

Planet Holloway **websheet Fall Review 1 (kinematics)**

AP Physics C - Chapter 1-3

You may print this out and write on it or work on your own paper.

Show all work.

1. A car is driving at 20 km/hr west. Later the same car is seen driving at 30 km/hr north. What is the direction of the average acceleration of the car?
2. If a 3 kg avocado falls for 0.6 m, how long did it fall?
3. A rocket car has an average acceleration of 55 m/s/s. What is the average speed of the car over 50 m if it started from 20 m/s?
4. A grapefruit is launched out of a cannon at 17 m/s at 25° above horizontal. What is the time in the air if the cannon was 5 m above the ground?
5. A water balloon dropped from rest achieves a speed of 37 m/s. How far did the water balloon fall?
6. Jackie runs 5 m west, then 12 m north, then 6 m east, then 4 m north, then 4 m east, then 8 m south. What is her displacement?
7. Two students walk around a circular track with a radius of 30 m. What is the displacement of student A who is halfway around the track and what is the displacement of student B who is one quarter of the way around the track?
8. A particle has a speed given by $v = c + bt^3$, what would be the displacement of the particle after 3 seconds have gone by? What would be its acceleration at 3 seconds?
9. Graph v vs. t for a ball thrown into the air at 30 m/s. What can be said about the graph? What is the total displacement (what is displacement based on in this graph?). What is the acceleration? (what determines the acceleration in this graph?) When is the speed of the particle increasing? (what determines speed on this graph?)
10. The velocity of an angry badger is given by $v = 2t^2 + 4t - 3$. What is the badger's position and acceleration at 3 seconds?

Answers:

1. 56.3° north of east
2. 0.35 s
3. 48.4 m/s
4. 1.95 s
5. 68.45 m
6. 9.43 m
7. 60 m, 42.4 m respectively
8. $3c + \frac{81b}{4}$, $27b$
9. zero, based on area under the curve;
-10 m/s/s, based on the slope of the function;
from 3 to 6 seconds, based on the absolute value of velocity, therefore when moving away from zero on the graph.
10. 27m, 16 m/s/s