

ANSWERS AND SOLUTIONS

4. 

$v_0$	$v_f$	$a$	$d$	$t$
9.4 m/s	-7.4 m/s	X	?	3.0 s

$$d = \left( \frac{v_f + v_0}{2} \right) t$$

$$= \left( \frac{-7.4 \text{ m/s} + 9.4 \text{ m/s}}{2} \right) (3.0 \text{ s})$$

$$= 3.0 \text{ m}$$

5. 

$v_0$	$v_f$	$a$	$d$	$t$
15.0 m/s	-8.0 m/s	-9.80 m/s <sup>2</sup>	?	X

$$v_f^2 = v_0^2 + 2ad$$

$$(-8.0 \text{ m/s})^2 = (15.0 \text{ m/s})^2 + 2(-9.80 \text{ m/s}^2) d$$

$$d = \frac{(-8.0 \text{ m/s})^2 - (15.0 \text{ m/s})^2}{2(-9.80 \text{ m/s}^2)}$$

$$= 8.2 \text{ m}$$

6. 

$v_0$	$v_f$	$a$	$d$	$t$
-5.0 m/s	-12.0 m/s	-9.80 m/s <sup>2</sup>	X	?

$$a = \frac{v_f - v_0}{t}$$

$$-9.80 \text{ m/s}^2 = \frac{-12.0 \text{ m/s} - (-5.0 \text{ m/s})}{t}$$

$$t = 0.71 \text{ s}$$

7. 

$v_0$	$v_f$	$a$	$d$	$t$
?	0	X	2.6 m	3.6 s

$$d = \left( \frac{v_f + v_0}{2} \right) t$$

$$2.6 \text{ m} = \left( \frac{0 + v_0}{2} \right) (3.6 \text{ s})$$

$$v_0 = \frac{(2.6 \text{ m})2}{3.6 \text{ s}}$$

$$= 1.4 \text{ m/s}$$

8. 

$v_0$	$v_f$	$a$	$d$	$t$
10.0 m/s	?	-9.80 m/s <sup>2</sup>	5.0 m	X

$$v_f^2 = v_0^2 + 2ad$$

$$= (10.0 \text{ m/s})^2 + 2(-9.80 \text{ m/s}^2)(5.0 \text{ m})$$

$$v_f = -1.4 \text{ m/s}$$

9. 

$v_0$	$v_f$	$a$	$d$	$t$
25.0 m/s	?	-9.80 m/s <sup>2</sup>	X	3.0 s

$$a = \frac{v_f - v_0}{t}$$

$$-9.80 \text{ m/s}^2 = \frac{v_f - 25.0 \text{ m/s}}{3.0 \text{ s}}$$

$$v_f = (3.0 \text{ s})(-9.80 \text{ m/s}^2) + 25.0 \text{ m/s}$$

$$= -4.4 \text{ m/s}$$

10. 

$v_0$	$v_f$	$a$	$d$	$t$
2.0 m/s	?	X	2.8 m	1.5 s

$$d = \left( \frac{v_f + v_0}{2} \right) t$$

$$2.8 \text{ m} = \left( \frac{v_f + 2.0 \text{ m/s}}{2} \right) (1.5 \text{ s})$$

$$v_f = \frac{2(2.8 \text{ m})}{1.5 \text{ s}} - 2.0 \text{ m/s}$$

$$= 1.7 \text{ m/s}$$

11. 

$v_0$	$v_f$	$a$	$d$	$t$
?	X	-9.80 m/s <sup>2</sup>	5.0 m	3.0 s

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

$$5.0 \text{ m} = v_0 (3.0 \text{ s}) + \frac{1}{2} (-9.80 \text{ m/s}^2) (3.0 \text{ s})^2$$

$$v_0 = \frac{5.0 \text{ m} - \frac{1}{2} (-9.80 \text{ m/s}^2) (3.0 \text{ s})^2}{3.0 \text{ s}}$$

$$= 16 \text{ m/s}$$

12. 

$v_0$	$v_f$	$a$	$d$	$t$
2.2 m/s	-1.1 m/s	?	X	2.0 s

$$a = \frac{v_f - v_0}{t}$$

$$= \frac{-1.1 \text{ m/s} - 2.2 \text{ m/s}}{2.0 \text{ s}}$$

$$= -1.7 \text{ m/s}^2$$