RELEASE NOTES

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University Physics Volume 1

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Revision Number:
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Page Count Difference:
The page count in this revision is 977, down from 996 last revision. This difference is due to errata changes.

Errata:
Below is a table containing submitted errata and the resolutions that OpenStax has provided for this latest text.

Location	Detail	Resolution Notes	Error Type
Unit 1 Mechanics: Chapter 1 Units and Measurement: Section 1.1 The Scope and Scale of Physics	Problem #17 states: "A generation is about one-third of a lifetime. Approximately how many generations have passed since the year 0 AD?". There was in fact no year 0 AD; the Gregorian Calendar began with the year 1 AD.	Delete "AD" from the question stem.	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 1 Units and Measurement: Section 1.2 Units and Standards	A small grammatical error: In Figure 1.9, the text below the ruler says "Light travels a distance of 1 meter in 1/299,792,458 seconds". It should be "Light travels a distance of 1 meter in 1/299,792,458 of a second". This correct phrasing is also what is used in the figure caption and the text around the figure (but the figure itself	This figure will be updated.	Typo

	includes a version of the text with incorrect grammar).		
Unit 1 Mechanics: Chapter 1 Units and Measurement: Section 1.2 Units and Standards	"However this cylinder has lost..." change to "However, this cylinder has lost..." (add comma after However).	Add a comma after "However".	Typo
Unit 1 Mechanics: Chapter 1 Units and Measurement: Section 1.5 Estimates and Fermi Calculations	The sentence "Estimates also allow us perform 'sanity checks' on calculations..." is missing the word "to" before the word "perform."	Our reviewers accepted this change.	Typo
Unit 1 Mechanics: Chapter 1 Units and Measurement: Section 1.6 Significant Figures	Says: "Some examples of how discrepancies in data can be represented include taking half the range (that is, the biggest less the smallest) or finding the standard deviation of the measurements." Should say: "Some examples of how uncertainties in data can be represented include taking half the range (that is, the biggest less the smallest) or finding the standard deviation of the measurements."	Revise this sentence to "Some examples include taking the range (that is, the biggest less the smallest) or finding the standard deviation of the measurements."	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 1 Units and Measurement: Section	Example 1.7: (0.3 lb / 5.1 lb) * 100% should be 5.9% rounded to 6%, not 5.1% rounded to 6%	Revise "5.1" to "5.9".	Incorrect answer, calculation, or solution

1.6 Significant Figures			
Unit 1 Mechanics: Chapter 2 Vectors: Section 2.1 Scalars and Vectors	https://openstax.org/l/21compveccalc redirect is broken. Needs new link.	This link will be updated.	Broken link
Unit 1 Mechanics: Chapter 2 Vectors: Section 2.2 Coordinate Systems and Components of a Vector	The indices for beginning and end should be in roman not in italic; they are not variables in this case.	Remove italic formatting from indices.	General/pedagogical suggestion or question
Unit 1 Mechanics: Chapter 2 Vectors: Section 2.2 Coordinate Systems and Components of a Vector	In University Physics Volume 1, the answer key for "Check Your Understanding", 2.6, appears to be incorrect. The answer is stated as 2.6 $\vec{\mathbf{D}}$ =(−20m)$\mathbf{j}$, but the direction is west so it should be defined with i instead of j.	This issue was addressed in another report and is correct in webview.	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 2 Vectors: Section 2.2 Coordinate Systems and Components of a Vector	Shouldn't the answer be D=(-20m)i hat? Due west would be 20 cos(pi) which equals (-20m)i hat + 0 (20 sin(pi)).	Revise the j-hat to an i-hat in the solution.	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 2 Vectors: Section 2.2 Coordinate	Check Your Understanding 2.7: Rounding error in magnitude calculation of vector. sqrt(15^2+31.7^2+2.5^2) = 31.159, which should be	Revise "35.1" to "35.2" in the answer.	Incorrect answer, calculation, or solution

Systems and Components of a Vector	rounded to 31.2 whereas the answer key says 31.1.		
Unit 1 Mechanics: Chapter 2 Vectors: Section 2.2 Coordinate Systems and Components of a Vector	Problem #37: The solution seems to have been incorrectly multiplied by 10. Components cannot be larger than the magnitude 5.0 for the vector.	Revise the answer in part (b) from "30.09" to "3.01" and from "39.93" to "3.99".	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 2 Vectors: Section 2.2 Coordinate Systems and Components of a Vector	The directions of travel in Problem #38 are given as cardinal directions (west and north) but the problem says to assume that the +x-axis is horizontal to the right. The axis direction should be specified as a cardinal direction.	Revise the last sentence in the question stem to "Assume the +x-axis is to the east."	Typo
Unit 1 Mechanics: Chapter 2 Vectors: Section 2.3 Algebra of Vectors	One of the dogs used in Example 2.10 is named "Dug" this is spelled as "Dong" at the end of the example.	Our reviewers accepted this change.	Typo
Unit 1 Mechanics: Chapter 2 Vectors: Section 2.3 Algebra of Vectors	The answer listed for Problem #47 in the textbook and the instructor's manual is incorrect. The answer for b. should be -2(ihat) +2(jhat), which gives an angle of 135 degrees, or 45 degrees north of west.	Revise "45°" to "135°".	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 2 Vectors: Section 2.3 Algebra of Vectors	Problem #47 (b): The difference vector should be -2i + 2j	Revise to "−2i + 2j".	Incorrect answer, calculation, or solution

Unit 1 Mechanics: Chapter 2 Vectors: Section 2.3 Algebra of Vectors	Problem #47 (a): The solution for the angle theta should be 236 degrees.	Revise from "236.3" to "236".	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 2 Vectors: Section 2.4 Products of Vectors	Resulting from Error 7486 (https://openstax.org/errata/7486), in the online version, Figure 2.27 had "perpendicular" subscripts on A & B changed to "parallel," but the caption was *not* changed -- so caption mistakenly still has "perp" subscripts, but these need to be "parallel" subscripts. Also, unlike the online version, the *downloadable* PDF **still** has the wrong ("perp") subscripts in *both* figure & caption -- must be changed to "parallel" ("||") subscripts.	Revise "⊥" to "II" in the caption. The PDF will be updated at a later date.	Typo
Unit 1 Mechanics: Chapter 2 Vectors: Section 2.4 Products of Vectors	In the equation after "Now, substituting into Equation 2.34 gives angle θ:", the value for F should be 24.9ζ, not 18.2ζ. It was calculated three steps earlier.	Revise "18.2" to "24.9".	Typo
Unit 1 Mechanics: Chapter 2 Vectors: Answer Key	Part c.) of problem 63 in the Chapter 2 Review asks the reader to find the component of vector i^hat along vector F^arrow, and part d.) asks to find the component of vector F^arrow along vector i^hat. The answers to parts c.) and d.) are cos(210°) ≈ -0.866 and 20.0cos(210°) ≈ -17.3, respectively. The answer key, however, gives 0.866 for c.) and 17.32 for d.). The answer	Add a negative sign to the answers for c) and d).	Incorrect answer, calculation, or solution

	key's answers are correct only if one assumes F^arrow to have a direction angle of 30° or -30° measured counterclockwise from the +x-axis instead of 210° or -150° measured counterclockwise from the +x-axis as shown in the figure to which the problem refers.		
Unit 1 Mechanics: Chapter 3 Motion Along a Straight Line: Section 3.1 Position, Displacement, and Average Velocity	The problem asks for acceleration in meters per second. It should be meters per second squared.	Revise "meters per second" to "meters per second squared".	Typo
Unit 1 Mechanics: Chapter 3 Motion Along a Straight Line: Section 3.1 Position, Displacement, and Average Velocity	In the calculation for the total displacement of two separate movements, the book says: "The total displacement is 2 − 4 = −2 m to the left, or in the negative direction." I suggest to change the answer to either -2 m along the x-axis or stating that it's 2 m to the left.	Revise the sentence "The total displacement is..." to "The total displacement is 2 − 4 = −2 m along the x-axis."	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 3 Motion Along a Straight Line: Section 3.1	Problem #29 uses data from the Chelyabinsk fireball (meteor). Using the data provided, I got a speed of half the speed of sound for the "blast wave" -- which isn't even a shock wave since its half the speed of sound (which is	After the sentence beginning "The blast wave...", add "The blast wave traveled at 10° above the horizon." Revise the answer to part (b) to "163% the speed of sound at sea level or about Mach 2."	Incorrect answer, calculation, or solution

Position, Displacement, and Average Velocity	correct according to the OpenStax solution manual). The data is correct (23.5 km height and 2 min 30 seconds until it hit the town), but...that assumes the blast wave went straight down. It did not. The meteor traveled on a shallow angle (luckily since that let the atmosphere absorb most of the energy). Anyway, I looked at the smoke trail (picture attached from Wikipedia) and it looks like about a 10 degree angle. If you use the slant range instead of the height, you get something like 800 m/s or about Mach 2 --- which makes a LOT more sense for a "shock wave"..		
Unit 1 Mechanics: Chapter 3 Motion Along a Straight Line: Section 3.2 Instantaneous Velocity and Speed	Equation 3.7 is totally wrong expression to highlight because it has no general applicability. The correctness of the expression depends on the specific form of x(t), given in the paragraph before, *and* its applicability is so narrow that even in Examples 3.3 and 3.4 (for which I think Equation 3.7 was given a number), it is not directly applicable. Equation 3.7 technically only applies when x(t) takes the form of a single-term polynomial, a situation so narrow that it almost never happens except in constant-velocity motion (both Examples 3.3 and 3.4 involve polynomials with multiple terms). One way to fix it would be	Revise the sentence right before equation 3.7 to "If each term in the x(t) equation has the form of At^n where A is a constant and n is an integer, this can be differentiated using the power rule to be:" Then after the equation box, add the sentence "Note that if there are additional terms added together, this power rule of differentiation can be done multiple times and the solution is the sum of those terms." The equation will also be revised.	General/pedagogical suggestion or question

	rather than to try to give an expression for dx/dt (prone to so much misinterpretation), actually and directly state the power rule for differentiation, and in Examples 3.3 and 3.4, refer to that power rule (if necessary, reminding students that terms connected by addition can be broken up and differentiation rules applied separately), rather than trying to use a non-existent explicit formula for dx/dt.		
Unit 1 Mechanics: Chapter 3 Motion Along a Straight Line: Section 3.2 Instantaneous Velocity and Speed	Many equations are not aligned properly with their bounding boxes in the web view (see attached screenshot). The issue seems to occur particularly with short equations rather than large equation blocks. I expect this is a HTML/CSS error? Highlighted error is for equation 3.5 but it occurs fairly regularly. I found the issue using the Chrome browser on my laptop and also on my phone.	Thank you for reporting this! We've corrected this error, and the equations should now be aligned correctly in the most recent webview: https://cnx.org/contents/1Q9uMg_a@10.18:Ej8o3nbb@7/32-Instantaneous-Velocity-and-	Other
Unit 1 Mechanics: Chapter 3 Motion Along a Straight Line: Section 3.4 Motion with Constant Acceleration	The question uses the term 'decelerates' but in Chapter 3.3 on page 117 is says: "The term deceleration ...., so we don't use it". I agree and the term should be removed/changed in Example 3.7.	Revise "decelerates" to "accelerates opposite the motion". This will also be updated throughout the book.	General/pedagogical suggestion or question
Unit 1 Mechanics: Chapter 3	Two problems: 1) Somehow, the variables for position, velocity, and	Units will be added in the solution. Our reviewers	General/pedagogical

