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Page Count Difference:

In the newest edition of *College Physics for AP® Courses*, there is a 12 page count increase when compared to the last version. This is attributed to padding changes in the document as well as errata revised content.

Errata:

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

Issue	Resolution	Severity
Chapter 2: Kinematics, Problems & Exercises, 62: This is problematic because of issues with the precision in the problem. Especially without gridlines, it's ludicrous to pretend that slopes can be estimated on a graph like that accurately out to three significant figures. The "assume all values are known to 3 significant figures" is ridiculous, and a student who measures coordinates on the graph and assumes that as they are told is very unlikely to get exactly 0.238. The phrasing of the question should be changed - at least one significant figure should be dropped, and it should say something like "...verify that the velocity at t = 30.0 s is APPROXIMATELY 0.24 m/s". Indeed, the problem says "using approximate values", and then goes on to treat the slope as something that can be calculated with great precision, which it obviously cannot.	Revise exercise 62 as follows: "By taking the slope of the curve in Figure 2.63, verify that the acceleration is approximately 3.2 m/s2 at t = 10 s." Update Solution Guide to match.	Typo

Chapter 2: Kinematics, Solution Guide: I found that the student solution manual of AP Physics is for College Physics NOT for AP Physics.	Update figure numbers throughout to match figure numbers in the PDF.	Minor
Chapter 3: Two-Dimensional Kinematics, Problems & Exercises, 37: Problem 3-37 is confusing in two ways. The line from which one serves is called the "baseline", not the service line. The "service line" marks the side of the service box farthest from the net. That line is not called the "out line" as the problem states.	Revise exercise 37 as follows: 37. Serving at a speed of 170 km/h, a tennis player hits the ball at a height of 2.5 m and an angle theta below the horizontal. The baseline from which the ball is served is 11.9 m from the net, which is 0.91 m high. What is the angle theta such that the ball just crosses the net? Will the ball land in the service box, which has an outermost service line 6.40 m from the net?	Typo
Chapter 3: Two-Dimensional Kinematics, Problems & Exercises, 44: Does not have a solution. The solution as presented in the solution guide only works because of rounding errors. They're correct that a = 9.8 * 4.57^2 / (2 * 7.15)^2. The solution guide rounds this to 2.00, but if you keep a few more digits, you get 2.00178. That would be a significant figure error if this were a final result, but it's not. They're correct that c = 0.61 + a. The solution guide rounds this to 2.61, but if you keep a few more digits, you get 2.61178. Again, this would be a significant figure error if this were a final result, but it's not. In this particular case, the difference is enormous. The rounded version in the solution guide yields the quadratic: 2x^2 - 4.57x + 2.61 = 0. This has real solutions, and thus there are a few angles that work. The version with a few more unrounded digits yields this quadratic: 2.00178x^2 - 4.57x + 2.61178 = 0. This has no real solutions, and thus there are no angles that work. Students shouldn't be rounding at intermediate steps. And a clever student, meeting a nasty quadratic or an equation involving trigonometry like this, will use a numerical equation solver or the graphing functions in their calculator to solve it for them. Normally rounding errors	In exercise 44, revise the initial speed value from "7.15 m/s" to "8.15 m/s" and the solution accordingly. Change final solution as follows: theta_0 = tan^-1 0.5866 = 30.4 degrees or theta_0 = tan^-1 2.3796 = 67.2 degrees	Typo

wouldn't make a big difference like this, but 7.15 m/s is JUST BARELY below the minimum necessary velocity to make the free throw at all, so some small rounding errors are the difference between having solutions and not having solutions. It's a relatively easy problem to fix. Just make the throw faster. If it were 8.15 m/s instead of 7.15 m/s, rounding issues would result in some petty difference in launch angle, rather than being the difference between having solutions and having none.		
Chapter 4: Dynamics: Force and Newton's Laws of Motion, Section: Newton's Third Law of Motion: Symmetry in Forces, Example 4.3: Example references mixed up: figure 4.10 caption has "system 1 is appropriate for Example 4.4" should say "system 1 is appropriate for this example" and "system 2 is chosen for this example" should say "system 2 is chosen for example 4.4"	In Example 4.3 Getting Up To Speed: Choosing the Correct System, in the caption for Figure 4.10, switch the references to "Example 4.4" and "this example".	Typo
Chapter 4: End of Chapter Exercises: Problem 33. While it is true that the vector sum of the two tensions yields applied F, Fapp, as shown in the Figure 4.38, this is misleading the students into thinking that this is the free body diagram of the forces on the tooth. It even confused the writer of the solution in the ISM. There's no way these 3 forces can be added together to get zero; the tooth will accelerate to the back of the throat. The forces on the tooth are the two tensions plus the force of the gums or jawbone which is pointing outward. Fapp places the tooth in stress with the force from the jawbone and the tooth moves, rotates and translates slightly over the course of several weeks to reduce that stress.	Revise the solution to exercise 33 as follows: 33. What force is exerted on the tooth in Figure 4.38 if the tension in the wire is 25.0 N? Note that the force applied to the tooth is smaller than the tension in the wire, but this is necessitated by practical considerations of how force can be applied in the mouth. Explicitly show how you follow steps in the Problem-Solving Strategy for Newton's laws of motion. Solution Step 1: Use Newton's laws since we are looking for forces. Step 2: Draw a force diagram: ...	Typo

