P20 Algebra Review.

1. $20 m/s = \frac{45 m}{t}$ $\quad t = \frac{45 m}{20.00 m/s} = 2.3 s$

2. $0.030 m/s = \frac{\vec{d}}{12.0 s}$ $\quad \vec{d} = (0.030 m/s)(12.0 s) = 0.360 m$

3. $2.5 m/s^2 = \frac{\vec{v}_f - 4.5 m/s}{8 s}$ (×8 s)

$202.5 m/s = \vec{v}_f - 4.5 m/s$ (+4.5 m/s)

$207 m/s = \vec{v}_f$

$\vec{v}_f = 2.1 \times 10^2 m/s$

4. $23.00 m/s^2 = \frac{5.2 m/s - \vec{v}_1}{1.50 s}$ (×1.50 s)

$34.5 m/s = 5.2 m/s - \vec{v}_1$ (−5.2 m/s)

$29.3 m/s = -\vec{v}_1$ (×−1)

$\vec{v}_1 = -29 m/s$

5. $73.0 m = \frac{(1.9 m/s + \vec{v}_1)(5.70 s)}{2}$ (×5.70 s, ÷2)

$416.1 m = (1.9 m/s + \vec{v}_1)$ (×2)

$25.6 m/s = 1.9 m/s + \vec{v}_1$ (−1.9 m/s)

$24 \frac{m}{s} = \vec{v}_1$

6. $97.9\,m = \frac{(7.6\,m/s + 44.7\,m/s)}{2}\,t$ (×2)

$195.8\,m = (52.3\,m/s)\,t$

$3.7\,s = t$

7. $32.0\,m = (\cancel{2.11\,m/s})(12.5\,s) + \frac{1}{2}(13.55\,m/s^2)(12.5\,s)^2$

$32.0\,m = \vec{v}_i(12.5\,s) + 1058.5938\,m$
$-1058\,m \qquad -1058\,m$

$-1026.5938\,m = \vec{v}_i(12.5\,s)$

$\vec{v}_i = -82.1\,m/s$

8. $50.0\,m = (2.11\,m/s)(0.050\,s) + \frac{1}{2}\vec{a}(0.050\,s)^2$

$-0.1055\,m \qquad -0.1055\,m$

$50.0\,m = 0.1055\,m + (0.00125\,s^2)\vec{a}$

$49.8945\,m = (0.00125\,s^2)\vec{a}$

$\vec{a} = 4.0 \times 10^4\,m/s^2$

9. $(3.40\,m/s)^2 = \vec{v}_i^{\,2} + 2(0.045\,m/s^2)(10.1\,m)$

$11.56\,m^2/s^2 = \vec{v}_i^{\,2} + 0.909\,m^2/s^2$

$-0.909 \qquad -0.909$

$\sqrt{10.651\,m^2/s^2} = \sqrt{\vec{v}_i^{\,2}}$ $\qquad \vec{v}_i = 3.3\,m/s$

10. $(12\,m/s)^2 = (20.1\,m/s)^2 + 2(1.5\,m/s^2)\vec{d}$

$144\,m^2/s^2 = 404.01\,m^2/s^2 + (3\,m/s^2)\vec{d}$

$-404.01 \qquad -404.01$

$-260.01\,m^2/s^2 = (3\,m/s^2)\vec{d}$ $\qquad \vec{d} = -87\,m$