

In Motion Review #1
(Definitions, Graphing Motion)

Answers

Part A – Multiple Choice

1. D
2. D
3. A
4. B
5. A
6. C
7. A

Part B – Constructed Response

1. A car travels 20 km North turns around, travels 40 km South and then travels 10 km North. Calculate the displacement of the car.

$$\begin{aligned} \text{positive direction} &= \text{North} \\ d &= 20\text{km} - 40\text{km} + 10\text{km} \\ d &= -10\text{km or } 10\text{km South} \end{aligned}$$

2. A bicycle travels 210 m West in 30 s. Calculate the velocity of the bicycle.

$$\begin{aligned} v &= \frac{d}{t} \\ v &= \frac{210}{30} \\ v &= 7 \text{ m/s West} \end{aligned}$$

3. A boy walks for 120 s at a speed of 1.5 m/s. How far does he go?

$$\begin{aligned} v &= \frac{d}{t} \\ 1.5 &= \frac{d}{120} \\ d &= 180 \text{ m} \end{aligned}$$

4. A girl runs a 200 m race at a speed of 2.0 m/s. How long does it take her?

$$\begin{aligned} v &= \frac{d}{t} \\ 2 &= \frac{200}{t} \\ t &= 100 \text{ s} \end{aligned}$$

5. A drag racer accelerates from rest (0 m/s) to 35 m/s in 5 s. Calculate the acceleration.

$$a = \frac{v}{t}$$
$$a = \frac{35 - 0}{5}$$
$$a = 7 \text{ m/s}^2$$

6. A car slows down at a rate of 1.2 m/s² from a speed of 25 m/s. How long does it take the car to stop?

$$a = \frac{v}{t}$$
$$1.2 = \frac{0 - 25}{t}$$
$$t = 20.8 \text{ s}$$

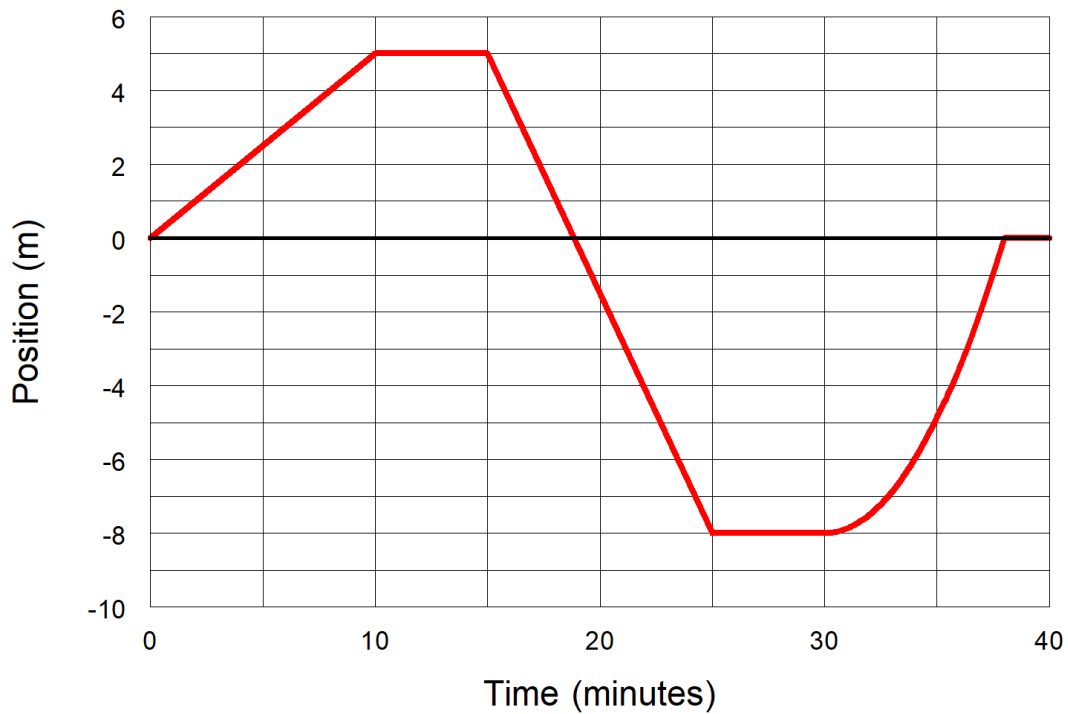
7. A rocket, starting from rest, accelerates at a rate of 8.0 m/s². How fast is going after 10 s?