Chapter 5: Further Applications of Newton's Laws: Friction, Drag, and Elasticity, Section: Friction, Table 5.1 Coefficients of Static and Kinetic Friction: Table 5.1 lists the static coefficient of friction as 0.4 for steel on ice when it should be .04 according to many other resources.	Revise the coefficient of friction for steel on ice from "0.4" to "0.04".	Typo
Chapter 5: Further Applications of Newton's Laws: Friction, Drag, and Elasticity, Section: Drag Forces, Example 5.2: In the example "A Terminal Velocity" found in section 5.2 Drag Forces, there is a typo in the solution explanation. The problem asks to find the terminal velocity of an 85 kg skydiver falling spread-eagle position. However in the solution it states "This is an adult (82 kg) falling spread eagle." The "82 kg" should be "85 kg". The correct mass of 85 kg is used in later parts of the solution.	In Example 5.2 A Terminal Velocity, revise the weight of the adult given in the first sentence of the Solution from "82 kg" to "85 kg".	Typo
Chapter 5: Further Applications of Newton's Laws: Friction, Drag, and Elasticity, Section: Elasticity: Stress and Strain, Example 5.3: "The Stretch of a Long Cable," uses 3020 m as L0 in the solution. In the problem, though, it said that "3 km" of cable was unsupported. So I'm not sure where this extra 20 m of cable came from. This would change the answer for delta(L) to be 17.4 meters. Either the statement of the problem should be changed to say "3.02 km" or the solution should use 3000 m.	In Example 5.3 The Stretch of a Long Cable, revise the value of "3 km" given in the first sentence to "3020 m".	Typo
Chapter 6: Gravitation and Uniform Circular Motion, Section: Satellites and Kepler's Laws: An Argument for Simplicity, Table 6.2: r^3/T^2 constant for Earth should be 1.01 x 10^19. If you use the r and T values in the tables you get the correct number.	Revise the last column in the first row of Table 6.2 Orbital Data and Kepler's Third Law to "1.01 x 10^19".	Typo

Chapter 6: Uniform Circular Motion and Gravitation, Problems & Exercises, 12: The orbital radius of the earth has no unit	In exercise 12, add the unit "m" after the orbital radius of Earth as follows: 12. Taking the age of Earth to be about 4 x 10^9 years and assuming its orbital radius of 1.5 x 10^11 m has not changed...	Typo
Chapter 7: Work, Energy, and Energy Resources, Section: Nonconservative Forces, Example 7.10: In the example "Calculating Distance Traveled: Sliding Up an Incline" the friction force is still 450 N as for the horizontal sliding. Because we know the weight of the player, we should adjust the normal force OR state clearly that the 5 degree slope does not influence the value of 450 N significantly, so it's kept constant.	In Example 7.10 Calculating Distance Traveled: Sliding Up an Incline, revise the second sentence as follows: "The player slides with the same initial speed, and the frictional force is still 450 N."	Typo
Chapter 7, Section 6 Conservation of Energy, Other Forms of Energy than Mechanical Energy, first paragraph: The phrase "other energy" is bolded in the text, but does not appear in any glossary.	Remove bold treatment from "other energy".	Typo
Chapter 7: Work, Energy, and Energy Resources, End of Chapter Exercises, exercise 7: Question #7. The question appears ambiguous or incorrect. If the roller coaster had an initial speed of 5 m/s uphill and it coasted uphill , stopped and then rolled back down to a final point 20m below the start; It would have the same velocity as the case where it started from rest at the top of the hill BUT NOT THE SAME VELOCITY AS IN THE CASE WHERE IT STARTED WITH AN INITIAL VELOCITY OF 5m/s going downhill	Revise exercise 7 for clarity as follows: In Example 7.7, we calculated the final speed of a roller coaster that descended 20 m in height and had an initial speed of 5 m/s downhill. Suppose the roller coaster had had an initial speed of 5 m/s uphill instead, and it coasted uphill, stopped, and then rolled back down to a final point 20 m below the start. We would find in that case that its final speed is the same as its initial.. Explain in terms of conservation of energy.	Typo
Chapter 8: Linear Momentum and Collisions, Test Prep for AP® Courses, 37: Ch. 8, Under "test prep for AP(R) courses," items 37 and 38 refer to a graph that appears in the Instructor's Solution manual as [Figure 8_S3_aircars] but does not appear in the text. Item 37 references Figure 8.9, but that figure is not helpful to find a	Revise exercise 37 to include the figure referenced.	Typo