Motion Along a Straight Line: Section 3.4 Motion with Constant Acceleration	acceleration need to be distinguished between the two animals (cheetah and gazelle). There should be subscripts to identify each animal. 2) When numbers are plugged in at the end of step a and also in step b, the numbers do not include units. Units should be included, like they are earlier in this section in Example 3.12.	decided not to add subscript labels on each equation.	suggestion or question
Unit 1 Mechanics: Chapter 3 Motion Along a Straight Line: Section 3.4 Motion with Constant Acceleration	Problem #57 gives an initial and final velocity, and the time to achieve the final velocity. Although this allows the student to solve for the average acceleration (part a), there isn't enough information given to solve for the distance traveled (part b). Suggest adding "Assume constant acceleration." to part (b).	Revise (b) to "Assuming constant acceleration, how far does it travel in that time?"	General/pedagogical suggestion or question
Unit 1 Mechanics: Chapter 3 Motion Along a Straight Line: Section 3.4 Motion with Constant Acceleration	I'm glad Problem #44 was corrected, but it's now missing some spaces and the equations for x and t are in the wrong order. The second sentence should start "If x=0 at t=0,".	Revise the question to "A particle moves in a straight line with an initial velocity of 0 m/s and a constant acceleration of 30 m/s2. If x = 0 at t = 0, what is the particle’s position at t = 5 s?"	Typo
Unit 1 Mechanics: Chapter 3 Motion Along a Straight Line: Section 3.6 Finding Velocity and Displaceme	Part D of Example 3.17 is missing an exponent (should be a 3).	Revise "(6.3 s)" to "(6.3 s)^3".	Typo

nt from Acceleration			
Unit 1 Mechanics: Chapter 3 Motion Along a Straight Line: Section 3.6 Finding Velocity and Displaceme nt from Acceleration	In Check Your Understanding 3.8, the unit for the acceleration function needs to be specified more carefully. The expression "5-10t m/s^2" is not dimensionally consistent, as you cannot add a unitless quantity "5" to the quantity with unit of time "10t". The simplest way to fix it would be to add a note that "t" is the amount of time passed in seconds, although an overall better approach (one more consistent with physics textbook, not math textbook) would be to build an expression that is unit-consistent in a self-contained way, something like "(5 s - 10 t) m/s^3" (in a similar way to the example immediately above Check Your Understanding 3.8 ... at least at the beginning, although the solution gets sloppy with units).	The expression will be revised.	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 3 Motion Along a Straight Line: Section 3.6 Finding Velocity and Displaceme nt from Acceleration	Check Your Understanding 3.8: In this problem students need to make the unstated assumption that the bike and person were at the same place at t=0, and thus covered the same displacement. This should be more clear.	Revise to "A bicycle has a constant velocity of 10 m/s. A person starts from rest and begins to run to catch up to the bicycle in 30 s when the bicycle is at the same position as the person. What is the acceleration of the person?"	General/ped agogical suggestion or question
Unit 1 Mechanics: Chapter 3	In problem 97, I suggest to replace "her average speed at this position is 8 m/s" with "her	Delete "average" from the question stem.	General/ped agogical

Motion Along a Straight Line: Additional Problems	speed at this position is 8 m/s". The term "average speed" suggests it was calculated based on eq. (3.3) over some unknown elapsed time; e.g. my students tried to assume the elapsed time was related to the distance to the finish line, or to the point where the runner stops.		suggestion or question
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions	I do not like the line break with a unit as, for example, in problems 54 and 59 where the velocity unit has "m/" in one line and "s" in the next line. This could be a general problem but I didn't find it in other Chapters, while quickly searching.	This will be addressed in the next PDF release.	General/pedagogical suggestion or question
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.1 Displacement and Velocity Vectors	Check your understanding problems in chapter 4 of the textbook. The answer in the back of the book is wrong. The problem is CYU 4.1. The question asks for the average velocity between 2s and 4s and the book sets up the equation correctly as r(t2)-r(t1)/t2-t1, however the numerical values for the answer given would be for if you had computed v(t2)-v(t1)/t2-t1. the correct answer is v_avg=(3.0(4)^3 i + 4.0 j)-(3.0(2)^3i+4.0j)/(4s-2s)=84i m/s. However the book shows (144.0i-36i)/(2.0s). 144 and 36 are what you would get if you plugged t2 and t1 in for the VELOCITY function (v=9t^2 i).	This issue was addressed in another report and has been corrected.	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 4	Problem #19 reads "The 18th hole at Pebble Beach Golf Course is a dogleg to the left of	Revise "from the tee" to "from where it started".	General/pedagogical

Motion in Two and Three Dimensions: Section 4.1 Displacement and Velocity Vectors	length 496.0 m. The fairway off the tee is taken to be the x direction. A golfer hits his tee shot a distance of 300.0 m, corresponding to a displacement... What is the final displacement of the golf ball from the tee?" This assumes a level of familiarity with golf that some students do not have. The required knowledge is that the tee shot originates from the tee. Why not pose the question "What is the final displacement of the golf ball from where it started?"		suggestion or question
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.1 Displacement and Velocity Vectors	The solution to part (b) of "Check your understanding 4.1" is incorrect. The solution correctly sets up the calculation of average velocity as displacement (change in position) divided by time interval, but in evaluating the two positions, the solution uses the velocities at those times, instead. The correct answer should be (84 m/s) ihat. I have posted a PDF with the correct solution.	Revise "144.0" to "188", "36.0" to "20", and "54.0" to "84".	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.1 Displacement and	Example 4.1: Although the overall calculation would be correct, the x-component for vector r(t2) should be expressed in terms of angle -45 deg and not +45 deg, i.e. cos(-45), to match the expression for the y-component and Figure 4.4.	Revise "(cos 45°)" to "(cos(−45°))".	Typo

Velocity Vectors			
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.2 Acceleration Vector	The colored dots should be explained in the caption. The motion is explained but which color defines which aspect would be helpful.	In the caption, add "as shown with blue dots" to the end of the first sentence. Add "with red stars" to the end of the second sentence. The figure will also be updated to revise the red dots to stars.	General/pedagogical suggestion or question
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.2 Acceleration Vector	Problem #29: The solution for the speed at 3 seconds should be 190 m/s.	Revise from "199.0" to "190.0".	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.3 Projectile Motion	The final angle had been corrected from last year, but now the minus sign is missing.	Add "below the horizon" after 36.9°.	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.3 Projectile Motion	The solution at the back of the textbook calculates the angle at which the time of flight of the ball is the same as it takes a receiver to run between two points, for a specified launch velocity (20.0 m/s), where it is to be caught. However, with the specified launch velocity, the ball lands at x = 20.5m at this time, not at x=20.0m (where the receiver is specified	Revise the question stem to: " 1. Aaron Rodgers throws a football at 20.0 m/s to his wide receiver, who is running straight down the field at 9.4 m/s. If Aaron throws the football when the wide receiver is 10.0 m in front of him, (a) at what angle does Aaron have to launch the ball at so the ball will be at the same height as the receiver	Incorrect answer, calculation, or solution

	to be). Hence, the ball is not caught by the runner, the ball was overthrown. In this problem, the ball's velocity cannot be given as a free parameter if the problem also specifies where and when it is to be caught. The problem should therefore be revised so that the student either calculates both the launch angle and velocity necessary to hit the receiver (this makes the problem somewhat more complicated problem than other problems in this section) OR, it should be modified so that the student is asked whether or not the receiver catches the ball (given the launch velocity), the answer to which is "NO".	when the receiver makes it to 20.0 m in front of Aaron? (b) Will the receiver be able to catch the ball?" Update the answer to include: "(b) x = (v_0^2sin(2θ))/g = 21 m Therefore, the ball will be overthrown, and the receiver will not be able to catch it."	
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.3 Projectile Motion	In Example 4.8 in "Significance", it should say "lands 10.0 m above its starting altitude" not "lands 10.0 m below its starting altitude". The example describes a ball landing 10 m above where it starts.	Revise to "10.0 m above".	Typo
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.3 Projectile Motion	In the "Problem-Solving Strategy: Projectile Motion" box, the symbol theta is used in two different senses. In Step #1, theta is used to indicate the angle of velocity vector, while in Step #4, theta is used to indicate the angle of displacement vector. These two angles are not the same, and the potential for confusion	Figure 4.11 and the related text will be updated to use phi instead of theta.	General/pedagogical suggestion or question

	is quite substantial, especially when the same symbol is used for both. The confusion might be solved in a few different ways. Figure 4.12 already uses theta_0 (although, that's the angle of initial velocity, not velocity as a function of time), which could be used to refer to the angle in Step #1. I think it would be better to use a different letter altogether. theta was already used in Figure 4.11 to refer to angle of displacement vector; perhaps phi should be used for angle of velocity vector (this would require changes in Figure 4.12 as well, and possibly changes throughout the section, if you want to ensure consistency through the section---although I think consistency through one boxed text and associated graphic is enough).		
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.3 Projectile Motion	Please refer to Example 4.8. It is: initial vertical velocity of 21.2 m/s and lands 10.0 m below its starting altitude spends 3.79 s in the air. There is a mistake in this line. It must be: initial vertical velocity of 21.2 m/s and lands 10.0 m above its starting altitude spends 3.79 s in the air.	Revise "lands 10.0 m below its starting altitude" to "lands 10.0 m above its starting altitude".	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions:	The answer listed for Problem #39, part d) in the textbook at instructor solutions manual is incorrect. The correct answer for part d) is 2550 i-hat + 378 j-hat m.	The solution to part d will be revised.	Incorrect answer, calculation, or solution

Section 4.3 Projectile Motion			
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.3 Projectile Motion	Problem #8: the vectors v and a (in parts b and c) should be in boldface with arrows above like other vector symbols. If you make that change, you might be able to write "v" rather than "the vector v" and "a" rather than "the vector a".	Our reviewers accepted this change.	Typo
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.3 Projectile Motion	Problem #59: As a student pointed out, the position of the quarterback is not given, and the football fans among our students will know that the quarterback is unlikely to throw the ball from the same "yard line" that the wide receiver started from. One solution would be "Aaron Rodgers throws the football at 20 m/s to his wide receiver, who is running straight down the field at 9.4 m/s. If Aaron throws the football when the receiver is 10.0 m in front of him, what angle does Aaron have to launch the ball at so the receiver catches it 20.0 m in front of Aaron?"	Revise the question to "Aaron Rogers throws a football at 20.0 m/s to his wide receiver, who is running straight down the field at 9.4 m/s. If Aaron throws the football when the wide receiver is 10.0 m in front of him, what angle does Aaron have to launch the ball at so the receiver catches it 20.0 m in front of Aaron?"	General/pedagogical suggestion or question
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.3 Projectile Motion	Figure 4.12: in a) Projectile Motion the Vx and Vy vectors don't sum to the V vector. They're close but visually you can see they're too long.	This figure will be updated.	Other

Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.3 Projectile Motion	The answer to Problem #39, part (d) seems wrong. I got the same horizontal displacement, 2545.5m, but my students (and I) got a value of 367.5m for the vertical displacement at 15s.	Revise the answer to part (d): "x = 169.7 m/s (15.0 s) = 2545.5 m", "y = (98.0 m/s)(15.0 s) – 4.9(15.0s) 2 = 367.5 m", and revise "465" to "367".	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.4 Uniform Circular Motion	The tangential acceleration vector is mislabeled "a_r" instead of "a_T" (two locations)	This issue was addressed in another report and is correct in webview.	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.4 Uniform Circular Motion	In Chapter 6.3 the text refers to centripetal acceleration as a_c, with a lowercase c as the subscript. In Chapter 4.4 on Uniform Circular Motion, the centripetal acceleration is a_C, with an uppercase C as the subscript. These two references to centripetal acceleration should be consistent. I know that the difference between uppercase C and lowercase c is not much, but it is enough to be confusing to the students, particularly when they are preparing for a test covering both chapters. Please fix this.	The capitalized Cs will be updated to lowercase c.	Typo
Unit 1 Mechanics: Chapter 4 Motion in Two and	Throughout the section you call the components of the acceleration a_C and a_T, but in Figure 4.22 and Example 4.12, you refer to the	Figures 4.22 and 4.23 will be updated to use T instead of r.	Typo

Three Dimensions: Section 4.4 Uniform Circular Motion	tangential acceleration component as a_r. This is very confusing because it is inconsistent and it does not even refer to the radial component (which is a_C in your notation). Please fix this.		
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.4 Uniform Circular Motion	The magnitude for the x-direction vector should be 4787 km not 4797 km. 4787 km is used in example 4.1.	This figure will be updated.	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Section 4.5 Relative Motion in One and Two Dimensions	For Problem #70, the sentence ending "." of the first sentence should not be in the new line.	This will be addressed in the next PDF release.	Typo
Unit 1 Mechanics: Chapter 4 Motion in Two and Three Dimensions: Additional Problems	Problem #87 needs to say that at t=0, the particle is on the x axis and that it's moving counterclockwise in the xy plane (or around the z axis).	Revise "...t = 0 s." to "...t = 0 s where it is on the x-axis and moving counterclockwise in the xy plane."	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 5 Newton's	Customer Support submitting errata, Case # 39523 Suggested Correction:	Revise "1.00 × 10^3" to "1.00 × 10^2".	Typo

Laws of Motion: Section 5.3 Newton's Second Law	I came across a typo in Problem #36. In Chapter 5 (Newton's Laws of Motion) on problem 36, it says that an SUV is traveling at 1.00x10^3 km/h, which works out to be about 621 miles per hour. I checked all of the copies of this textbook, the hardcover print, the online pdf, and the iphone app and they all say the same number. The only one that is different is on the textbook answers page that is given to the instructors, the problem is repeated the same way but in the calculation of the answer, it uses 100 km/h.		
Unit 1 Mechanics: Chapter 5 Newton's Laws of Motion: Section 5.4 Mass and Weight	I suggest to move the second interactive simulation "Use this interactive simulation to move the Sun, Earth, Moon, and space station to see the effects on their gravitational forces and orbital paths." to Chapter 13.	Move this simulation to Chapter 13.4.	General/pedagogical suggestion or question
Unit 1 Mechanics: Chapter 5 Newton's Laws of Motion: Section 5.4 Mass and Weight	Problem #47 states "A body with a mass of 10.0 kg is assumed to be in the Earth's gravitational field with g = 9.80 m/s^2. What is its acceleration?" If the body is in freefall, the acceleration should be 9.8m/s^2. The answer given, 0.6i -8.4j, makes no sense unless there is an additional constraint, such as being on a ramp.	Revise the last sentence in the question to "What is the net force on the body if there are no other external forces acting on the object?" and revise the answer to "98 N".	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 5	Problem #57 has already been revised once. The new version, visible online Fall 2020, reads:	Revise the question to: "A team of nine members each engage in a tug-of-war, pulling	Incorrect answer,

Newton's Laws of Motion: Section 5.6 Common Forces	"A team of nine members on a tall building tug on a string attached to a large boulder on an icy surface. The boulder has a mass of 200 kg and is tugged with a force of 2350 N. (a) What is magnitude of the acceleration? (b) What force would be required to produce a constant velocity?" The suggested solution to this problem, indicated in Errata revision 9847, is: "Revise the answer to: a. 1.95 m/s^2 b. 1960 N" It is unclear why nine members (of what group?) are involved in this problem, and what the height of the building is, which is presumably some height above an icy surface. Is the force applied along the angle of the rope (in which case we need to know the height or angle of the rope to identify the horizontal component of Force applied)? The "icy surface" implies a surface of negligible friction, in which case there is no way a force applied can produce a constant velocity. The previous tug-of-war problem had some issues, easily fixed by specifying a force of friction for each team. Consider restoring that problem as follows: "Two teams of nine members	in opposite directions on a horizontal rope. Each of the first team's members has an average mass of 68 kg and exerts an average force of 1350 N horizontally on the ground as they pull on the rope. Each of the second team's members has an average mass of 73 kg and exerts an average force of 1365 N horizontally on the ground as they pull on the rope in the opposite direction. (a) What is magnitude of the acceleration of the two teams, and which team wins? (b) What is the tension in the section of rope between the teams?" The answer will also be updated.	calculation, or solution

	each engage in a tug-of-war, pulling in opposite directions on a horizontal rope. Each of the first team's members has an average mass of 68 kg and exerts an average force of 1350 N horizontally on the ground as they pull on the rope. Each of the second team's members has an average mass of 73 kg and exerts an average force of 1365 N horizontally on the ground as they pull on the rope in the opposite direction. (a) What is magnitude of the acceleration of the two teams, and which team wins? (b) What is the tension in the section of rope between the teams? Answers: (a) 0.106 m/s^2 in the direction of team 2. Team 2 wins the tug-of-war. (b) Tension = 1.22 x 10^4 N.		
Unit 1 Mechanics: Chapter 5 Newton's Laws of Motion: Section 5.6 Common Forces	During the calculation, assuming no friction, the first equation within the floating text on page 239 needs to be corrected. The minus sign should be an equal sign.	Revise " − mg" to "= mg".	Typo
Unit 1 Mechanics: Chapter 5 Newton's Laws of Motion: Section 5.6 Common Forces	In the section on normal forces, just before check your understanding 5.8, it has an outline of the trigonometry used to find the components of weight. In the text part, it says "Wy = w cos(theta) = mg sin(theta)" This sin part should be a cos. It has the correct	Revise "sin" in the first line to "cos".	Typo

	version in Figure 5.23, but the text version is incorrect.		
Unit 1 Mechanics: Chapter 5 Newton's Laws of Motion: Section 5.6 Common Forces	I believe Problem #57 is insoluble. The forces the tug-of-war teams are exerting are given, but what are they exerting the forces on? Not each other, because the forces are unequal, so that would violate Newton's Third Law. Furthermore, neither team's acceleration can be found from the force on it because we don't know their friction with the ground. If the teams are exerting those forces on the rope, the acceleration can't be found because the mass of the rope isn't given. In practice, friction with the ground is crucial in tug-of-war. If this problem can be saved, maybe it's by giving the frictional force on one team or both.	Revise this question to: A team of nine members on a tall building tug on a string attached to a large boulder on an icy surface. The boulder has a mass of 200 kg and is tugged with a force of 2350 N. (a) What is magnitude of the acceleration? (b) What force would be required to produce a constant velocity? Revise the answer to: a. 1.95 m/s^2 b. 1960 N	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 5 Newton's Laws of Motion: Section 5.7 Drawing Free-Body Diagrams	The Free-Body diagram for mass m1 is not correct. The Normal Force N should point up and the gravitational force m1g should point down.nAlso, the solution incorrectly states that the acceleration vectors a1 and a2 are equal, however they point in different directions. The magnitudes of the accelerations are equal, but not the vectors.	This figure was updated in errata 6454. The text in the Significance section will be updated to "...assuming the string remains taut, the magnitudes of acceleration are equal. Thus, we have have |a→|_1 = |a→|_2 . If..."	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 5 Newton's Laws of Motion: Section 5.7	In Example 5.16, the first figure under the "Solution" heading has the labels on the vertical vectors reversed. The labels N and m_1 g should be swapped, so that the normal force points	This figure will be updated.	Typo

Drawing Free-Body Diagrams	upward and the weight downward.		
Unit 1 Mechanics: Chapter 5 Newton's Laws of Motion: Additional Problems	The answer to Problem #83 is inconsistent. The work shows the answer as 2mk^2x^3, but then reports it as 2mk^2x^2. "F=2mk2x2; First, take the derivative of the velocity function to obtain a=2kxv=2kx(kx2)=2k2x3. Then apply Newton's second law F=ma=2mk2x2."	This is corrected in webview and the solution guide.	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 5 Newton's Laws of Motion: Additional Problems	I believe there is an error in the answer to problem 79, an "additional problem" of chapter 5. I believe the error arises from flipping, or exchanging out the x and y components of the F3 vector when finding your net force, which leads to an erroneous acceleration answer. service ticket #23312	This solution will be updated.	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 6 Applications of Newton's Laws: Section 6.1 Solving Problems with Newton's Laws	Example 6.7: The second sentence seems to be missing the symbol(s) "Δv=" right after "and" to complete the equation referenced. The picture attached shows the correction annotated in red (for my reference).	Add "Δv=" after "and".	Typo
Unit 1 Mechanics: Chapter 6 Applications of Newton's	Submitted by Customer Support on behalf of user, Case 52312 "I'm going through the	This problem and the previous problem intend for students to look up the coefficient of friction of ice from Table 6.1 in the textbook. Add the	Incorrect answer, calculation, or solution

Laws: Section 6.2 Friction	homework questions in chapter 6, and I feel that the coefficient of friction is not stated in problem #63 part (a). If you use the solution for F (which is what you're trying to solve for), you end up with a value of mu = 0.100."	following sentence to questions 62a and 63a: The coefficient of friction of ice can be found in Table 6.1.	
Unit 1 Mechanics: Chapter 6 Applications of Newton's Laws: Section 6.2 Friction	In the description of Figure 6.14, in the PDF textbook, on page 287, there is a statement that "However, f⃗ is equal to w⃗ x in magnitude, so there is a constant velocity down the slope (along the x-axis)." This suggests that there is constant velocity because "f⃗ is equal to w⃗ x" , and by calculating w⃗ x via the values (w x vector = mg sin theta = 9.80 m/s^2 (62 kg) sin 25, which equals about 257 newtons. This is not equal to the frictional force 45.0 newtons, and so this detail is wrong. The rest of the example is correct. These errors are also present in the print version of the textbook, although that version is slightly older and does not completely reflect the PDF version.	Delete the sentence "However, f → is equal to..."	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 6 Applications of Newton's Laws: Section 6.2 Friction	Notation inconsistency. P with a vector sign above denotes the vector of the pushing force. Stating that fs=P-vector is incorrect; fs=P (the magnitude, without the vector arrow). P-vector cannot be used as a scalar in an equation; it should be replaced by the magnitude.	Add an i-hat to the end of all the forces. Also remove the vector on the P term in the equation right before the Significance section.	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 6	Example 6.12: I believe the notation/label for the down force acting on the	This figure will be updated.	Typo

