

PhySci Common Assessment 1 – Linear Motion and Projectiles

Chapter 2 – Linear Motion

Chapter 2 – Linear Motion; p. 10 – 27.

Additional Problems – Appendix F; p. 660 – 662.

Answer the following questions to the best of your ability. Show your work to receive full credit.

Key Terms:

- *Acceleration (2.4)* $a = \frac{v_f - v_i}{t}$
- *Average speed (2.2)*
- *Free fall (2.5)* $v = 10t$ $d = 5t^2$ $g = 10 \text{ m/s}^2$
- *Instantaneous speed (2.2)*
- *Speed (2.2)* $v = \frac{d}{t}$
- *Velocity (2.3)*

Review Questions/Problems:

1. Find the speed of a baseball that crosses from the front to the back of home plate, a distance of 0.3 m in 0.01 s.
2. A cyclist travels for 30 minutes with an average speed of 10 km/h. How far does she travel?
3. What is the acceleration of a bus that goes from rest to a speed of 50 km/h in 10 seconds?
4. Johnny Hotfoot slams on the brakes of his car moving at 26.7 m/s and skids to a stop in 4 seconds. Calculate the deceleration of the car.
5. An apple drops from a tree and hits the ground in 1.4 s. How far does it fall?
6. You drop your pencil from your desk, which is 1.0 m above the floor. (1) How long does it take for the pencil to hit the floor? and (2) how fast is it going when it hits the floor?
7. A skydiver jumps from a helicopter hovering at high altitude. If there is no air resistance, how fast would she be falling 12 seconds after jumping?
8. If a baseball is thrown straight upward at 30 m/s, (1) how long will it take to reach the top of its path? And (2) how fast will it be traveling when it returns to the player's hand?

Phisci Common Assessment 1 – Linear Motion and Projectiles

Chapter 3 – Projectiles

Chapter 3 – Projectiles; p. 28 – 42.

Additional Problems – Appendix F; p. 663 – 665.

Answer the following questions to the best of your ability. Show your work to receive full credit.

Key Terms:

- *Horizontal component (3.4)* $v = \frac{d}{t}$ $d = vt$
- *Projectile (3.4)*
- *Resultant (3.2)*
- *Scalar (3.1)*
- *Vector (3.1)*
- *Vertical component (3.4)* $t = \sqrt{\frac{d}{5}}$

Review Questions/Problems:

1. An airplane glider is flying at 100 km/h due West. During the flight, the glider encounters a 20 km/h headwind (wind pushing the nose of the plane). Draw the vectors to scale and calculate the resultant velocity. [1 cm = 20 km/h].
2. Referring to problem #1, draw the vectors to scale and calculate the resultant velocity if there was a 20 km/h tailwind (wind pushing on the tail of the plane).
3. A man paddles across the Missouri River at 9 m/s North in his kayak. The river current is measured at 2 m/s flowing from West to East. Draw the vectors to scale and use the Pythagorean Theorem to calculate the resultant velocity. [1 cm = 2 m/s].
4. Three Physical Science students use a water balloon launcher to send a projectile a total distance of 28.3 m from the roof of the Ray-Pec High School South Building (6 m high). How fast was that projectile launched? Draw a picture to better explain your answer.
5. Referring to Problem #4, those same students use an air-powered cannon to launch the same projectile at a speed of 65 m/s. What is the new distance traveled by the projectile? Draw a picture to better explain your answer.

