NAME FREE FALL PRACTICE

TITLE POE - KINEMATICS

DATE

PERIOD

1) $v_i = 0\ m/s$
$a = g = -9.8\ m/s^2$
$t = 4.0\ s$
$v_f = ?$

$v_f = v_i + at$
$= 0 + (-9.8\ m/s^2)(4.0\ s) = \boxed{-39.2\ m/s}$

NEG TELLS ME ITS GOING DOWN

$\Delta y = v_i t + \frac{1}{2}at^2$
$= \frac{1}{2}(-9.8\ m/s^2)(4.0\ s)^2 = \boxed{-78.4\ m}$

NEG SAYS IT IS BELOW STARTING POINT

2) $v_i = -8.0\ m/s$
$t = 4.0\ s$
$a = g = -9.8\ m/s^2$

$v_f = v_i + at$
$= -8\ m/s + (-9.8\ m/s)(4.0\ s) = \boxed{-47.2\ m/s}$

$\Delta y = (-8\ m/s)(4\ s) + \frac{1}{2}(-9.8\ m/s^2)(4.0\ s)^2 = \boxed{110.4\ m}$

3) $v_i = 8.0\ m/s$
$t = 4.0\ s$
$a = g = -9.8\ m/s^2$

$v_f = v_i + at$
$= 8\ m/s + (-9.8\ m/s^2)(4.0\ s) = \boxed{-31.2\ m/s}$

$\Delta y = v_i t + \frac{1}{2}at^2$
$= (8\ m/s)4\ s + \frac{1}{2}(-9.8\ m/s^2)(4.0\ s)^2$
$= \boxed{-46.4\ m}$

4) $v_i = 8.0\ m/s$
$v_f = 3.0\ m/s$
$a = g = -9.8\ m/s^2$

a) $t = ?$

$t = \frac{v_f - v_i}{a} = \frac{3\ m/s - 8\ m/s}{-9.8\ m/s^2} = \boxed{.51\ s}$

b) $\Delta y = ?$

$v_f^2 = v_i^2 + 2a\Delta y$ or $\Delta y = \frac{v_f^2 - v_i^2}{2a}$

$\Delta y = \frac{(3\ m/s)^2 - (8\ m/s)^2}{2(-9.8\ m/s^2)} = \boxed{2.81\ m}$

NAME

TITLE

DATE

PERIOD

4...

c) $V_f = -3\,m/s$ $\quad \Delta y = ?$

$$t = \frac{V_f - V_i}{a} = \frac{-3\,m/s - 8\,m/s}{-9.8\,m/s^2} = \boxed{1.12\,s}$$

$$\Delta y = \frac{V_f^2 - V_i^2}{2a} = \frac{(-3\,m/s)^2 - (8\,m/s)^2}{2(-9.8\,m/s^2)} = \boxed{2.81\,m}$$

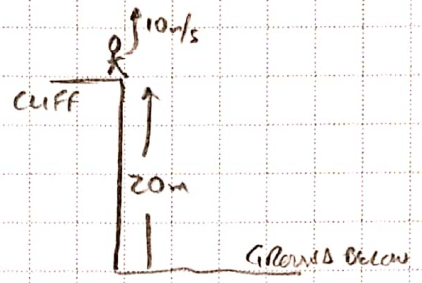
5) $V_i = 10\,m/s$

$V_{TOP} = V_f = 0\,m/s$

$a = g = -9.8\,m/s^2$

$y_i = 20\,m$

$y_{max} = y_f = ?$



$$V_f^2 = V_i^2 + 2a\Delta y$$

$$y_f - y_i = \Delta y = \frac{V_f^2 - V_i^2}{2a}$$

$$y_f = \frac{\cancel{V_f^{\,0}} - V_i^2}{2a} + y_i$$

$$y_f = \frac{-V_i^2}{2a} + y_i = \frac{-(10\,m/s)^2}{2(-9.8\,m/s^2)} + 20m = \boxed{25.1\,m}$$

ONLY 5.1 IF YOU DON'T MEASURE FROM GROUND BUT FROM CLIFF

$$t = \frac{\cancel{V_f^{\,0}} - V_i}{a} = \frac{-10\,m/s}{-9.8\,m/s^2} = \boxed{1.02\,s}$$