Applications of Newton's Laws: Section 6.2 Friction	turquoise/vertical/top block should be "19.6 N" or "19 Newtons", and not the vector N.		
Unit 1 Mechanics: Chapter 6 Applications of Newton's Laws: Section 6.2 Friction	The reference to Example 6.10 should be Example 6.11. Picture attached shows annotation in red for my reference.	Our reviewers accepted this change.	Typo
Unit 1 Mechanics: Chapter 6 Applications of Newton's Laws: Section 6.2 Friction	In Example 6.12, the force diagram for the 2.0 kg mass has a weight vector labelled 19.6 vector-N, but this should be 19.6 Newtons (no vector hat on the N, it is a unit). A unit vector j could be used to keep the vector notation, -19.6 N hat-j, though in examples 6.13 and 6.14 the vector notation is simply omitted.	This figure will be updated.	Typo
Unit 1 Mechanics: Chapter 6 Applications of Newton's Laws: Section 6.3 Centripetal Force	Figure 6.28, (c) should show counterclockwise rotation in the dark blue (currently is clockwise)	This figure will be updated.	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 6 Applications of Newton's Laws: Section 6.3 Centripetal Force	Problem #72: The online version and ISM has only one question. The printed book has a), b), and c). b) and c) deal with energy which should not be asked at that point. Therefore, removing part b) and c) from the question in the book would be correct.	Our reviewers accepted this change.	Other factual inaccuracy in content

Unit 1 Mechanics: Chapter 6 Applications of Newton's Laws: Section 6.3 Centripetal Force	/l/21carousel is broken	This link will be updated.	Broken link
Unit 1 Mechanics: Chapter 6 Applications of Newton's Laws: Section 6.4 Drag Force and Terminal Speed	Problems 90-98 have no connection with drag forces. They should be moved to the appropriate earlier sections or to Additional Problems.	Move questions 90-98 to the Additional Problems section.	General/pedagogical suggestion or question
Unit 1 Mechanics: Chapter 6 Applications of Newton's Laws: Additional Problems	Problem #115 uses a phrase "rotational velocity" and then gives a quantity in units of cm/s. Here, "tangential velocity" or simply "speed" might be more appropriate. "Rotational velocity" is too close to "angular velocity", so it might be mistaken omega, and while students can figure it out from the given unit (that it is linear velocity), it causes an unnecessary confusion.	Revise "rotational" to "tangential".	Typo
Unit 1 Mechanics: Chapter 7 Work and Kinetic Energy: Section 7.1 Work	In problem #42, there are two points referenced, (3,4) and (8,6). As such, the problem becomes practically unsolvable. However, if the second point is switched to (6,8), the problem, while still challenging, becomes solvable. With such a switch, the answer would be 15 J.	The force will be updated in this problem, and revise the second point from "(8 m, 6 m)" to "(6 m, 8 m)".	Typo

Unit 1 Mechanics: Chapter 7 Work and Kinetic Energy: Section 7.1 Work	Problem #42: Provided solutions state 5 Joules as final answer; I can only match that if I assume a typo in the provided ordered pairs (the two points). Works out fine if they are (3, 4) and (6, 8) instead of (3, 4) and (8, 6).	Revise "(8 m, 6 m)" to "(6 m, 8 m)".	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 7 Work and Kinetic Energy: Section 7.1 Work	Problem #39 Bungee cord problem, 5th line, "...and for 4.88 m <= x... " This is confusing as stated. Would prefer it said "and for x >= 4.88m, of k2 =111 N/m".	Revise "4.88 m ≤ x" to "x ≥ 4.88 m".	Typo
Unit 1 Mechanics: Chapter 7 Work and Kinetic Energy: Section 7.3 Work-Energy Theorum	The picture in Example 7.10 incorrectly shows a firearm cartridge flying through and striking a bullet stop made of boards. A cartridge is an ammunition assembly packaging a projectile(s) (i.e. bullet, shot or slug), a propellant, and an ignition device all within a case. When fired, only the projectile(s) exits the barrel and strikes the target, while the case is discarded from the firearm.	Delete "from a 0.22LR-caliber cartridge" from the first sentence.	Typo
Unit 1 Mechanics: Chapter 7 Work and Kinetic Energy: Section 7.3 Work-Energy Theorem	The equation in the solution currently reads: N = –mgR + (m v_2^2)/R = (–mg + 2mg(y_1–R)) / R > 0. This is wrong. It should read: N = –mg + (m v_2^2)/R = (–mgR + 2mg(y_1–R)) / R > 0.	Revise the equation on the left to: N = −mg + (mv_2^2)/R = (−mgR + 2mg(y_1 − R)) / R > 0.	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 7 Work and	Problem #61 has 'constant' twice: "When a 3.0-kg block is pushed against a massless	Delete one of the instances of "constant".	Typo

Kinetic Energy: Section 7.3 Work-Energy Theorem	spring of force constant constant..."		
Unit 1 Mechanics: Chapter 7 Work and Kinetic Energy: Section 7.3 Work-Energy Theorem	From customer: "Instead of writing (-mg+mv_2^2)/R it should be (-Rmg+mv_2^2)/R."	Revise "–mg" to "–mgR".	Typo
Unit 1 Mechanics: Chapter 7 Work and Kinetic Energy: Section 7.3 Work-Energy Theorem	The solution to Example 7.9 has a step where there's a term that goes as [-mg + mv^2]/R. The units on that are wrong. The term should go as -mg + mv^2/R.	Revise this term in the solution to "–mg + mv^2/R".	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 7 Work and Kinetic Energy: Section 7.4 Power	The analysis of example 7.12 in openstax is incorrect. (This is the example finding the average power during pull ups.) The man is moving slowly and so his acceleration can be taken to be zero. The force he applies must balance his weight, so this force points directly up and is almost constant. The power is P=F . v. So the average power in one cycle (of up and down) is <P> = F . <v>, Here <...> means "average".	Revise the example to "An 80-kg army trainee does pull-ups on a horizontal bar (Figure 7.14). It takes the trainee 0.8 seconds to raise the body from a lower position to where the chin is above the bar. How much power do the trainee's muscles supply moving his body from the lower position to where the chin is above the bar? (Hint: Make reasonable estimates for any quantities needed.)" Delete "(If you lift and lower yourself at constant speed, the force you exert cancels gravity	Incorrect answer, calculation, or solution

	But in a cycle, the initial and final positions are the same in a cycle, meaning that the average velocity is 0. Therefore the average power in a cycle is also zero! Now the power expended by the man is different than the power expended by the force your muscles are expending. Think of the man holding his chin above the bar. This takes a lot of power! But the man isn't moving at all, so the power due to the force he's exerting is zero (Fv= F 0 = 0). If instead you considered the man sitting on the bar, you can see that in that case, he's not expending much any power at all. It's the same for a heavy weight resting on a table. No power is expended by the table, but if a human were to hold the same box, they'd be expending a lot of power. There are a lot of internal processes going on in a muscle to keep an object up that expend energy even if the object isn't moving. Think about trying to start up hill with a manual transmission. The power expended by the force supplied by the car to the wheels is zero. But the engine is revving and a lot of energy is being consumed. The solution to this problem in openstax seems to have made the mistake of thinking that P=F . v = | F.v|. That's not true.	over the whole pull-up cycle.) Thus, the work done by the trainee’s muscles (moving, but not accelerating, his body) for a complete repetition (up and down) is 2mgΔy." Revise the equation in the solution.	

	Another way to think about this is to replace the man by a hanging mass and spring, with no energy dissipation. The average power expended by the spring in a cycle is zero, as energy is conserved. If you want to insist that the man is expending power going down, and that's what was meant, it certainly is not the same as the power going up. In fact, the man holding himself in place will be exerting at least the amount of power as him going down.		
Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Section 8.1 Potential Energy of a System	The integration of -W should be 1/3*3(N/m^2)x^3, instead of the x^2.	This issue was addressed in another report and is correct in webview.	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Section 8.1 Potential Energy of a System	On page 365 the 2nd equation has brackets around (1/2ky)^2 and they should only be around the y variable. The same thing twice again on page 386, Example 8.4.	Revise "((1/2)ky_c)^2" to "(1/2)k(y_c)^2".	Typo
Unit 1 Mechanics: Chapter 8 Potential	In the equation for conservation of energy with respect to the y-axis, the equation for potential energy	Revise the end of the right side of the equation to "+ 1/2k(y_c)^2".	Other factual inaccuracy in content

Energy and Conservation of Energy: Section 8.1 Potential Energy of a System	along a spring (right side of the equation) at point Yc is incorrect, as the entire expression was squared as opposed to squaring only the variable Yc, which was done in Equation 8.7. I have attached a screenshot with the correction made to the error.		
Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Section 8.1 Potential Energy of a System	The caption in Figure 8.4 states "..with the y-axis pointing downwards". I would interpret this to mean that y is becoming positive as the mass falls, and the gravitational potential energy would need to be U = -m g y. This disagrees with the way the problem is solved below the figure where the final (lowest) position of the mass is negative. In all cases where "m g y" is the gravitational potential energy, y must be positive pointing away from the Earth.	Revise the first sentence in the caption to "A vertical mass-spring system, with the positive y-axis pointing upward."	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Section 8.1 Potential Energy of a System	The following statement under "Systems of Particles", "...parts of the system are either so big (like Earth, compared to an object on its surface) or so small (like a massless spring), that the changes those parts undergo are negligible IF included in the system (emphasis mine)" confuses the distinction between work and potential energy, and disagree with the text further on. To be considered as a potential energy, the Earth and/or springs must be included in the system. I would suggest changing this to "when", or something similar.	Revise "changes those parts undergo are negligible if" to "changes those parts undergo are negligible when".	General/pedagogical suggestion or question

Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Section 8.1 Potential Energy of a System	In equation 8.3 and the sentence before this, a minus sign is missing. The textbook states: As long as there is no friction or air resistance, the change in kinetic energy of the football equals the change in gravitational potential energy of the football. This can be generalized to any potential energy: ΔK_AB = Δ_UAB. (8.3) This is not correct. The change in kinetic energy is minus the change in potential energy (or the sum of the change in kinetic energy plus the change in potential energy is zero).	Revise the sentences before the equation to "As long as there is no friction or air resistance, the change in kinetic energy of the football equals negative of the change in gravitational potential energy of the football. This can be generalized to any potential energy:" and also add a minus sign before ΔU_AB.	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Section 8.1 Potential Energy of a System	The equation for conservation of energy, specifically the spring component of Uc is incorrect. It should be 0.5 k y^2, not (0.5 k y)^2.	Revise the second line of the equation to "0 = 0 + mgy_C + 1/2 ky_C^2".	Typo
Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Section 8.1 Potential Energy of a System	Example 8.4 has a few errors: I. The equations for solution to part b have a couple of errors. 1) The product inside the squared parenthesis on the second equation for potential energy at point B should be divided by 2, not 6. 2) This would yield a result of positive 0.12 J, not negative.	This example will be updated to revise these errors.	Incorrect answer, calculation, or solution

