

Physics Exam Review

2. a) 10.2 km 3SF f) 50,000 1 SF
b) 0.02 m 1SF
c) 5.0 cm 2SF
d) 307.0 km 4SF
e) 0.5060 4SF

3. a) 17.5 mL + 95 mL + 8.25 mL (when + and - answer same as fewest # of decimal places)
120.1 mL

b) 0.2 cm + 23.91 cm + 0.62 cm
24.7 cm

c) $\frac{72.5 \text{ min}}{60 \text{ min}} = 1.2 \text{ min}$ (when \times or \div answer same as measure w fewest SF)

d) $\frac{465 \text{ km}}{5.21 \text{ h}} = 89.3 \text{ km/h}$

e) 13.63 h - 0.5 h = 13.1 h

f) 22.4 h \times 0.1 h = 2 h

4. a) i) a and b $\frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 0}{1.5 - 0} = 5.3$

ii) b and c $\frac{y_2 - y_1}{x_2 - x_1} = \frac{6.5 - 8}{3 - 1.5} = -1$

iii) c and d $\frac{y_2 - y_1}{x_2 - x_1} = \frac{6.5 - 6.5}{6 - 3} = 0$

4. iv) d and e $\frac{y_2 - y_1}{x_2 - x_1} = \frac{1.5 - 6.5}{8 - 6} = \frac{-5}{2} = -2.5$

b) a to b

5. a) i. between 0 seconds and 11 seconds

$$v = 20\text{m/s} \quad t = 11 \text{ s}$$

$$a = \frac{v}{t}$$

$$a = \frac{20\text{m/s}}{11\text{s}}$$

$$a = 1.8 \text{ m/s}^2$$

ii. between 11 seconds and 48 seconds

$$t = 48\text{s} - 11\text{s}$$

$$t = 37 \text{ s}$$

$$v = 20\text{m/s}$$

$$a = \frac{v}{t}$$

$$a = \frac{20\text{m/s}}{37\text{s}}$$

$$a = 0.54 \text{ m/s}^2$$

b) $d = 1/2 v \times t$ in the triangular section 0 s to 11 s

$$d = 1/2 (20\text{m/s}) \times (11\text{s})$$

$$d_1 = 110\text{m}$$

$d = v \times t$ in the square section 11 s to 48 s

$$d = (20\text{m/s}) \times (37\text{s})$$

$$d_2 = 740 \text{ m}$$

$$\text{Total} = d_1 + d_2$$

$$= 110\text{m} + 740 \text{ m}$$

$$= 850 \text{ m}$$

6. Distance (m)

0
30
60
90
90
90
90
90
90

Time (s)

0
1
2
3
4
5
6
7
8

$$v = 30\text{m/s}$$

$$d = v \times t$$

$$= 30 \times 1$$

$$= 30$$

$$d = 30 \times 2$$

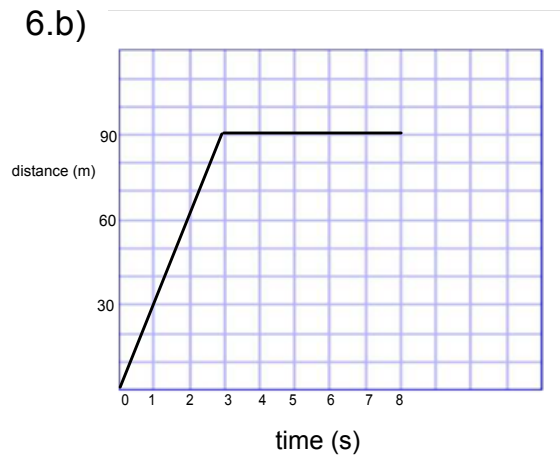
$$d = 60$$

$$d = 30 \times 3$$

$$= 90$$

If you stop your speed remains the same for 5 seconds

6.b)



7. a)

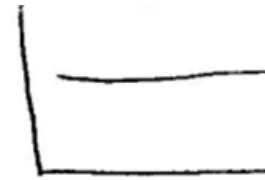
speed



time

b)

speed



time

8. If it takes 0.99s for an air bag to stop a person, what is the acceleration of a person moving at 15m/s and coming to a complete stop in that time?

$$t = 0.99\text{s}$$

$$v_1 = 15\text{ m/s}$$

$$v_2 = 0\text{ m/s}$$

$$a = ?$$

$$a = \frac{v_2 - v_1}{t} = \frac{0\text{ m/s} - 15\text{ m/s}}{0.99} = -14.85\text{ m/s}^2 = -15\text{ m/s}^2$$

$$9. t = 6.0\text{h}$$

$$d = 31\text{ km}$$

$$v = \frac{d}{t}$$

$$v = \frac{31\text{ km}}{6.0\text{ h}}$$

$$v = 5.2\text{ km/h}$$

The average speed of the hikers is 5.2 km/h.

$$10. t = 2.1\text{ h}$$

$$v = 3.6\text{ km/h}$$

$$d = vt$$

$$d = (3.6\text{ km/h})(2.1\text{ h})$$

$$d = 7.6\text{ km}$$

Mary walked 7.6 km.

$$11. t = 18\text{ h}$$

$$v = 210\text{ km/h}$$

$$d = vt$$

$$d = (210\text{ km/h})(18\text{ h})$$

$$d = 3780\text{ km}$$

The balloon flew a total distance of 3780 km.

