

Ex. 2 Solve.

a) $3y^2 + 15y + 18 = 0$

$$3(y^2 + 5y + 6) = 0$$

$$3(y+2)(y+3) = 0$$

$$y = -2, -3$$

b) $x^2 - 16 = 0$

$$(x+4)(x-4) = 0$$

$$x = \pm 4$$

c) $4b^2 - 9 = 0$

$$(2b-3)(2b+3) = 0$$

$$\begin{array}{l} 2b-3=0 \\ 2b=3 \\ b=\frac{3}{2} \end{array} \quad \begin{array}{l} 2b+3=0 \\ b=-\frac{3}{2} \end{array}$$

$$b = \pm \frac{3}{2}$$

d) $-m^2 + 7m - 10 = 0$

$$-(m^2 - 7m + 10) = 0$$

$$-(m-5)(m-2) = 0$$

$$m = 2, 5$$

e) $4x^2 + 14x = 8$

$$4x^2 + 14x - 8 = 0$$

$$2(2x^2 + 7x - 4) = 0$$

$$2(2x-1)(x+4) = 0$$

M - 8

A 7

N. 8, -1

	x	4
2x	2x ²	8x
-1	-x	-4

$$\therefore x = -4, \frac{1}{2}$$

f) $w^2 + 4 = 3w(w-5)$

$$w^2 + 4 = 3w^2 - 15w$$

$$0 = 2w^2 - 15w - 4$$

Prime

M - 8

A - 15

N ?

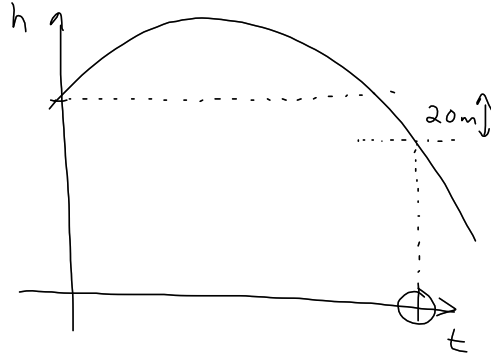
Ex. 3 A ball is thrown from a cliff. Its height, h , in metres, above the sea, after t seconds, can be modelled by the equation $h = -5t^2 + 21t + 120$. How long will the ball take to fall 20 m below its initial height?

Initial height? (height at $t=0$)

$$\begin{aligned} \underline{t=0} \quad h &= -5(0)^2 + 21(0) + 120 \\ &= 120 \end{aligned}$$

Target height

$$h = 100\text{m}$$



Steps

- Set equation equal to target height
- Rearrange = 0
- Solve

$$100 = -5t^2 + 21t + 120$$

$$0 = -5t^2 + 21t + 20$$

$$= -(5t^2 - 21t - 20)$$

$$= -(t-5)(5t+4)$$

$$M \quad -100$$

$$A \quad -21$$

$$N \quad 4, -25$$

$$\begin{array}{r} -100 \\ 1, 100 \\ 2, 50 \\ \hline 4, -25 \end{array}$$

$$t = 5, -\frac{4}{5}$$

$$\begin{array}{r} 5t \quad 4 \\ \hline t \quad \left| \begin{array}{c|c} 5t^2 & 4t \\ \hline -25t & -20 \end{array} \right. \\ -5 \end{array}$$

↑ Invalid
(can't have negative time)

∴ Ball reaches 100m at $t=5\text{s}$