	II. Also, the equation for K for the solution to part C is missing the square of the velocity, i.e. K = (mV^2)/2.		
Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Section 8.1 Potential Energy of a System	The word "energy" is misspelled the first time in step 3 of Figure 8.2.	This figure will be updated.	Typo
Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Section 8.2 Conservative and Non-Conservative Forces	Problem #27: When providing the classic Lennard-Jones potential, the terms should have opposite signs. This way the equilibrium separation distance is a positive value under a sixth-root (no complex solutions). As is, the question and answer are correct, but don't seem to reflect what students would expect if they researched the Lennard-Jones potential. Also, perhaps it would be nice to have students graph the potential?	Revise the question to delete the negative sign before "a/x" and revise "seperation" to "separation". Also delete the negative sign before "2a" in the answer.	General/pedagogical suggestion or question
Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Section 8.2 Conservative and Non-Conservative Forces	Problem #25: For part b), defining the potential energy from x = infinity would be impossible since the force diverges on that limit. Perhaps the force was meant to be X^-2?	Delete part b) from this question.	Incorrect answer, calculation, or solution

Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Section 8.3 Conservation of Energy	In the right hand side of Equation 8.14, the numerator should be dx (instead of dt)	Our reviewers accepted this change.	Typo
Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Section 8.3 Conservation of Energy	Problem #44: First, the answer is 6w, not 8w. I found this in an old book: https://books.google.com/books?id=9Go7AQAAIAAJ&pg=PA295 (and I checked it for a specific case). Second, the assumption that "the ball's speed is zero as it sails over the top of the circle" is impossible. If the ball's speed is 0 at that point, it will simply fall straight down. In fact, if the ball is moving so slowly that its speed would be 0 at the top, it will never reach the top. Before it gets to that point, it will be going too slowly to stay on the circular path. The minimum speed at the top for the ball to stay on the circular path is sqrt{rg} (giving a *tension* at the top of 0). The answer 6w is true in general as long as the speed at the top is greater than or equal to the minimum, but if you want to make the problem more specific so students can use a number instead of v, you could give the speed at the	Revise the problem to "A small ball is tied to a string and set rotating with negligible friction in a vertical circle. If the ball moves over the top of the circle at its slowest possible speed (so that the tension in the string is negligible), what is the tension in the string at the bottom of the circle, assuming there is no additional energy added to the ball during rotation?"	Other factual inaccuracy in content

	top, maybe as sqrt{rg} or some multiple of it.		
Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Section 8.5 Sources of Energy	Problem #65 needs to specify that the initial position of the block is where the spring is not stretched or compressed, that is, when its length is the equilibrium length when it's horizontal. The only way I could tell that was by looking at the answer.	Revise the first sentence in the question to "A block of mass 200 g is attached at the end of a massless spring at equilibrium length of spring constant 50 N/cm."	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Additional Problems	Problem #76: Correct "surfarce" to "surface".	Our reviewers accepted this change.	Typo
Unit 1 Mechanics: Chapter 8 Potential Energy and Conservation of Energy: Additional Problems	It is stated that v2 = (m/m)+M(v1). I believe that the parentheses are misplaced. Using conservation of linear momentum for inelastic collisions, it should be written as v2=[m/(m+M)]v1.	This issue was addressed in another report and is correct in the most recent version.	Typo
Unit 1 Mechanics: Chapter 9 Linear Momentum and Collisions: Section 9.2 Impulse and Collisions	Example 9.3: Captain Kirk never flew the starship you show in the image, that is the Enterprise-E. Either change the text to involve Mr. Data, and Captain Picard, OR Change the image to a picture of the Enterprise from JJ Abrams' 2009 movie. Yes, this is very important to me.	Revise the text “'Mister Sulu, take us out; ahead one-quarter impulse.' With this command, Captain Kirk of the starship Enterprise (Figure 9.11) has his ship start from..." to "When Captain Picard commands, "Take us out; ahead one-quarter impulse," the starship Enterprise (Figure 9.11) starts from..."	Other factual inaccuracy in content

Unit 1 Mechanics: Chapter 9 Linear Momentum and Collisions: Section 9.3 Conservation of Linear Momentum	The solution for part a) is asking for the change of momentum. Hence, the last sentence preluding the answer should state "Thus, the ball's change of momentum during the bounce is", not velocity.	Revise "the ball's change of velocity" to "the ball's change of momentum".	Typo
Unit 1 Mechanics: Chapter 9 Linear Momentum and Collisions: Section 9.3 Conservation of Linear Momentum	Figure 9.14: Momentum vector label p3 in the caption should instead be p2 as in the figure.	Revise the subscript 3 after p to 2.	Typo
Unit 1 Mechanics: Chapter 9 Linear Momentum and Collisions: Section 9.4 Types of Collisions	The subscripts used in the diagram is reversed in the solution.	This issue was addressed in another report and is correct in webview.	Typo
Unit 1 Mechanics: Chapter 9 Linear Momentum and Collisions: Section 9.4 Types of Collisions	The definition of "perfectly inelastic" is incorrect (or at least different than every other text definition). OpenStax says: In the extreme case, multiple objects collide, stick together, and remain motionless after the collision. Since the objects are all motionless after the collision, the final kinetic energy is also zero; the loss of	Revise the paragraph starting "In the extreme case..." to "Any collision where the objects stick together will result in the maximum loss of kinetic energy (i.e., Kf will be a minimum). Such a collision is called perfectly inelastic. In the extreme case, multiple objects collide, stick together, and remain motionless after the collision. Since the objects are	Other factual inaccuracy in content

	kinetic energy is a maximum. Such a collision is said to be perfectly inelastic. • If 0<Kf <Ki, the collision is inelastic. • If Kf =0, the collision is perfectly inelastic. • If Kf =Ki, the collision is elastic. This implies perfectly inelastic is ONLY when both objects stick together AND STOP. In all other texts, perfectly inelastic is when two objects stick together ---- that is the MAX loss of kinetic energy for that particular collision. The most extreme case of perfectly inelastic is when they stick together and stop but it is NOT the only perfectly inelastic case. I think it should read: Any collision where the objects stick together will result in the maximum loss of kinetic energy (i.e. Kf will be a minimum). Such a collision is said to be perfectly inelastic. In the extreme case, multiple objects collide, stick together, and remain motionless after the collision. Since the objects are all motionless after the collision, the final kinetic energy is also zero; obviously the loss of kinetic energy is a maximum. • If 0 < Kf <Ki, the collision is inelastic. • Kf is a minimum when the	all motionless after the collision, the final kinetic energy is also zero; therefore, the loss of kinetic energy is a maximum. If 0 < Kf <Ki, the collision is inelastic. If Kf is the lowest energy, or the energy lost by both objects is the most, the collision is perfectly inelastic (objects stick together). If Kf = Ki, the collision is elastic."	

	collision is perfectly inelastic (objects stick together). • If Kf = Ki, the collision is elastic.		
Unit 1 Mechanics: Chapter 9 Linear Momentum and Collisions: Section 9.5 Collisions in Multiple Dimensions	The third sentence under the Strategy paragraph for the Example has an extra "the" between "for" and "just".	The typo has been corrected.	Typo
Unit 1 Mechanics: Chapter 9 Linear Momentum and Collisions: Section 9.5 Collisions in Multiple Dimensions	Example 9.15: When substituting to get the numeric result for the final x- and y-momenta of mass 3, incorrect masses are substituted for m_1 (14.5 kg is used but it should be 4.5 kg) and m_2 (4.5 kg is used but it should be 3.2 kg). This leads to incorrect numeric results in the remainder of the example solution.	The masses will all be changed as suggested.	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 9 Linear Momentum and Collisions: Section 9.5 Collisions in Multiple Dimensions	In the second sentence of Problem #59, "dear" should be "deer".	Our reviewers accepted this change.	Typo
Unit 1 Mechanics: Chapter 9 Linear Momentum and	Thank you for correcting the errors in the question. However, Problem #53 now says "dove" in the second sentence and "pigeon" in the third, which is a bit distracting.	Our reviewers accepted this change.	Other factual inaccuracy in content

Collisions: Section 9.5 Collisions in Multiple Dimensions	Making them both "pigeon" would be the best.		
Unit 1 Mechanics: Chapter 9 Linear Momentum and Collisions: Section 9.7 Rocket Propulsion	In equations, m_i is used for the initial mass of the rocket, while the text uses m_0. I found two such places: in 'Learning Objectives': "A fully fueled rocket ship in deep space has a total mass m0...", and below eq. (9.38): "...decreases the total rocket mass from m_0 down to m." I suggest to use m_0 everywhere, as p_i and p_f are used to discuss changes corresponding to dv (maybe even some major review of notation should be considered here, to clearly distinguish between quantities corresponding to dv and Delta-v).	Revise "m_i" to "m_0".	Typo
Unit 1 Mechanics: Chapter 9 Linear Momentum and Collisions: Section 9.7 Rocket Propulsion	The equation expanding initial momentum to final momentum (pi = pf), should solve to: m dv = dm(gas) dv + dm(gas) u.	Revise the last term in this equation from "v" to "u".	Typo
Unit 1 Mechanics: Chapter 9 Linear Momentum and	The mean radius of the Earth's orbit used is incorrect. It should be 149.6 million km or 1.496e11 m instead of 1.496e9. The calculated center	This issue was addressed in another report and is correct in webview.	Incorrect answer, calculation, or solution

Collisions: Answer Key	of mass should then be approximately 460 km.		
Unit 1 Mechanics: Chapter 10 Fixed-Axis Rotation: Introduction	There are three problems with the caption to Figure 10.1. Most obviously, the information is now out of date because US wind capacity has nearly doubled since 2012. Secondly, it confuses installed capacity with average power output, incorrectly implying that it takes 60 GW to power 15 million US homes and that there was at least one instant during 2012 when the actual power output was 60 GW. Third and most importantly, the phrase "for a year" incorrectly implies that "power" and "gigawatts" refer to energy generated over some specific amount of time, rather than their actual meaning, energy per unit time. Here is a suggested fix for all three problems: "During 2019, wind farms in the US had an average power output of 34 gigawatts, enough to power 28 million homes."	Revise the caption to "Brazos wind farm in west Texas. During 2019, wind farms in the United States had an average power output of 34 gigawatts, which is enough to power 28 million homes. (credit: modification of work by U.S. Department of Energy)"	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 10 Fixed Axis Rotation: Section 10.1 Rotational Variables	I am transcribing your odd-numbered problems into an open-source collection of quiz questions. Problem 35 (Chap.10 Vol.1) states a formula in so-called "handy" or "formulary" form: $\omege$=(25t)rad/s. You need to specify that t is measured in seconds, because such formulas are routinely expressed in mixed units. For example in plasma physics one might express the gyro-radius	Revise "velocity from" to "velocity for 3.0 s from" and revise "for 3.0 s" to "where t is measured in seconds" in the question stem.	General/pedagogical suggestion or question

	of ion in centimeters, where the energy is in electron-volts, the magnetic field is in kilogauss, and the mass in atomic mass units. See the attached pdf file for an example of how this might be fixed:		
Unit 1 Mechanics: Chapter 10 Fixed-Axis Rotation: Section 10.1 Rotational Variables	Summary: The second expression in the equality ω = lim Δt→0 (Δω/Δt) = dθ/dt should be lim Δt→0 (Δθ/Δt).	Revise "ω" to "θ".	Typo
Unit 1 Mechanics: Chapter 10 Fixed-Axis Rotation: Section 10.1 Rotational Variables	The last sentence before the Figure (referring to Fig. 10.7b) should be changed to "is negative, then the angular acceleration is negative and points along the -z-axis."	Revise "+z" to "–z".	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 10 Fixed-Axis Rotation: Section 10.2 Rotation with Constant Angular Acceleration	The last equation of Section 10.2 should start with \theta = ...	In the last equation before the Significance" section, revise "θ_0 =" to "θ_f".	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 10 Fixed-Axis Rotation: Section 10.2 Rotation with Constant	On deriving equation (10.2) there is an equation before the following sentence "where we have set t_0=0. Now we rearrange to obtain" . In this equation the second line [before equality] involves time t (and dt) in the integrand	Revise "αtdt" to "αt'dt'".	Typo

