The 5 Kinematics Equations Practice

1. $\vec{v}_1 = 2.28\times10^2\ m/s$ [fwd]
$\vec{a} = 6.25\times10^1\ m/s^2$ [fwd]
$\vec{d} = 1.86\ km$ [fwd]
$= 1860\ m$
$\vec{v}_2 = ?$

$v_2^2 = v_1^2 + 2ad$
$v_2^2 = (2.28\times10^2\ m/s)^2 + 2(62.5\ m/s^2)(1860\ m)$
$v_2^2 = 284484\ m^2/s^2$
$\vec{v}_2 = 533\ m/s$ [fwd]

2. $v_1 = 0\ m/s$
$\vec{a} = 4.1\ m/s^2$ [S]
$d = 51\ m$ [S]
$t = ?$

$d = v_1 t + \frac{1}{2}at^2$
$51 = 0t + \frac{1}{2}(4.1)t^2$
$51 = 2.05t^2$
$t = 5.0\ s$

3. $\vec{v}_1 = 52\ m/s$ [W]
$\vec{a} = 2.8\ m/s^2$ [W]
$t = 5.0\ s$
$\vec{v}_2 = ?$

$v_2 = v_1 + at$
$\vec{v}_2 = (52\ m/s) + (2.8)(5.0)$
$v_2 = 66\ m/s$ [W]

4. $a = |4g|$
$= -39.2\ m/s^2$
$t = 0.82\ s$
$v_2 = 0\ m$
$d = ?$

$d = v_2 t - \frac{1}{2}at^2$
$d = (0)(0.82) - \frac{1}{2}(-39.2\ m/s^2)(0.82\ s)^2$
$d = 13.2\ m$
$d = 13\ m$

5. $\vec{v}_2 = 12\ m/s$ [N]
$t = 3.0\ s$
$d = 58\ m$ [N]
$\vec{v}_1 = ?$

$d = \left(\frac{v_1 + v_2}{2}\right)t$
$\frac{2d}{t} - v_2 = v_1$

$58 = \frac{v_1 + 12}{2}(3.0)$

$v_1 = \frac{2(58)}{3.0} - 12\ m/s$
$\vec{v}_1 = 27\ m/s$ [N]