solution.		
Chapter 8: Linear Momentum and Collisions, Solution Guide, 6: The mass of Earth is xx and its orbital radius is an average of xx. Calculate its linear momentum. In the calculation, the value for the radius of the Earth is used (6.37x10^6 m) instead of the distance Earth-sun (1.496x10^11 m).	Revise the solution to exercise 6 as follows: 6. The mass of Earth is 5.972 x 10^24 kg and its orbital radius is an average of 1.496 x 10^11 m. Calculate its linear momentum. Solution m = 5.962 x 10^24 kg, R = 1.496 x 10^11 m T = 365 days x 24 h/1 day x 3600 s/1 h = 3.15 x 10^7 s v = 2piR/T; p = mv = 2piRm/T = 2pi{[(1.496 x 10^11 m)(5.972 x 10^24 kg)]/3.15 x 10^7 s} = 1.78 x 10^29 kg.m/s	Typo
Chapter 9: Statics and Torque, Section: Applications of Statics, Including Problem-Solving Strategies: first link to Figure 9.20 should read "Figure 9.21" and link accordingly	In the first sentence after Figure 9.22, correct the link to Figure 9.20 to Figure 9.21.	Minor
Chapter 9: Statics and Torque, Section Summary 9.6: The third bullet says "Someone with good posture stands or sits in such AS way that their center of gravity lies directly above the pivot point.....", when it should say in such A way.	Revise the last bullet point as follows: "Someone with good posture stands or sits in such a way that the person's center of gravity lies directly above the pivot point in the hips, thereby avoiding back strain and damage to disks."	Typo
Chapter 11: Fluid Statics, Section: Pressure: It shows a conversion from millibar to Pascal of 100 mb=1×10^5 Pa This should read 1000 mbar = 1 x 10^5 Pascal OR 1 mbar = 100 Pascal OR 1 bar = 1 x 10^5 Pascal	Revise equation 11.9 as follows: 100 mb = 1 x 10^4 Pa.	Typo
Chapter 11: Fluid Statics, Test Prep for AP Courses: Problem 5 from the "Test Prep for AP Courses" section in chapter 11, page 487, is the same problem as problem 3, chapter 13, page 574. The problem is appropriate for chapter 13 but not for chapter 11.	Remove question 5, as it is a duplicate.	Minor

Chapter 12: Fluid Dynamics and Its Biological and Medical Applications, Section: Molecular Transport Phenomena: Diffusion, Osmosis, and Related Processes, Subsection: The Rate and Direction of Diffusion: Just after Figure 12.21 description, there's the line "The rate of diffusion is proportional ... ." I believe that this should say "The net rate of ... " because technically the rate itself is based on a random motion. It's a net rate the changes based on concentration difference. This doesn't come up until sentence 3 when you say "no net movement." I believe the word net earlier might clear up confusions and misconceptions and without it, actually leads to misconceptions.	In the paragraph after Figure 12.22, revise both instances of "rate of diffusion" to "net rate of diffusion".	Typo
Chapter 12: Fluid Dynamics and Its Biological and Medical Applications, Problems & Exercises, 10: The formula solution for problem OSColPhysAP2016 12.1.XP.002. has an extra factor of 1e5 in both part a and b of the problem.	Revise exercise 10 as follows: 10. The flow rate of blood through a 2.00 x 10^-6-m -radius capillary is 3.80 x 10^-9 cm3 /s^2...	Typo
Chapter 13: Temperature, Kinetic Theory, and the Gas Laws, Section: Kinetic Theory: Atomic and Molecular Explanation of Pressure and Temperature: In the following statement: "from the left-hand side of the equation by canceling N and multiplying by 3/2" Change "left" to "right".	Revise "left-hand side" to "right-hand side" in the first sentence after "Making Connections: Things Great and Small—Atomic and Molecular Origin of Pressure in a Gas."	Typo
Chapter 15: Thermodynamics, Section: The First Law of Thermodynamics and Some Simple Processes, Example 15.2: "Temperature must decrease during an adiabatic process, since work is done at the expense of internal energy:" should be changed to Temperature must decrease during an adiabatic expansion process, since work is done at the expense of internal energy:	In Example 15.2 Total Work Done in a Cyclical Process Equals the Area Inside the Closed Loop on a PV Diagram, revise "Temperature must decrease during an adiabatic process" to "Temperature must decrease during an adiabatic expansion process".	Typo