$$a = \frac{v}{t}$$
$$8 = \frac{v_f - 0}{10}$$
$$v_f = 80 \text{ m/s}$$

8. A train accelerating at a rate of -2.0 m/s² comes to a stop in 60 s. How fast was it originally traveling?

$$a = \frac{v}{t}$$
$$-2 = \frac{0 - v_i}{60}$$
$$v_i = 120 \text{ m/s}$$

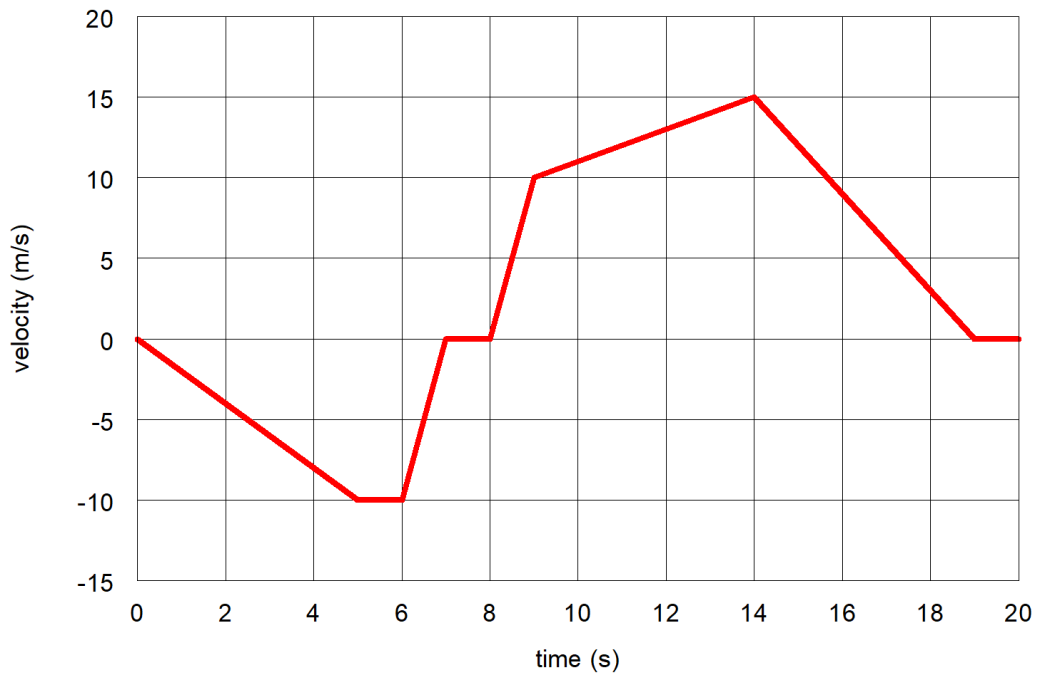
9. The following position-time graph represents the position of a boy walking along the sidewalk. Positive position is North.



Describe the motion during the following time intervals.

- (a) 0 – 10 minutes walking north at a constant velocity
- (b) 10 – 15 minutes stationary
- (c) 20 – 25 minutes walking south at a constant velocity
- (d) 30 – 35 minutes walking north while speeding up

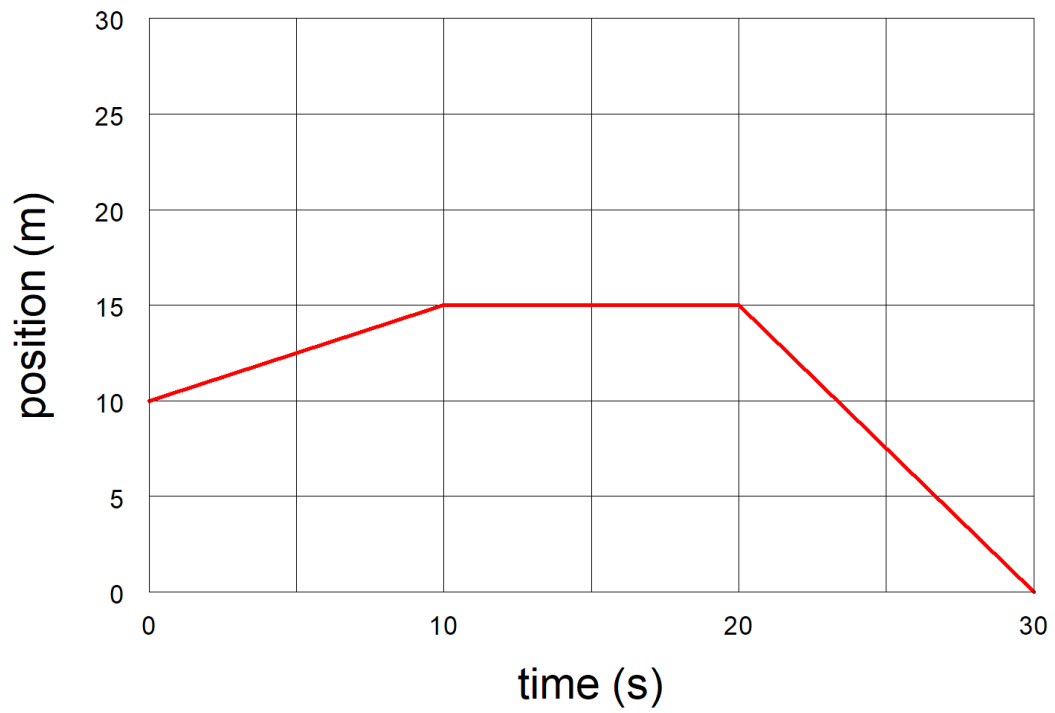
10. The following velocity-time graph represents the movement of a toy car. The positive direction is east.



Describe the motion during the following time intervals:

- (a) 0-5 s moving west, speeding up
- (b) 5-6 s moving west, constant velocity
- (c) 6-7 s moving west, slowing down
- (d) 7-8 s stationary
- (e) 14-19 s moving east, slowing down

11. A dog, starting at a position of 10 m, walks forwards at a speed of 0.5 m/s for 10 s. The dog stops for 10 s and then runs back with a speed of 1.5 m/s for 10 s. Create a position-time graph to represent the motion of the dog.



12. A car, starting with a speed of 25 m/s, slows down at a rate of 2.0 m/s^2 for 10 s. The car maintains this speed for 10 s and then accelerates at a rate of 1.5 m/s^2 for 10 s. Graph the speed of the car with respect to time.

