

Unit 1 Worksheet 12: Last Set of Freefall Problems

- 1) James Moore is hovering 1500 m above the earth's surface in his homemade hot air balloon. James notices there is a swimming pool below and decides to go for a swim. A) Assuming James hangs over the edge and lets go of the side, how long does it take James to reach the pool? B) How fast is James going when he reaches the pool? C) If 1 mph is equal to 0.447 m/s, how fast is James going in mph?

Answers: A) _____ B) _____ C) _____

- 2) Dayna Peck is at the level 4 dancing practice, level 4 is full of 5-7 year old kids, but Dayna has been struggling. Dayna is in class practicing her new moves when the teacher walks in the door with ice cream. All the little kids started to sprint to the teacher, but Dayna is in the way! A) What does her velocity have to be when she leaves the ground if she wants to jump over the kids? The tallest kid is 1.2 m tall. B) How long is she in air?

Answers: A) _____ B) _____

- 3) Cameron Fortuna is testing his egg drop project for physics. He climbs to the top of his 2nd story house, 20 m, to begin the test. A) What velocity must he throw the egg up with to reach a height of 40 m from the ground? B) How long does it take for the project to get back to the height it was thrown from? C) If the project can only handle hitting the ground with a speed of 31.6228 m/s, from what height can it be dropped?

Answers: A) _____ **B)** _____ **C)** _____

- 4) Jacob Witt grows up (it takes about 30 years) and becomes an astronaut. Jacob becomes the best darn astronaut and is picked as the first person to return to the moon. His first task is to determine the acceleration due to gravity. So he decides to drop his Physics Honors notebook from high school (a tribute to his best physics honors teacher in high school). The 15 kg notebook takes 1.2478 s to reach the ground when dropped from a height of 1.3 m. A) What is the acceleration due to gravity on the moon? B) How many times greater is the acceleration on Earth compared to the moon?

Answers: A) _____ **B)** _____

- 5) Katelyn Fergan decides she just can't stand Mr. Devenney's class anymore!!!! She runs to the window, throws a chair through the glass and takes her backpack and throws it straight up into the air. Mr. Devenney sees all the commotion and realizes this is a chance to finally figure out the height of the window. He quickly grabs a radar gun and finds that Katelyn (with all her might) throws the backpack up with a speed of 6 m/s. He uses the radar gun again and finds the speed of the backpack right before impact is 14 m/s. A) What is the height of the window? B) Using the height found in part A, how long would it take for the backpack to reach the ground if it was thrown down with a speed of 10 m/s?

Answers: A) _____ **B)** _____