Chapter 17: Physics of Hearing, Section: Ultrasound, Example 17.8: ("Calculate Velocity of Blood: Doppler-Shifted Ultrasound"), an extra zero is present in a result given in step 3: "(3) Calculate to find the frequency: 20,500,325 Hz." The calculated frequency should read "2,500,325 Hz". That frequency is correctly used in later parts of the problem.	In Example 17.8 Calculate Velocity of Blood: Doppler-Shifted Ultrasound step 3 of the solution for part a, revise 20,500,325 to 2,500,325.	Typo
Chapter 17: Physics of Hearing, Test Prep for AP Courses: Question 18: I believe there is a fundamental flaw in the premise of this question. A student is not going to be able to determine the speed of sound in a wooden ruler (which is over 3,000 m/s according to The Engineering ToolBox) by counting oscillations. Striking the end of a protruding ruler creates transverse waves (not sound waves) that are visible and longitudinal waves (sound waves) that aren't visible or measurable by anything a student would have access to. Any measurable, audible sound would come from the repetitive striking of the ruler against the desk which, if a high enough frequency, might be perceived as sound. But it wouldn't have anything to do with the frequency of sound in wood. It seems to me that there is a confusion between the speed of sound through solids vs. the speed of sound in air.	Revise question 18 as follows: 18. A student decides to test the speed of sound through wood using a wooden ruler. The student rests the ruler on a desk with half of its length protruding off the desk edge. A The student then holds one end in place and strikes the protruding end with his other hand, creating a musical sound, and counts the number of vibrations of the ruler. Explain why the student would not be able to measure the speed of sound through wood using this method.	Typo
Chapter 18: Electric Charge and Electric Field, Solution Manual, Exercise 45: For Ch 18 #45, ISM gives 1.91 x 10^-3 N downwards. This is clearly wrong; it's way too small. I get –76.3 N j-hat (downwards)	Revise the solution to exercise 45 part (b) as follows: 45. (b) Calculate the magnitude of the force on the charge q, given that the square is 10.0 cm on a side and q = 2.00 muC. Solution (b) Since the square is 10.0 cm on a side, the distance to the charge q will be (10.0cm/2)(sqrt(2)) = 7.071 cm, so F_a = k(qq_a/r^2) = [8.99 x 10^9 N . m^2(2.00 x 10^-6 C)(7.50 x 10^-6 C)]/(0.07071 m)^2 45 degrees below x-axis. The total force will be F_y = 4 x F_a sin45 = 4 x (26.97 N)sin45 = 76.3 N (downward)	Typo

