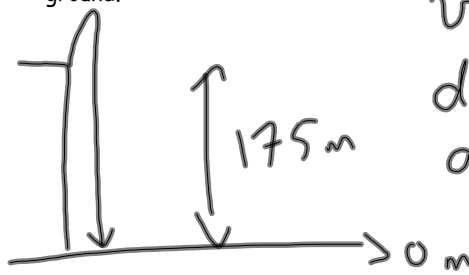


1. A boulder is thrown from a 175 m high cliff towards an approaching monster. Its initial upwards velocity is 57 m/s.

- Calculate the maximum height above the ground the boulder travels.
- Calculate the vertical velocity when the boulder is 75 m above the ground.



$$v_0 = 57 \text{ m/s}$$

$$d_0 = 175 \text{ m}$$

$$a = -9.81$$

$$v_f = 0 \text{ @ max height}$$

time = ?
do not need

$$v_f^2 = v_0^2 + 2a\vec{d}$$

$\nwarrow d_f - d_0$

$$0^2 = (57)^2 + 2(-9.81)(d_f - 175)$$

$$0^2 = 3249 - 19.62(d_f - 175)$$

$$0 = 3249 - 19.62d_f + 3433.5$$

$$-6682.5 = -19.62d_f$$

$$\boxed{340 \text{ m} = d_f}$$

b) $v_f = ?$ $d_f = 75 \text{ m}$

$$v_f^2 = v_0^2 + 2a\vec{d}$$

$\nwarrow d_f - d_0$

$$v_f^2 = (57)^2 + 2(-9.81)(75 - 175)$$

$$= 3249 + 1962$$

$$v_f^2 = 5211$$

$$v_f = \sqrt{5211}$$

$$= +72.2 \text{ m/s}$$

↑
up

or

$$\boxed{-72.2 \text{ m/s}}$$

↑
down

2. A fighter jet initially flying 385 m/s [W] turns to fly 200 m/s [E]. This happens in 16 seconds.

a. Calculate the acceleration of the plane.

b. Calculate the displacement of the plane in that time.

$$a) \quad a = \frac{v_f - v_o}{t}$$

$$v_f = 200 \text{ m/s}$$

$$v_o = -385 \text{ m/s}$$

$$t = 16 \text{ s}$$

$$a = \frac{200 - (-385)}{16} = \frac{585}{16} = \boxed{36.6 \text{ m/s}^2}$$

$$b) \quad d_f = ? \quad d_f = d_o + v_o t + \frac{1}{2} a t^2$$

$$d_f = 0 + (-385)(16) + \frac{1}{2}(36.6)(16)^2$$

$$= -6160 + 4684.8$$

$$= \boxed{-1475 \text{ m}}$$