

10.	$v_0$	$v_f$	$a$	$d$	$t$
	0	X	$9.80 \text{ m/s}^2$	50.0 m	

Find how far it falls in the 1<sup>st</sup> 2 seconds

$$\begin{aligned} d &= v_0 t + \frac{1}{2} a t^2 \\ &= \frac{1}{2} (9.80 \text{ m/s}^2) (2.00 \text{ s})^2 \\ &= 19.6 \text{ m} \end{aligned}$$

Now, find how far it falls in the 1<sup>st</sup> 3 seconds

$$\begin{aligned} d &= v_0 t + \frac{1}{2} a t^2 \\ &= \frac{1}{2} (9.80 \text{ m/s}^2) (3.00 \text{ s})^2 \\ &= 44.1 \text{ m} \end{aligned}$$

Difference is  $44.1 \text{ m} - 19.6 \text{ m} = 24.5 \text{ m}$

11. a)  $v_{\text{average}} = \frac{v_f + v_0}{2}$

$$= \frac{50.0 \text{ m/s} + 0}{2}$$

$$= 25.0 \text{ m/s left}$$

b) Reading the graph: 4.0 s

12.	$v_0$	$v_f$	$a$	$d$	$t$
	0		$9.80 \text{ m/s}^2$	7.0 m	X

Find either  $v_f$  or  $t$

$$\begin{aligned} v_f^2 &= v_0^2 + 2ad \\ &= 2(9.80 \text{ m/s}^2)(7.0 \text{ m}) \end{aligned}$$

$$v_f = 11.7 \text{ m/s}$$

$$\begin{aligned} v_{\text{average}} &= \frac{v_f + v_0}{2} \\ &= \frac{11.7 \text{ m/s} + 0}{2} \\ &= 5.9 \text{ m/s down} \end{aligned}$$

13.  $v_{\text{average}} = \frac{d}{t}$

$$\begin{aligned} t &= \frac{d}{v_{\text{average}}} \\ &= \frac{7.0 \text{ m}}{5.9 \text{ m/s}} \\ &= 1.2 \text{ s} \end{aligned}$$

14. The average velocity occurs at the mid-time in uniform accelerated motion. Therefore, the average velocity occurs at 0.60 s.

15.  $v_{\text{average}} = \frac{v_f + v_0}{2}$

$$12.0 \text{ m/s} = \frac{v_f - 0}{2}$$

$$v_f = 24.0 \text{ m/s}$$

$v_0$	$v_f$	$a$	$d$	$t$
0	24.0 m/s	$9.80 \text{ m/s}^2$	X	?

$$\begin{aligned} a &= \frac{v_f - v_0}{t} \\ t &= \frac{24.0 \text{ m/s} - 0}{9.80 \text{ m/s}^2} \\ &= 2.45 \text{ s} \end{aligned}$$

16.	$v_0$	$v_f$	$a$	$d$	$t$
	0	X	?	10.0 m	1.20 s

$$d = v_0 t + \frac{1}{2} a t^2$$

$$10.0 \text{ m} = \frac{1}{2} (a) (1.20 \text{ s})^2$$

$$\begin{aligned} a &= \frac{2(10.0 \text{ m})}{(1.20 \text{ s})^2} \\ &= 13.9 \text{ m/s}^2 \end{aligned}$$

17.	$v_0$	$v_f$	$a$	$d$	$t$
	0	19.6 m/s	?	24.0 m	X

$$\begin{aligned} v_f^2 &= v_0^2 + 2ad \\ (19.6 \text{ m/s})^2 &= 2(a)(24.0 \text{ m}) \\ a &= \frac{(19.6 \text{ m/s})^2}{2(24.0 \text{ m})} \\ &= 8.00 \text{ m/s}^2 \end{aligned}$$

18.	$v_0$	$v_f$	$a$	$d$	$t$
	0	11.0 m/s	?	X	1.50 s

$$\begin{aligned} a &= \frac{v_f - v_0}{t} \\ &= \frac{11.0 \text{ m/s} - 0}{1.50 \text{ s}} \\ &= 7.33 \text{ m/s}^2 \end{aligned}$$