Angular Acceleration	instead of time t' and dt' (i.e t prime).		
Unit 1 Mechanics: Chapter 10 Fixed-Axis Rotation: Section 10.2 Rotation with Constant Angular Acceleration	Instructor solutions manual and text for 41b in chapter 10 lists the solution as 200 radians but the correct solution is 220 radians	Revise the solution to part (b) to "220".	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 10 Fixed-Axis Rotation: Section 10.3 Relating Angular and Translational Quantities	Chapter 10, Probl. 52: "0.3m" should be "0.3 m".	Our reviewers accepted this change.	Typo
Unit 1 Mechanics: Chapter 10 Fixed-Axis Rotation: Section 10.6 Torque	Problem #72 refers to the "cylindrical head bolts" of a car, but they're called "cylinder head bolts" (the bolts that fasten the cylinder head to the cylinder block). All bolts are cylindrical, as far as I know, so "cylindrical head bolts" would be redundant.	Revise "cylindrical" to "cylinder".	Typo
Unit 1 Mechanics: Chapter 10 Fixed-Axis Rotation: Section 10.7 Newton's Second Law for Rotation	At the University Physics Volume 1 book, page 530 Example 10.16 , there is a mistake. The mass of the merry-go-round is 200kg at question and 50kg at answer. Just wanted to let you know.	Our reviewers accepted this change.	Typo
Unit 1 Mechanics:	Problem #105: Either the question text for part (b) is	Revise part (b) in the question stem to "What is the work	Incorrect answer,

Chapter 10 Fixed-Axis Rotation: Section 10.8 Work and Power for Rotational Motion	misleading or the answer in both the student and teacher solutions for part (b) is wrong. The answer given actually corresponds to the question: "what is the work done by the cord on the pulley?" However, the work done by gravity on the system to move the block is the same as the work done by gravity just on the block, namely, $$m g d sin\theta$$ = 6.3 J. Note that the work done on and within the system consists of the work done on the block by gravity, the work done by the cord on the block, and the work done by the cord on the pulley. The latter two are equal and opposite, with magnitudes given by the answer in the text: 1.25 J.	done by the cord on the pulley?"	calculation, or solution
Unit 1 Mechanics: Chapter 10 Fixed-Axis Rotation: Section 10.8 Work and Power for Rotational Motion	Problem #104 gives the force and lever arm that the athlete applies to the *pedals*, and the rotation rate of the *wheel*. To use the equation P = tau*omega, the torque and the angular speed must pertain to the same object. Either the problem should give the omega of the wheel, which should be much lower than 10 rev/s, or it should give the radius of the sprocket or other information so the student can find the omega of the pedals from that of the wheel.	Revise the first part of the question to "An athlete in a gym applies a constant force of 50 N to the pedals of a bicycle at a rate of the pedals moving 60 rev/min."	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 10 Fixed-Axis Rotation:	The equation for the net torque in the key equations is incorrect. It says that the magnitude of the net torque is the sum of the magnitudes of each torque. Torque is a vector	Add vector signs over tau.	Other factual inaccuracy in content

Key Equations	quantity, and this should be a vector sum. The LaTeX form of this equation should be \vec{\tau}_{net} = \sum_i \vec{tau}_i. The page with the incorrect equation is at the following URL. https://openstax.org/books/university-physics-volume-1/pages/10-key-equations		
Unit 1 Mechanics: Chapter 11 Angular Momentum	In Chapter 6.2, the indices for static and kinetic friction use small letters 's' and 'k'. In Chapter 11, capital letters 'S' and 'K' are used. This is not really important but makes the book more consistent across Chapters.	Revise capital K and S subscripts and lowercase them all for consistency.	General/pedagogical suggestion or question
Unit 1 Mechanics: Chapter 11 Angular Momentum: Section 11.1 Rolling Motion	Static friction is in the wrong direction. It should be facing the direction of motion to prevent slipping.	This figure will be updated.	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 11 Angular Momentum: Section 11.1 Rolling Motion	Under equation 11.4, the text includes the statement, "The acceleration will also be different for two rotating cylinders with different rotational inertias." Because the mass and radius cancel out of the acm equation, this is incorrect. Perhaps the statement should read that the acceleration will be different for two rotating OBJECTS with different rotational inertias, clarifying that the acceleration differences depend on different I formulas.	Revise "rotating cylinders" to "rotating objects".	Other factual inaccuracy in content

Unit 1 Mechanics: Chapter 11 Angular Momentum: Section 11.1 Rolling Motion	The text for Fig. 11.6 mentions point P which is not shown in the figure. It would be nice to have the contact point P of ball and surface in the drawing as in Fig. 11.3 b).	This figure will be updated.	General/pedagogical suggestion or question
Unit 1 Mechanics: Chapter 11 Angular Momentum: Section 11.1 Rolling Motion	Example 11.1 involves rolling without slipping, so the relevant friction force is that of static friction. The inequality f_x <= mu_s*N is used, but the next step, which writes the acceleration of the center of mass, assumes that the equality holds (f_s = mu_s*N). Equality cannot be assumed here. Plus, the resulting equation [(a_CM)_x = g(sin(theta)-mu_s*cos(theta))] is not actually used because the acceleration is written in terms of f_s for the remainder of part (a). Later, part (b) says, "Because slipping does not occur, f_s<=mu_s*N." I think this is somewhat confusing because that inequality is always true of static friction. The connection to rolling motion is that rolling without slipping means that static friction should be used as opposed to kinetic friction.	This example will be revised. Delete "f_s ≤ μ_s N," and revise the equation after "we can then solve for the linear acceleration of the center of mass from these equations:" to "a_CM = gsin θ – fs/m". Also revise "We write..." to "We rewrite..."	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 11 Angular Momentum: Section 11.3 Conservation of Angular Motion	Problem #56 poses a physically impossible orbit for a satellite in an orbit around Earth. For orbital motion like this, specifying the apogee (2500 km from surface, or 8870 km for r_A) and perigee (500 km from surface, or 6870 km for r_P) fully specifies the	Revise "730 m/s" to "6260 m/s".	Other factual inaccuracy in content

	parameters of the elliptical orbit and the speed at apogee cannot be additionally specified arbitrarily without either violating conservation of mechanical energy or conservation of angular momentum. While the intent is clear (students should use conservation of angular momentum), for physical correctness, speed at apogee should be specified at the correct value. Using given apogee and perigee altitudes, you need speed of 6.263 km/s (or some number rounded to appropriate significant figures) at apogee in order to conserve mechanical energy.		
Unit 1 Mechanics: Chapter 11 Angular Momentum: Section 11.3 Conservation of Angular Motion	As written, problem #52 is a trick question. It says "The small mass suddenly separates from the disk," and for a physical situation like that, the answer to the question "What is the disk's final rotation rate?" is that the final rotation rate did not change (the small mass takes its angular momentum with it and the disk doesn't get to "keep" the total angular momentum). I don't think this approach is pedagogically useful, and I suggest changing the wording of the question, *so that* the total angular momentum will be conserved while changing the rotational inertia of the object---maybe something along the line of "The small mass, while attached to the	In the question stem, revise "The small mass suddenly separates from the disk." to "The small mass, while attached to the disk, slides gradually to the center of the disk."	General/pedagogical suggestion or question

	disk, slides gradually to the center of the disk." (Or any other description that achieves the same change of rotational inertia while allowing for a mechanism of angular momentum transfer from the small mass to the disk.)		
Unit 1 Mechanics: Chapter 11 Angular Momentum: Section 11.4 Precession of a Gyroscope	Problem #75 currently reads: "The center of mass of the disk is 10 cm from a pivot which is also the radius of the disk. What is the precession angular velocity?" What is meant by this is that the center of mass is 10 cm from the pivot point of the gyroscope, and additionally, the radius of the gyroscope is 10 cm. These are completely unrelated quantities and the current wording is very confusing. Suggested correction would be to give the disk a unique radius and state it separately.	Revise the second sentence in problem 75 to "The center of mass of the disk is 15 cm from a pivot with a radius of the disk of 10 cm." Revise the answer to problem 75 to "1.17 rad/s". Revise the last sentence in problem 76 to "If the mass of the rotating disk is 0.4 kg and its radius is 30 cm, and the distance from the center of mass to the pivot is 40 cm, what is the rotation rate in rev/s of the disk?"	Other
Unit 1 Mechanics: Chapter 11 Angular Momentum: Section 11.4 Precession of a Gyroscope	In Figure 11.21, the precession angle is labeled d_ϕ, but it should simply be dϕ.	This figure will be updated.	Typo
Unit 1 Mechanics: Chapter 12 Static Equilibrium and Elasticity: Section 12.1	The answer key for Problem #27 only lists the direction. The magnitude is missing. It should be 4472 N.	The answer key will be updated to include 4,472 N.	Incorrect answer, calculation, or solution

Conditions for Static Equilibrium			
Unit 1 Mechanics: Chapter 12 Static Equilibrium and Elasticity: Section 12.2 Examples of Static Equilibrium	Problem #37: I keep getting 132.8 Newtons for the friction. There seems to be some confusion about this (see ID 8555 submitted 5/3/2019.) See the attached Pdf file or visit: en.wikiversity.org/wiki/OpenStax_University_Physics/V1/Ch_13_P_37:_torque	Revise the answer from "376" to "132.8".	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 12 Static Equilibrium and Elasticity: Section 12.3 Stress, Strain, and Elastic Modulus	Problem #47: The answer in both the online version of the textbook and in the ISM is stated as 9.00cm. It should be 32.9 cm.	Revise the answer to "32.9 cm".	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 12 Static Equilibrium and Elasticity: Additional Problems	The answer listed for Problem #71 for the force from the floor is incorrect. It should be a normal force of 167 N and a friction force of 57.7 N, giving a total force of 177 N at an angle of 109 degrees with respect to the horizontal. The coefficient of static friction should be 0.346.	Revise "192.4" to "177", revise "60" to "109", and revise "0.577" to "0.346".	Incorrect answer, calculation, or solution
Unit 1 Mechanics: Chapter 13 Gravitation: Section 13.3 Gravitational Potential	https://openstax.org/l/21escapevelocit redirect is broken. Needs new link.	This link will be updated.	Broken link

