

ANSWERS Science 10: Exam Review: Physics

1. Define the following terms:

You can find the definitions in the glossary of your textbook as well as your notes

2. State the number of significant digits in each of the following values:

- a. 3SF
- b. 1SF
- c. 2SF
- d. 4SF
- e. 4SF
- f. 1SF

3. Evaluate each of the following using either the certainty or the precision rules for significant figures.

- a. 121
- b. 24.7 cm
- c. 1 min
- d. 89.3 km/h
- e. 13.1h
- f. 2h

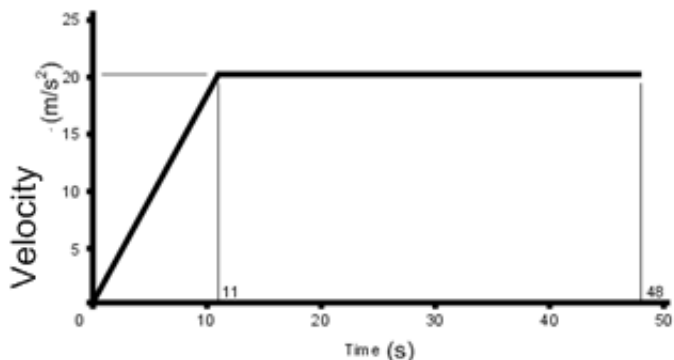
4. Use the following graph to answer the questions below:

a) What is the average speed between:

- i) a and b  $v = \frac{d_2 - d_1}{t_2 - t_1} = \frac{8 - 0}{1.5 - 0} = \frac{8}{1.5} = 5.3 \text{ m/s}$
- ii) b and c  $v = \frac{d_2 - d_1}{t_2 - t_1} = \frac{6.5 - 8}{3 - 1.5} = \frac{-1.5}{1.5} = -1 \text{ m/s}$
- iii) c and d  $v = \frac{d_2 - d_1}{t_2 - t_1} = \frac{6.5 - 6.5}{6 - 3} = \frac{0}{4} = 0 \text{ m/s}$
- iv) d and e  $v = \frac{d_2 - d_1}{t_2 - t_1} = \frac{1.5 - 6.5}{8 - 6} = \frac{-5}{2} = -2.5 \text{ m/s}$

b) Which line shows the greatest speed? From a to b

5. Use the following graph to answer the questions below:



a. What is the acceleration between:

i) between 0 seconds and 11 seconds

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

$$a = \frac{v}{t} = \frac{20\text{m/s}}{11\text{s}} = 1.8\text{m/s}^2$$

ii) 11 seconds and 48 seconds

$$t = 48\text{s} - 11\text{s} \quad v_1 = 20\text{m/s}$$

$$t = 37 \text{ s} \quad v_2 = 20\text{m/s}$$

$$a = \frac{v_2 - v_1}{t} = \frac{20\text{m/s} - 20\text{m/s}}{37\text{s}} = 0 \text{ m/s}^2$$

b. Determine the total distance travelled from 0 seconds to 48 seconds.

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

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

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

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

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

$$= 850 \text{ m}$$

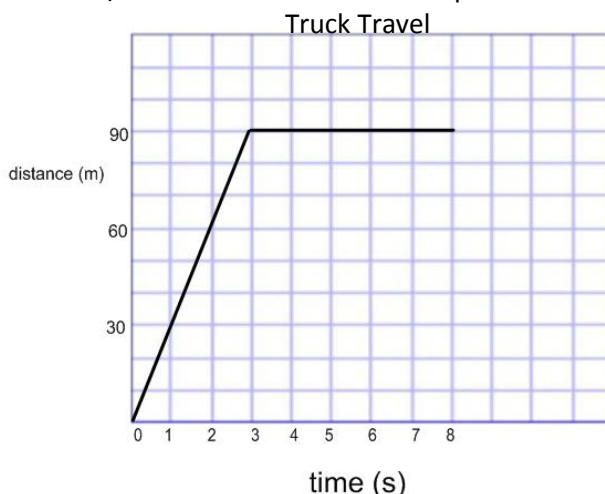
$d = v \times t$  in the square section 11 s to 48 s

