1.

a). $s = v_i t + \frac{1}{2} a t^2$

$s = 0 + \frac{1}{2} \times 3.2 \times 30^2$

$s = 1440 m$

b) $t = \sqrt{\frac{2s}{a}}$

$t = \sqrt{\frac{8}{9.81}}$

$= 0.903$ seconds

$v = at$

$= 3.2 \times 0.903 \times 9.81$

$= 8.86 ms^{-1}$

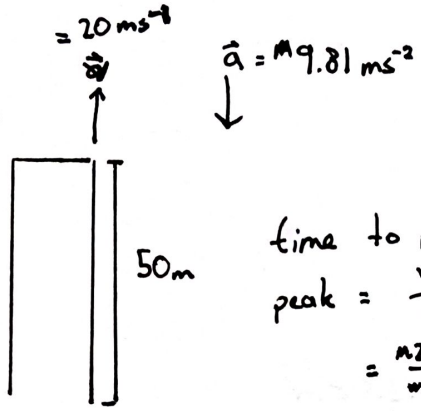
or

$V_f = 2s/t$

$V = 8/9.81$

$= 8.86 ms^{-1}$

2.) a)



time to reach peak $= \frac{v}{a}$

$= \frac{-20}{-9.81}$

$= 2.04 s$

distance up $s = 0t + \frac{1}{2} \times -9.81 \times 2.04^2$

$s = 20.4 m$

distance down $= 50 + 20.4 = 70.4 m$

$t = \sqrt{\frac{2s}{a}}$ $t = \sqrt{\frac{2 \times 70.4}{9.81}}$ $t = 3.79 s$

~~$x = at$~~ ~~v~~ total time $= 2.04 + 3.79 = \underline{5.83 s}$

b.) time till stone reaches top $= 2.04 s$

3.) time for fish to reach reef:

$t = \frac{d}{v}$ $t = \frac{-10}{-3} = 3 + \frac{1}{3}$ seconds.

time for shark to de-celerate:

$t = \frac{v}{a}$ $t = \frac{5}{6} = 0.8\bar{3}$ seconds.

Displacment from $x = 0$:

$s = v_i t + \frac{1}{2} \times a \times t^2$

$s = 5 \times 0.83 + (\frac{1}{2} \times -6 \times 0.83^2)$

$s = 2.08\,m$

total distance to travle $= -2.08 + -10 = -12.08\,m$

$t = \sqrt{\frac{2s}{a}}$ $t = \sqrt{\frac{-24.16}{-6}}$ $t = 2$ seconds

total time for shark $= 2 + 2.08 = 4.08$ seconds.

No. The shark dosen't catch the fish.

4.)

4.)

$s_1 = v_i t + \frac{1}{2} a t^2$ $\quad v_i = 0$

$s_1 = \frac{1}{2} a t^2$

also

$s_2 = vt^2$ where $v = at^2$

Therefor $s_2 = (at^2)t^2$

$s^T = \frac{1}{2} at^2 + (at^2)t$

$s^T = 100$ solve for a

$a = 2.77\ ms^{-2}$

We could also find the area under the curve from 0-4 seconds to find velocity and then acceleration

$\frac{1}{2} \times 4 \times x + 7x = 100$

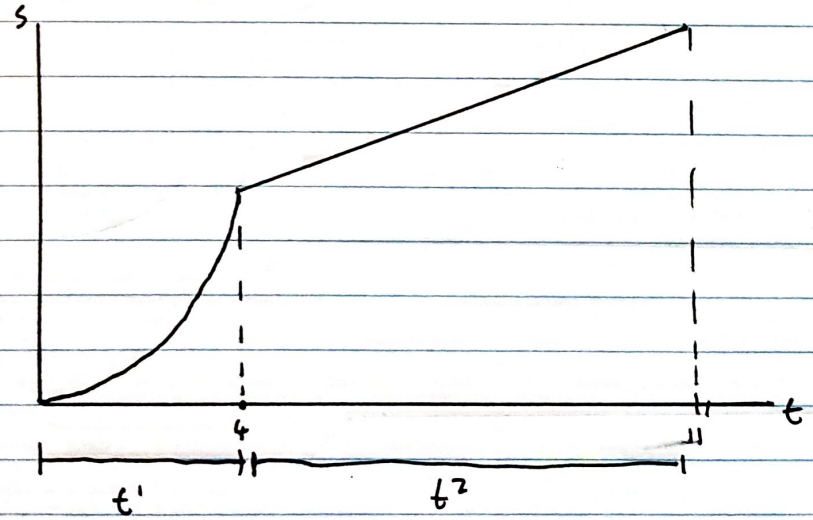
$9x = 11$

$x = 11.111\ldots$

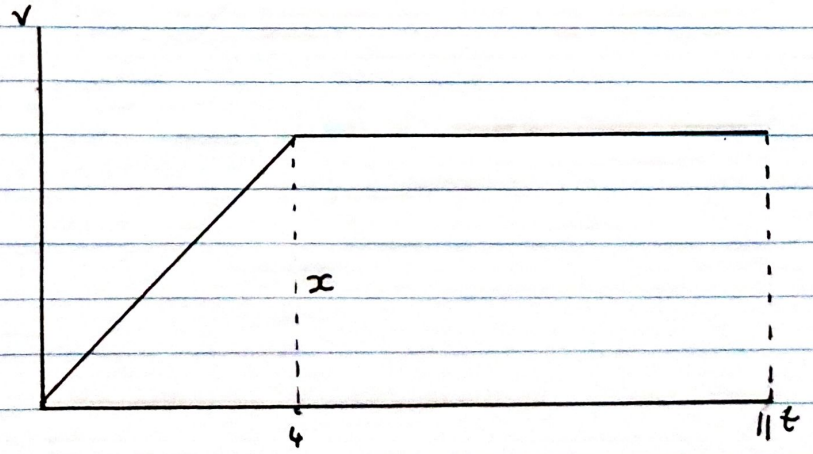
$a = \frac{v}{t}$

$a = \frac{11.111}{4}$

$a = 2.77 ms^{-2}$



Displacment vs time



Velocity vs time