Energy and Total Energy			
Unit 1 Mechanics: Chapter 13 Gravitation: Section 13.4 Satellite Orbits and Energy	Problem #39: The (a) is missing in front of the first question.	Add "(a)" before the first part of the question.	Typo
Unit 1 Mechanics: Chapter 13 Gravitation: Section 13.4 Satellite Orbits and Energy	In the Solution of Example 13.10, when solving for M_E, the period, T is written in the equation with units of meters rather than seconds. I suggest changing "2.36 x 10^6 m" to "2.36 x 10^6 s".	Revise "10^6 m" to "10^6 s".	Typo
Unit 1 Mechanics: Chapter 13 Gravitation: Section 13.5 Kepler's Laws of Planetary Motion	The angle theta identified in Figure 13.17 is inconsistent with the definition of theta in Equation 13.10. In the equation the minimum r (perihelion) corresponds to theta=0, while the maximum r (aphelion) corresponds to theta=180. In the figure these definitions are switched. The equation is in the standard form used in the field, and so it is the figure that should be corrected. The angle theta should be identified on the left (not on the right), as the angle from the semi-major axis at perihelion.	This figure will be updated.	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 13 Gravitation: Section 13.5 Kepler's Laws of	Figs.13.6 and 13.7 have the foci of the ellipses in the wrong place. The eccentricity of these ellipses is about 0.7, not about 0.5 as shown. Fig 13.20 shows a circular orbit (zero eccentricity) but shows the sun far from the center! It would	Figure 13.20 will be updated.	Other factual inaccuracy in content

Planetary Motion	be better to have figures that are geometrically correct.		
Unit 1 Mechanics: Chapter 13 Gravitation: Section 13.7 Einstein's Theory of Gravity	In the section about Black Holes, the name of the Danish astronomer should be spelled Ole Rømer, not the changed last name spelling Roemer. The first name of Pierre-Simon Laplace needs a hyphen.	Reivse "Roemer" to "Rømer" and "Pierre Simon" to "Pierre-Simon".	Typo
Unit 1 Mechanics: Chapter 13 Gravitation: Section 13.7 Einstein's Theory of Gravity	In the first sentence, there should be a "to" between "able" and "see". Picture attached shows annotation in red for my reference.	Our reviewers accepted this change.	Typo
Unit 1 Mechanics: Chapter 14 Fluid Mechanics	In many of the problems in Chapter 14, the first part of a multi-part question does not have the '(a)' before the first question.	Our reviewers accepted this change.	Typo
Unit 1 Mechanics: Chapter 14 Fluid Mechanics: Section 14.1 Fluids, Density, and Pressure	Customer Support submitting errata, Case # 41686 Specifically, one of the example problems, Example 14.1, makes reference to a table that has densities of water as table 14.1, when table 14-2 is the table which has water densities.	This will be updated to link to Table 14.2.	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 14 Fluid Mechanics: Section 14.1 Fluids, Density, and Pressure	In the final equation and sentence, the variable for the density \rho got mixed up with a small p.	Revise "p"s to "ρ" (rho symbol).	Incorrect answer, calculation, or solution

Unit 1 Mechanics: Chapter 14 Fluid Mechanics: Section 14.1 Fluids, Density, and Pressure	The "g" of gravity is missing in Specific gravity formula.	Thank you for the feedback! This error has already been corrected, and appears correctly in the webview. This change will be reflected in the PDF on the next revision cycle.	Typo
Unit 1 Mechanics: Chapter 14 Fluid Mechanics: Section 14.5 Fluid Dynamics	The figure reference after the second equation, "Figure 14.28" should link to "Figure 14.27".	Our reviewers accepted this change.	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 14 Fluid Mechanics: Section 14.5 Fluid Dynamics	I write because I may have found a typo. On page 719 of University Physics Volume 1 in the caption for Figure 14.26, the second version of the equation for Q appears to read dv/dt rather than dV/dt. It looks like a lower case v rather than a capital V. Since both velocity and volume are in this equation, this might lead to some confusion.	This figure will be updated.	Typo
Unit 1 Mechanics: Chapter 14 Fluid Dynamics: Section 14.7 Viscosity and Turbulence	Table 14.4: The viscosity are all 1000 times larger than they should be. Maybe the unit in the heading should be mPa*s, instead of Pa*s.	Revise the heading to show these viscosity values are × 10^–3.	Other factual inaccuracy in content
Unit 1 Mechanics: Chapter 14 Fluid Mechanics:	The answer listed in the textbook for Problem #111 is incorrect. If we use the density of sea water as 1030 kg/m^3, as is listed in the book, the answer should be 12.3 N.	Revise the answer to "12.3 N".	Incorrect answer, calculation, or solution

Additional Problems			
Unit 2 Waves and Acoustics: Chapter 15 Oscillations: Section 15.1 Simple Harmonic Motion	The phase shift in Figure 15.8 goes in the wrong direction. Adding phi should move the curve by phi to the left, not to the right. As drawn, figure 15.8b is cos(theta - phi).	This figure will be updated.	Other factual inaccuracy in content
Unit 2 Waves and Acoustics: Chapter 15 Oscillations: Section 15.1 Simple Harmonic Motion	The formula cos(theta + phi) is said to represent a cosine function shifted to the right by phi, when in fact, adding a positive constant to the argument of any function shifts the graph to the left. In particular, the representation in Figure 15.8 would be correct if it were labeled as cos(theta - phi) for a positive phi, but this would change all of the formulae in the chapter. So, it might be best to redraw the figure and make sure that all references to the phase constant refer to left shifts rather than right ones.	The figure will be updated. Also revise the figure caption to change "right" to "left".	Other factual inaccuracy in content
Unit 2 Waves and Acoustics: Chapter 15 Oscillations: Section 15.1 Simple Harmonic Motion	After Fig. 15.8, in the v(t) and a(t) equation row, the middle equation has a \varphi instead of a \phi. In the paragraph after the a(t) equation, a space is needed after the first 'position'. Equations 15.3 - 15. 8 should be aligned at the equation sign. The horizontal lines between the equation numbers are 'weird'.	Replace the "ϕ" symbol with "ω" in the equation below Figure 15.8. Add a space after the word "position" on the following page. Cannot fix the equation alignment due to technical hindrances.	Typo
Unit 2 Waves and Acoustics:	Problem #31: "By how much leeway" should be "How much leeway".	Revise to "How much leeway..."	Typo

Chapter 15 Oscillations: Section 15.1 Simple Harmonic Motion			
Unit 2 Waves and Acoustics: Chapter 15 Oscillations: Section 15.2 Energy in Simple Harmonic Motion	The answers for part (b) and (c) to Problem #37 in the textbook and the instructor's solution guides result from neglecting the change in gravitational potential energy while the rope stretches. Another person already reported these errors, but I obtained a different numerical answer than he or she did, though we used the same method to solve the problem.	Revise the answers to part (b) to "44.3 cm" and part (c) to "65.0 cm".	Incorrect answer, calculation, or solution
Unit 2 Waves and Acoustics: Chapter 15 Oscillations: Section 15.2 Energy in Simple Harmonic Motion	I believe that the solution posted for problem 15.37 in University Physics Vol.1 is incorrect. If the final stretch of the rope is x then the climber fell a total of (x+2) meters and conservation of energy would mean mg(x+2) = (1/2)k x^2. This gives x = 0.165 meters.	Revise to "16.5 cm".	Incorrect answer, calculation, or solution
Unit 2 Waves and Acoustics: Chapter 15 Oscillations: Section 15.3 Comparing Simple Harmonic Motion and Circular Motion	Problem #40: I suggest to update the sketch. If the linkage moves further to the right, it will get caught in the blade guide. In this position, the saw blade need to be extended to the left. Also, the question asks "... saw blade as it moved up and down". For this sketch, it should state "... left and right".	This figure will be updated.	General/pedagogical suggestion or question
Unit 2 Waves and Acoustics:	There is some inconsistency about the quantity "L" in this chapter:	The figure will be revised to use "H" instead of "L". Before the "Significance" heading in	Incorrect answer,

Chapter 15 Oscillations: Section 15.4 Pendulums	Equation (15.21) for the period of a physical pendulum defines the quantity L as the distance between the CM of a body, and the axis of rotation. So for a uniform rod of length H, L = H/2. In example 15.4 (Reducing the Swaying of a Skyscraper), L is taken to be the full length of the physical pendulum, but this gives in incorrect result when applying equation (15.21) directly. The "L" to be inserted here should be half the length of the beam, giving this expression for the period: T = 2*pi*sqrt(2*L/(3*g))	the solution, add the following text: This length L is from the center of mass to the axis of rotation, which is half the length of the pendulum. Therefore the length H of the pendulum is: H = 2L = 5.96 m.	calculation, or solution
Unit 2 Waves and Acoustics: Chapter 15 Oscillations: Section 15.4 Pendulums	My solution to the problem is in the attached file.	This example and figure will be updated.	Incorrect answer, calculation, or solution
Unit 2 Waves and Acoustics: Chapter 15 Oscillations: Section 15.5 Damped Oscillations	Problem #51: Since the energy of a simple harmonic oscillator is proportional to the square of the amplitude of oscillation, then if the fractional decrease of the amplitude over a period is 3%, the energy decreases by roughly 2 * 3%, not 0.03*0.03 = 9%, which is the solution given in the back of the book and in the ISG.	Revise to "6%".	Incorrect answer, calculation, or solution
Unit 2 Waves and Acoustics: Chapter 15 Oscillations:	The definition given for the "quality" of an oscillating system, Q is 1/ the typical definition (see	In the equation "Q = Δω/ω_0", switch the numerator and denominator so it is "Q = ω_0/Δω".	Other factual inaccuracy in content

Section 15.6 Forced Oscillations	https://ww3.haverford.edu/physics-astro/songs/qsong.htm).		
Unit 2 Waves and Acoustics: Chapter 15 Oscillations: Section 15.6 Forced Oscillations	The formula for the amplitude of the driven damped oscillator (eq 15.29) is incorrect. It should be m squared inside the square root in the denominator.	This is correct in webview.	Incorrect answer, calculation, or solution
Unit 2 Waves and Acoustics: Chapter 15 Oscillations: Section 15.6 Forced Oscillations	The text about driven oscillation after Equation (15.29) is incorrect. The maximum amplitude DOES NOT occur at the natural frequency of the system. This can be seen by maximizing A in Equation (15.29). Taking the derivative of A with respect to the driving angular frequency omega and solving for the angular frequency for which the derivative is zero gives a resonant frequency of omega_res = omega_0 sqrt(1 - 2(b/(2m))^2), where omega_0 is the natural angular frequency and the other parameters are as defined in Section 15.6. This resonant frequency is a little less than omega_0, and it approaches omega_0 in the limit of small damping constant b. The maximum amplitude (at omega_res) is A_max = F_0 / (b sqrt(omega_0^2 -	Revise "...the natural angular frequency of the system of the mass and spring" to "...the angular frequency of the driving force."	Other factual inaccuracy in content