Chapter 18 Student and Instructor Solution Manuals: Throughout the entirety of Chapter 18 in the ISM, 9.00 x 10^9 Nm^2/C^2 is used for Coulomb's constant. The student text book clearly and correctly gives 8.99 x 10^9 Nm^2/C^2 as the value. In the current system of SI units, Coulomb's constant is = 8.9875517873681764×10^9, which clearly has a 3SF rounding to 8.99 x 10^9. If I use your answers, I'm going to be disagreeing with my students in the last significant digit on most of these problems.	Revise the Solution Manuals to use the value 8.99 x 10^9 for Coulomb's constant as given in the text of Chapter 18.	Typo
Chapter 25, Section 4 Total Internal Reflection, Corner Reflectors and Diamonds, first paragraph: The link for "Figure 25.51" should be to Figure 25.15.	In the first paragraph of section 25.4 "Total Internal Reflection", revise the link to Figure 25.51 to Figure 25.16.	Typo
Chapter 25: Geometric Optics, Section: Total Internal Reflection: "Since n1 > n2, the angle of refraction is greater than the angle of incidence—that is, ?1 > ?2" The second > should be <. Corrected version: "?1 < ?2"	In the first paragraph of the section, revise the parenthetical statement as follows: "(Since n1 > n2 , the angle of refraction is greater than the angle of incidence--that is, theta2 > theta1.)"	Typo
Chapter 28: Special Relativity, End of Chapter Exercises, exercise 50: There is approximately 10^34 J of energy available from the fusion of hydrogen in the world’s oceans. (a) If 10^33 J of this energy were utilized, what would be the decrease in mass of the oceans? (b) How great a volume of water does this correspond to? (c) Comment on whether this is a significant fraction of the total mass of the oceans." Is not a simple problem. The students have not been given the information necessary to answer this problem. The solution, provided in the answer book, is extremely misleading and completely wrong. It assumes that the mass, which disappears to generate the energy amount given, equates to the mass of the water that will leave the oceans. And from this concludes that the oceans will drop about 3 cm. If one takes an overly conservative approach and assumes	Revise exercise 50 to include the conversion of mass to energy of water as follows: 50. There is approximately 1034 J of energy available from fusion of hydrogen in the world’s oceans. (a) If 1033 J of this energy were utilized, what would be the decrease in mass of the oceans? Assume that 0.08% of the mass of a water molecule is converted to energy during the fusion of hydrogen. (b) How great a volume of water does this correspond to? (c) Comment on whether this is a significant fraction of the total mass of the oceans.	Typo

about 14 MeV per fusion, and that this takes two hydrogen atoms out of the ocean one finds that the drop in the level of the ocean is more than 6 meters (about 21 ft).		
Chapter 30: Atomic Physics, Solution Manual, Exercise 5: The Voltage in Millikan's oil-drop experiments is given as V=2033 V but the solution uses V = 2300 V.	Revise the solution to exercise 5 as follows: 5. In Millikan's oil-drop experiment, one looks at a small oil drop held motionless between two plates. Take the voltage between the plates to be 2033 V, and the plate separation to be 2.00 cm. The oil drop (of density 0.81 g/cm^3) has a diameter of 4.0 x 10^-6 m. Find the charge on the drop, in terms of electron units. Solution F = qE = qV/d = mg rho = m/V => rhoV = (810 kg/m^3)(4pi/3)(d^3/8) = [(810 kg/m^3)(pi)(4.10 x 10^-6 m)^3]/6 =2.71 x 10^-14 kg q = mgd/V = [(2.71 x 10^-14 kg)(9.80 m/s^2)(2.00 x 10^-2 m)]/2033 V = 2.6 x 10^-18 C	Typo
Chapter 30: Atomic Physics, Test Prep for AP Courses: Chapter 29 question 17 is identical to Chapter 30 question 13. Is this intentional?	Remove questions 13 and 14 from the Test Prep for AP Courses for Chapter 30.	Typo

Chapter 32, Section Summary: Missing Chapter 32.4 Section Summary	Add the following as a summary of Section 32.4: 32.4 Food Irradiation - Food irradiation is the treatment of food with ionizing radiation. - Irradiating food can destroy insects and bacteria by creating free radicals and radiolytic products that can break apart cell membranes. - Food irradiation has produced no observable negative short-term effects for humans, but its long-term effects are unknown.	Minor
Chapter 32: Medical Applications of Nuclear Physics, Problems & Exercises, 33: Problem 33 in chapter 32 in the Instructor's Solutions Manual. Your solution in part (a) finds the number of grams of deuterium (D), assuming D is 0.0150% of the total grams of H in the water. But it isn't—in problem 34 you say that D is 0.0150% of H by number. Thus, the total grams of D in the water is twice your answer, since each D has roughly double the mass of a zero-neutron H atom.	Revise exercise 33 as follows: 33. (a) Calculate the number of grams of deuterium in an 80,000-L swimming pool, given deuterium is 0.0150% (by number) of natural hydrogen... Solution (a) (2.00 g/18.0 g)(1.00 kg/L)(80,000 L)2(0.000150) = 2.67 = 2.67 x 10^3 g (b) M = 2.014 g + 2.014 g = 4.028 x 10^-3 kg E = (2.667 kg/4.028 x 10^-3 kg)(6.02 x 10^23)(2.27 MeV) = 1.303 x 10^27 MeV = 2.09 x 10^14 J	Typo