12. A car travels a distance of 143m at an average speed of 95 km/h. How long did the trip take?

$$d = 143\text{ m}$$

$$v = 95\text{ km/h}$$

$$t = ?$$

$$t = \frac{d}{v} = \frac{143\text{ m}}{95\text{ km/h}} = 1.51\text{ h}$$

$$\begin{array}{ll}
 13. \ a = 1.5\text{m/s}^2 & v_2 = v_1 + a \times t \\
 \quad t = 10.0\text{s} & \quad = 0 + (1.5\text{m/s}^2) \times (10.0\text{s}) \\
 \quad v_1 = 0\text{m/s} & \quad v_2 = 15\text{m/s}
 \end{array}$$

Joese final speed is 15m/s

14. A train is accelerating at a rate of 2m/s^2 . If its initial speed is 20m/s and it travels for 30 seconds what is its final velocity?

$$\begin{array}{ll}
 a = 2\text{m/s}^2 & v_2 = v_1 + at \\
 v_1 = 20\text{m/s} & v_2 = 20\text{m/s} + (2\text{m/s}^2) (30\text{s}) \\
 t = 30\text{s} & v_2 = 20\text{m/s} + 60\text{m/s} \\
 v_2 = ? & v_2 = 80\text{m/s}
 \end{array}$$

15. While pulling a barge, a tugboat accelerates at 0.11 m/s^2 to produce a 5.0 m/s change in speed of the barge. How long did this take?

$$\begin{array}{ll}
 a = 0.11\text{ m/s}^2 & t = \frac{v}{a} = \frac{5.0\text{m/s}}{0.11\text{m/s}^2} = 45\text{ s} \\
 v = 5.0\text{m/s} & \\
 t = ? &
 \end{array}$$

16. The NASA Space Shuttle touches down on a runway and begins accelerating at a speed of -8.80 m/s^2 . It comes to a stop after 40 s on the runway. What was its speed when it hit the runway?

$$\begin{array}{ll}
 a = -8.80\text{m/s}^2 & v_1 = v_2 - at \\
 v_2 = 0\text{m/s} & v_1 = 0\text{m/s} - (-8.80\text{m/s}^2) (40\text{s}) \\
 t = 40\text{s} & v_1 = 0\text{m/s} - (-352\text{m/s}) \\
 & v_1 = 352\text{ m/s} \\
 & v_1 = 400\text{m/s}
 \end{array}$$

17. A runner achieves a velocity of 12.20 m/s ; 10.0 sec after he begins calculate his acceleration.

$$\begin{array}{ll}
 v = 12.20\text{m/s} & a = \frac{v}{t} = \frac{12.20\text{ m/s}}{10.0\text{s}} = 1.22\text{ m/s}^2 \\
 t = 10.0\text{ s} & \\
 a = ? &
 \end{array}$$

18. It takes Johnny 0.30 hour to drive to school. His route is 20.0 km long. What is Johnny's average speed on his drive to school?

$$\begin{array}{ll}
 t = 0.30\text{ h} & v = \frac{d}{t} = \frac{20.0\text{km}}{0.30\text{h}} = 67\text{ km/h} \\
 d = 20.0\text{ km} & \\
 v = ? &
 \end{array}$$

Sample Multiple Choice Answers

1. The average speed and the instantaneous speed will be the same in which one of the following examples?
 - a. an average speed taken at the bottom of an incline as a skateboarder travels up the incline and the instantaneous speed taken when he reaches the top of the incline
 - b. any point as a leaf is falling from a tree to the ground
 - c. a car traveling at 100km/h
 - d. a car traveling at 100km/h and then speeding up to 120 km/h

2. The slope of a line on a distance-time graph will determine the
 - a. Speed of the object
 - b. Distance of the object
 - c. Acceleration of the object
 - d. the amount of time the object moved

3. A horizontal line on a velocity time graph indicates the object is:
 - a. The objects velocity is increasing
 - b. Object is not moving
 - c. The objects velocity is decreasing
 - d. The objects velocity is constant