

Example #3

- Pg. 224 #14

$$P = -4x^2 + 20x - 9$$

a) break even points = zeros

$$P = -4x^2 + 20x - 9$$

$$P = -(4x^2 - 20x + 9)$$

$$= -(4x^2 - 2x \cancel{- 18} x + 9)$$

$$= -[2x(2x-1) \quad -9(2x-1)]$$

$$= -(2x-9)(2x-1)$$

$$a = 4$$

$$c = 9$$

$$ac = 36$$

$$\begin{array}{r} -1 \\ -2 \\ \hline -36 \\ -18 \end{array}$$

$$P = -(2x-9)(2x-1)$$

$$2x-9=0$$

$$2x=9$$

$$x = \frac{9}{2}$$

$$x = 4.5$$

$$2x-1=0$$

$$2x=1$$

$$x = \frac{1}{2}$$

$$x < 0.5$$

x is the number of games in hundreds of thousands.

$$\therefore 4.5 \times 100000 = 450000$$

$$0.5 \times 100000 = 50000$$

The company breaks even if they produce 50000 or 450000 games.

b) * I'm answering part c) first because I need it to find vertex

b) c) A.O.S. $x = \frac{0.5 + 4.5}{2}$

$$x = \frac{5}{2}$$

$$x = 2.5$$

$$\therefore 2.5 \times 100,000 = 250,000$$

The company makes maximum profit
when they produce 250,000 games.

$$P = -(2x - 9)(2x - 1)$$

$$P = -(2(2.5) - 9)(2(2.5) - 1)$$

$$P = -(-4)(4)$$

$$P = 16$$

$$\therefore 16 \times \$1,000,000 \\ = \$16,000,000$$

The Company makes a maximum profit
of \$16,000,000 when they make
250,000 video games.

Consolidation

- Identify the type of algebraic expression and the factoring strategies you would use to factor the expression. Factor fully.
- Determine the zeros and the vertex.
- State solution to the given problem.



Pg. 216 #11

$$h = -5t^2 + 10t + 75$$

a) Standard form

$$h \text{ int.} = 75 \text{ m}$$

b) maximum \rightarrow vertex

- ① Find the zeros
- ② Find the A.O.S. (t coordinate of vertex)
- ③ Use t coordinate of vertex to det. max. height.

$$① h = -5t^2 + 10t + 75$$

$$h = -5(t^2 - 2t - 15)$$

$$h = -5(t-5)(t+3)$$

zeros $t=5, t=-3$

-1, 15

-15, 1

-5, 3

A.O.S.

$$t = \frac{-3+5}{2}$$

$$t = \frac{2}{2}$$

$$t = 1 \text{ s}$$

Rock reaches maximum height
1 second after it is thrown.

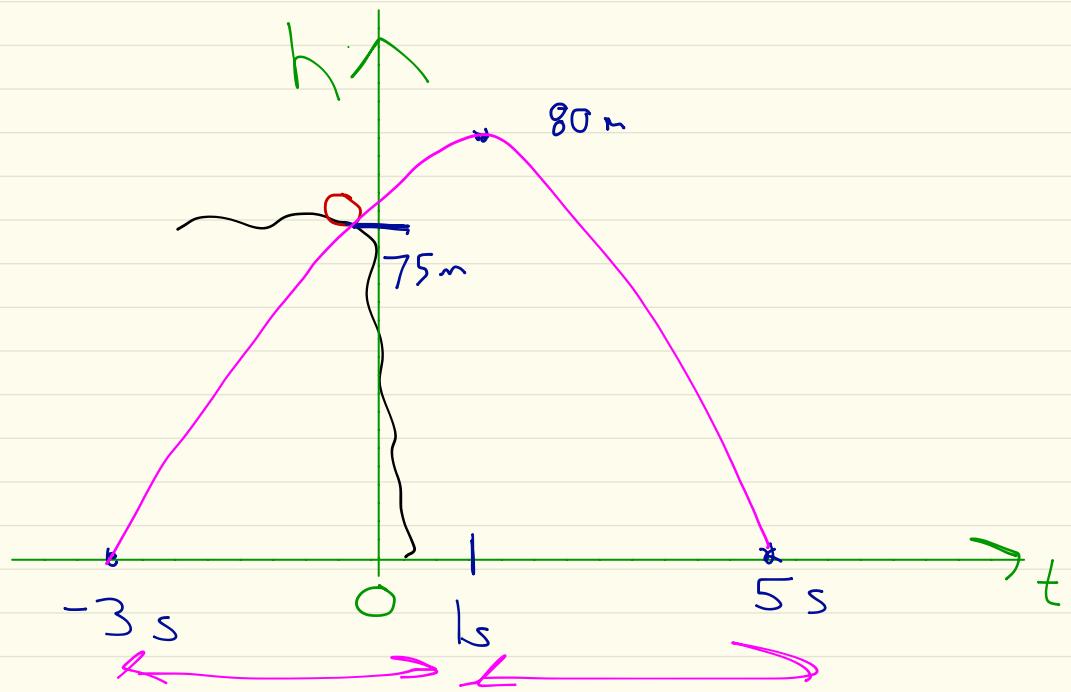
c) $h = -5(h-5)(h+3)$

$$h = -5(1-5)(1+3)$$

$$h = -5(-4)(4)$$

$$h = 80$$

Rock reaches a max height
of 80 metres.



Work

Pg. 241 #16, 17

Pg. 231 #14
Pg. 242 #9