

18.	v_0	v_f	a	d	t
	?	25.0 m/s	0.900 m/s ²	37.0 m	X

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

$$(25.0 \text{ m/s})^2 = v_0^2 + 2(0.900 \text{ m/s}^2)(37.0 \text{ m})$$

$$v_0 = 23.6 \text{ m/s south}$$

19.	v_0	v_f	a	d	t
	0	?	1.4 m/s ²	?	5.0 s

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

$$= \frac{1}{2} (1.4 \text{ m/s}^2)(5.0 \text{ s})^2$$

$$= 18 \text{ m}$$

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

$$1.4 \text{ m/s}^2 = \frac{v_f - 0}{5.0 \text{ s}}$$

$$v_f = 7.0 \text{ m/s down}$$

20.
$$v_{\text{average}} = \frac{d}{t}$$

$$d = (v_{\text{average}})t$$

$$= (9.60 \text{ m/s})(2.70 \text{ s})$$

$$= 25.9 \text{ m right}$$

21.	v_0	v_f	a	d	t
	0	12.4 m/s	3.10 m/s ²	?	4.00 s

You can use any formula except $a = \frac{v_f - v_0}{t}$

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

$$= \frac{1}{2} (3.10 \text{ m/s}^2)(4.00 \text{ s})^2$$

$$= 24.8 \text{ m south}$$

22.	v_0	v_f	a	d	t
	0	10.0 m/s	?	12.5 m	2.50 s

You can use any formula except $d = \left(\frac{v_f + v_0}{2}\right)t$

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

$$= \frac{10.0 \text{ m/s} - 0}{2.50 \text{ s}}$$

$$= 4.00 \text{ m/s}^2 \text{ west}$$

23.	v_0	v_f	a	d	t
	0	X	?	19.6 m	Find from v_{average}

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

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

$$= \frac{19.6 \text{ m}}{5.00 \text{ m/s}}$$

$$= 3.92 \text{ s}$$

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

$$19.6 \text{ m} = \frac{1}{2} (a)(3.92 \text{ s})^2$$

$$a = 2.55 \text{ m/s}^2 \text{ east}$$

24.	v_0	v_f	a	d	t
	X	?	1.00 m/s ²	417.2 m	27.0 s

Find v_0 first

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

$$417.2 \text{ m} = v_0 (27.0 \text{ s}) + \frac{1}{2} (1.00 \text{ m/s}^2)(27.0 \text{ s})^2$$

$$v_0 = \frac{417.2 \text{ m} - \frac{1}{2} (1.00 \text{ m/s}^2)(27.0 \text{ s})^2}{27.0 \text{ s}}$$

$$= 1.95 \text{ m/s}$$

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

$$1.00 \text{ m/s}^2 = \frac{v_f - 1.95 \text{ m/s}}{27.0 \text{ s}}$$

$$v_f = (27.0 \text{ s})(1.00 \text{ m/s}^2) + 1.95 \text{ m/s}$$

$$= 29.0 \text{ m/s east}$$