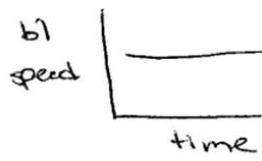
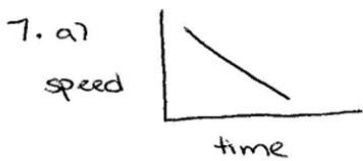
$$d = (20\text{m/s}) \times (37\text{s})$$

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

6. A truck travels a constant speed of 30m/s for 3 seconds and then stops for 5 seconds at a stop sign.

Distance (m)	Time (s)
0	0
30	1
60	2
90	3
90	4
90	5
90	6
90	7
90	8





Using the following formulas solve each of the following:

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?

$$t = 0.99s$$

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

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

$$a = ?$$

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

9. If two hikers walk the trans-Canada trail for 6.0h and covered 31km, what is their average speed for the day?

$$T = 6.0h$$

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

$$v = \frac{d}{t} = \frac{31 \text{ km}}{6.0h} = 5.2 \text{ km/h}$$

10. Mary walked for 2.1h at a speed of 3.6km/h. What distance did Mary travel?

$$T = 2.1h$$

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

$$d = vt = (3.6 \text{ km/h})(2.1h) = 7.6 \text{ km}$$

11. In the final leg of a round the world trip a balloon flew for 18h at an average of 210km/h. How far did it travel?

$$T = 18h$$

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

$$d = vt = (210 \text{ km/h})(18h) = 3800 \text{ km}$$

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

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

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

$$\text{convert } 95 \text{ km/h to m/s } \div 3.6 = 26 \text{ m/s}$$

$$t = \frac{d}{v} = \frac{143 \text{ m}}{26 \text{ m/s}} = 5.5 \text{ s}$$

13. Joe is accelerating from rest at a rate of 1.5m/s<sup>2</sup> for 10.0 sec. What is the final speed reached by Joe?

$$a = 1.5 \text{ m/s}^2$$

$$t = 10.0 \text{ s}$$

$$v_1 = 0 \text{ m/s}$$

$$v_2 = v_1 + a \times t$$

$$= 0 + (1.5 \text{ m/s}^2) \times (10.0 \text{ s})$$

$$v_2 = 15 \text{ m/s}$$

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

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

$$v_1 = 20 \text{ m/s}$$

$$t = 30 \text{ s}$$

$$v_2 = v_1 + at$$

$$v_2 = 20 \text{ m/s} + (2 \text{ m/s}^2)(30 \text{ s})$$

$$v_2 = 20 \text{ m/s} + 60 \text{ m/s}$$

$$v_2 = 80 \text{ m/s}$$

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

$$a = 0.11 \text{ m/s}^2$$

$$v = 5.0 \text{ m/s}$$

$$t = \frac{v}{a} = \frac{5.0 \text{ m/s}}{0.11 \text{ m/s}^2} = 45 \text{ s}$$

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

$$a = -8.80 \text{ m/s}^2$$

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

$$t = 40 \text{ s}$$

$$v_1 = v_2 - at$$

$$v_1 = 0 \text{ m/s} - (-8.80 \text{ m/s}^2)(40 \text{ s})$$

$$v_1 = 0 \text{ m/s} - (-352 \text{ m/s})$$

$$v_1 = 352 \text{ m/s}$$

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

$$v = 12.20 \text{ m/s}$$

$$t = 10.0 \text{ s}$$

$$a = \frac{v}{t} = \frac{12.20 \text{ m/s}}{10.0 \text{ s}} = 1.22 \text{ m/s}^2$$

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?

$$t = 0.30 \text{ h}$$

$$d = 20.0 \text{ km}$$

$$v = ?$$

$$v = \frac{d}{t} = \frac{20.0 \text{ km}}{0.30 \text{ h}} = 67 \text{ km/h}$$