	(b/(2m))^2)). This is NOT the value given in the text. In the limit of small b, A_max approaches the value given in the text. For a more detailed examination of this system see Stephen T. Thornton and Jerry B. Marion (2004). Classical Dynamics of Particles and Systems, Fifth Edition (Brooks/Cole, Belmont, CA), Section 3.6, pp. 117--123.		
Unit 2 Waves and Acoustics: Chapter 15 Oscillations: Section 15.6 Forced Oscillations	Understanding of the physics behind the Tacoma-Narrows bridge collapse has recently been improved. It is no longer thought to be a case of resonance, so another example should be used in its place. For more information, see https://www.aps.org/publications/apsnews/201611/physicshistory.cfm	This example and figure will be updated to focus on the London Millennium Footbridge.	Other factual inaccuracy in content
Unit 2 Waves and Acoustics: Chapter 15 Oscillations: Additional Problems	Problem #60: The numerical value for x should be 4.00 cm instead of 4.0 cm, if 4.00 cm is used in the solution. In general, I would like that the whole book takes more attention to significant figures.	Revise to "4.00 cm".	Typo
Unit 2 Waves and Acoustics: Chapter 15 Oscillations: Additional Problems	Problem #56: Suppose you attach an object with mass m to a vertical spring originally at rest, and let it bounce up and down. You release the object from rest at the spring's original rest length, the length of the spring in equilibrium, without the mass attached. The amplitude of the motion is	Revise "M/m" to "N/m".	Typo

	the distance between the equilibrium position of the spring without the mass attached and the equilibrium position of the spring with the mass attached. (a) Show that the spring exerts an upward force of 2.00mg on the object at its lowest point. (b) If the spring has a force constant of 10.0 N/m, is hung horizontally, and the position of the free end of the spring is marked as y=0.00m , where is the new equilibrium position if a 0.25-kg-mass object is hung from the spring? (c) If the spring has a force constant of 10.0 M/m and a 0.25-kg-mass object is set in motion as described, find the amplitude of the oscillations. (d) Find the maximum velocity. Under question C, it lists the force constant as 10.0 M/m. The unit should be 10.0 N/m		
Unit 2 Waves and Acoustics: Chapter 16 Waves: Section 16.1 Traveling Waves	The wavelength, lambda, indicated in Figure 16.5 is incorrect. The left arrow of the indicated region could be moved one grid space to the right, or the right arrow one grid space to the left, to capture exactly one cycle. Optionally, the dashed lines showing the wavelength could extend from diagram (g) all the way up to diagram (b), rather than stopping at (d).	This figure will be updated.	Other factual inaccuracy in content
Unit 2 Waves and Acoustics:	A function is described as y_2(x,y) rather than y_2(x,t).	Revise "By_2(x, y)" to "By_2(x, t)".	Typo

Chapter 16 Waves: Section 16.2 Mathematics of Waves	Current text: "...are solutions to the linear wave equation, then Ay_1(x,t) + By_2(x,y), where A and B are constants..." With the typo fixed: "...are solutions to the linear wave equation, then Ay_1(x,t) + By_2(x,t), where A and B are constants..."		
Unit 2 Waves and Acoustics: Chapter 16 Waves: Section 16.2 Mathematics of Waves	In 'The Linear Wave Equation' part (and Example 16.4), several equations of the second derivative in the Leibnitz notation has the "^2" after the \delta in the denominator instead of the variable x or t.	Revise "∂^2 x" to "∂x^2" in the denominator. In Example 16.4 step 3, make the same change and also revise "∂^2 t" to "∂t^2" in the denominator.	Typo
Unit 2 Waves and Acoustics: Chapter 16 Waves: Section 16.2 Mathematics of Waves	Ch. 16 Problem 51 part e) is asking to find the phase. It should say "initial phase".	Revise "phase shift" to "initial phase shift".	Typo
Unit 2 Waves and Acoustics: Chapter 16 Waves: Section 16.4 Energy and Power of a Wave	Submitted by Customer Support on behalf of user, Case 58313 The last paragraph of 16.4 says "In the case of the two-dimensional circular wave, the wave moves out, increasing the circumference of the wave as the radius of the circle increases. If you toss a pebble in a pond, the surface ripple moves out as a circular wave. As the ripple moves away from the source, the amplitude decreases. The energy of the wave spreads around a larger	Revise "amplitude decreases proportional" to "intensity decreases proportional".	Other factual inaccuracy in content

	circumference and the amplitude decreases proportional to 1/r, which is also the same in the case of a spherical wave, since intensity is proportional to the amplitude squared." This is not true. For a circular wave, *intensity* decreases proportionally to 1/r, not amplitude. This is also not the same falloff with r as the case for a spherical wave, because the dimensionality is different.		
Unit 2 Waves and Acoustics: Chapter 16 Waves: Section 16.4 Energy and Power of a Wave	Problem #75: Equation of wave is given, mass and tension in string are also given. From the tension and mass, we can calculate an omega that is different from the one in the statement. Therefore the problem does not work. Easy fix: replace 1170.2 by 74.54. More difficult fix: remove either the tension or the linear density from the problem statement.	Revise "0.40" to "15.7".	Incorrect answer, calculation, or solution
Unit 2 Waves and Acoustics: Chapter 16 Waves: Section 16.4 Energy and Power of a Wave	In the derivation for the average power transported by a traveling wave, I think that the expression for U_lambda when dU is being integrated should be the integral of sin^2(kx) from 0 to lambda (not cos^2(kx)) because what is being integrated is the position expressed as Asin(kx-wt+phi). Luckily, the result of the integral does not change, it's still lambda/2 and the subsequent steps seem fine.	Revise "cos" to "sin".	Other factual inaccuracy in content
Unit 2 Waves and	In the paragraph just before Figure 16.18, a sentence states	Revise the sentence starting "Both the incident..." to "Both	Typo

Acoustics: Chapter 16 Waves: Section 16.5 Interference of Waves	"Both the incident and the reflected waves have amplitudes less than the amplitude of the incident wave." We believe this should be "Both the TRANSMITTED and the reflected waves have amplitudes less than the amplitude of the incident wave.	the transmitted and the reflected waves have amplitudes less than the amplitude of the incident wave."	
Unit 2 Waves and Acoustics: Chapter 16 Waves: Section 16.6 Standing Waves and Resonance	The data given in problem #105 do not match the data used in the key. The key uses mass density 0.02 kg/m, but the problem gives it as 0.2 kg/m. This error is in the student solutions manual and in the answers given in the textbook itself.	Revise "0.2" to "0.02" in the problem.	Incorrect answer, calculation, or solution
Unit 2 Waves and Acoustics: Chapter 16 Waves: Section 16.6 Standing Waves and Resonance	In the description under Figure 16.25 "surface of the milk of oscillate" should be "surface of the milk to oscillate"	In the caption, revise "milk of" to "milk to".	Typo
Unit 2 Waves and Acoustics: Chapter 16 Waves: Section 16.6 Standing Waves and Resonance	In Ch. 16 Problem #105 the air temperature is given and it is assumed that the students would know what would be the speed of sound in air at that temperature. However the dependence of speed of sound on air temperature is covered in the next chapter (ch. 17). It would be better either to specify directly how much is the speed of sound or move this problem to ch. 17.	Revise the second to last sentence in the question stem to "The speed of sound at the current temperature T = 20°C is 343.00 m/s."	General/pedagogical suggestion or question
Unit 2 Waves and	ch. 17 problem 43 has double commas in the last sentence.	Our reviewers accepted this change.	Typo

Acoustics: Chapter 17 Sound: Section 17.1 Sound Waves			
Unit 2 Waves and Acoustics: Chapter 17 Sound: Section 17.2 Speed of Sound	The data used in the key bear no relation to the data given in problem #55. The textbook says the temperature is 90 F, but the key uses 95 F. The textbook gives the time delays as 1.00 s and 3.00 s, but the key uses 0.10 s and 0.15 s, respectively.	Revise "90.00" to "95.00", "1.00" to "0.10", and "3.00" to "0.15".	Incorrect answer, calculation, or solution
Unit 2 Waves and Acoustics: Chapter 17 Sound: Section 17.2 Speed of Sound	M is described as the molecular mass. It should be described as the molar mass (as it is later on during the derivation of this equation in the same section).	Revise "molecular mass" to "molar mass".	Typo
Unit 2 Waves and Acoustics: Chapter 17 Sound: Section 17.4 Normal Modes of a Standing Sound Wave	Good morning, I would like to bring to you attention figure 17.22 in section 17.4. I believe that the figure labels the first, second and third overtones of a open-closed pipe incorrectly. In an open-closed pipe the first overtone's frequency is 3 times the frequency of the fundamental, so should be labelled f3, Similarly the second overtone should be f5, and the third overtone should be f7. This is because asymmetric systems resonate only in odd harmonics. Thank you for your hard work,	This figure will be updated.	Other factual inaccuracy in content
Unit 2 Waves and	The particular image/caption combination for Figure 17.28 is	Delete from the caption, "Resonance has been used in	General/ped agogical

Acoustics: Chapter 17 Sound: Section 17.5 Sources of Musical Sound	problematic, because it implies that this particular African culture has been unchanged since prehistoric times. I recommend keeping both the image and the caption, but separating them into two figures: 1) For the purposes of demonstrating resonance used in musical instruments since prehistoric times, I recommend showing actual archeological artifacts. 2) I do appreciate the fact that this figure shows an example of a non-western instrument. I recommend keeping this particular image, but with a caption about the resonator gourds specifically (without implying that the culture it comes from has been unchanged since prehistoric times).	musical instruments since prehistoric times."	suggestion or question
Unit 2 Waves and Acoustics: Chapter 17 Sound: Section 17.7 The Doppler Effect	The description in the figure legends for both figures of what the dotted and solid lines represent is backwards: the dotted lines show the position of the wavefronts at t=0 and the solid lines at t=T0. The description in the legends is also inconsistent with the text description. Problem areas in text and legends are highlighted in the attached screenshot. The figures themselves are correctly labeled and consistent with the text. The problem is with the legends.	In the captions for Figures 17.33 and 17.34, revise "solid" to "dotted" and "dotted" to "solid".	Typo

Unit 2 Waves and Acoustics: Chapter 17 Sound: Section 17.7 The Doppler Effect	Just below Equation 17.19, it says v_w is the speed of sound, but this should just be v. There is no v_w. It happens again after Table 17.4, as noted in Erratum 6111.	Revise "v_w" to "v".	Typo
Appendix A Units	In Table A1, some units in parentheses need a space after the unit name.	Our reviewers accepted this change.	Other
Appendix C Fundamental Constants	Update to revise the definitions of several fundamental physical constants that were adopted May 2019.	Revise as indicated.	General/pedagogical suggestion or question
Appendix D Astronomical Data	The cell in the "Period of Revolution (d = days) (y = years)" column and the "Saturn" row currently reads "29.5 6", which I think it a typo and should actually read "29.5 y" (I think whoever made the table accidently hit the "6" key instead of the "y" key, as they're right next to each other on a qwerty keyboard). Case 54748	Our reviewers accepted this change.	Typo
Appendix D Astronomical Data	In Tables B2 and D1 the period of revolution (days per year) give 365.25 and 365.26, respectively. Those values should be the same.	In Appendix D, revise "365.26 d" to "365.25 d".	Other
Appendix E Mathematical Formulas	Mathematical formula. Number 16: derivative of tan-1 - It should be positive 1/((1+x)^2) instead of negative… The derivative of cot-1 is negative	Delete the negative sign in the 16th derivative.	Typo
Appendix F Chemistry	Element 117, ununseptium, is now called Tennessine; Element 118, ununoctium, is now called Oganesson	This figure will be updated.	Other factual inaccuracy in content