#18

$y = 0.2x^2 - 1.6x + 4.2$

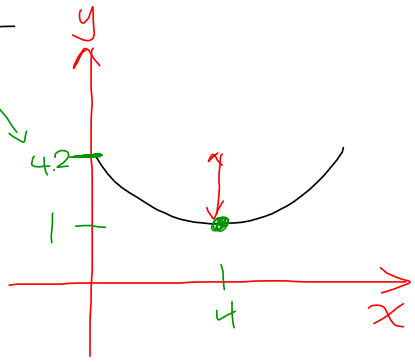
$y = 0.2(x^2 - 8x) + 4.2$

$y = 0.2(x^2 - 8x + 16 - 16) + 4.2$

$= 0.2(x-4)^2 - 3.2 + 4.2$

$= 0.2(x-4)^2 + 1$

$(4, 1)$



depth

$4.2 - 1.0$

$= 3.2$

5.3 Solving by Factoring

Solve $x = \#$

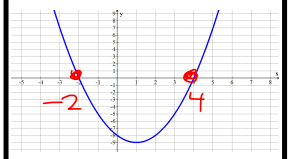
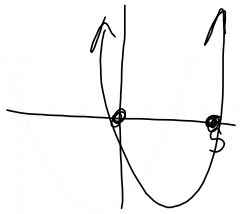
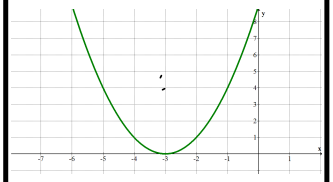
Recall: Equations in Factored Form

$y = a(x - r)(x - s)$

Where are the zeros/ x-intercepts?

$y = 0$, → $x = r$, $x = s$

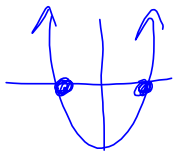
$= 0$ $= 0$

Equation	$y = (x - 4)(x + 2)$	$y = x(x - 5)$	$y = (x + 3)^2$
Zeros / Roots (Solutions / Answers $x =$)	$x = 4, x = -2$	$x = 0$ $x = 5$	$x = -3$
Sketch			

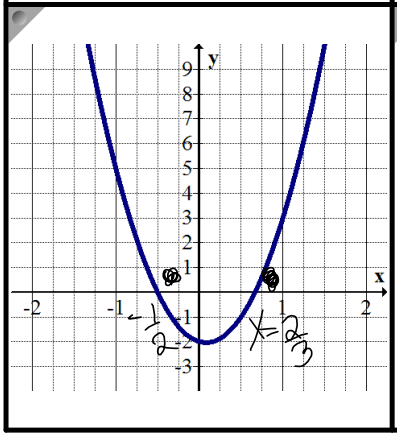
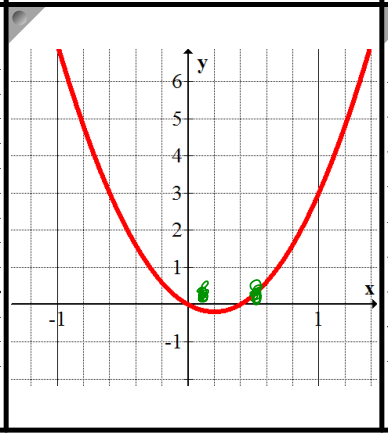
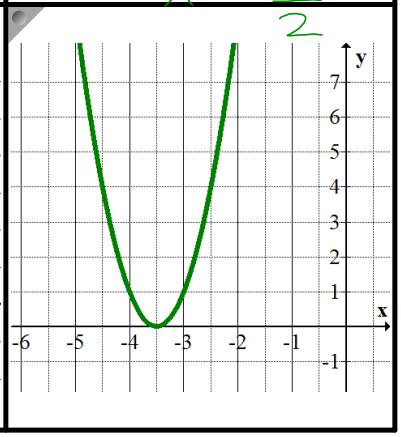
Recall: The zeros/x-intercepts/roots are the values of x that cause the function, y, to equal zero.

If a • b = 0, either a = 0 or b = 0.

$y = 0$



Where are the zeros for the following?

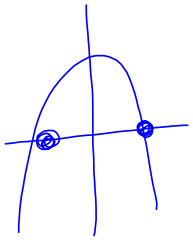
$y = (2x + 1)(3x - 2)$	$y = x(5x - 2)$	$y = (2x + 7)^2$
$2x + 1 = 0$ OR $3x - 2 = 0$ $\frac{2x}{2} = \frac{-1}{2}$ $\frac{3x}{3} = \frac{2}{3}$ $x = -\frac{1}{2}$ $x = \frac{2}{3}$ $y = 0$	$x = 0$ $5x - 2 = 0$ $\frac{5x}{5} = \frac{2}{5}$ $x = \frac{2}{5}$ OR $y = 0$	$2x + 7 = 0$ $\frac{2x}{2} = \frac{-7}{2}$ $x = -\frac{7}{2}$
		

$-\frac{7}{2}$

$x =$

Finding the zeros of $y = ax^2 + bx + c$
is the same as
solving the equation $0 = ax^2 + bx + c$

y=0



To Solve a Quadratic Equation

- write in the form $ax^2 + bx + c = 0$ (y=0)
- fully factor
- determine the value of x that makes each factor equal to zero

Ex. 1 Solve. x=#

a) $(x - 5)(2x + 3) = 0$

$x - 5 = 0$ | $2x + 3 = 0$

$x = 5$ | $\frac{2x}{2} = \frac{-3}{2}$

$x = -\frac{3}{2}$

b) $x(3x - 5) = 0$

$x = 0$ | $3x - 5 = 0$

$\frac{3x}{3} = \frac{5}{3}$

$x = \frac{5}{3}$

c) $x^2 + 4x - 5 = 0$

$(x + 5)(x - 1) = 0$

$x = -5$ | $x = 1$

M: −5
A: 4
N: 5, −1

d) $x^2 - 7x + 12 = 0$

$(x - 3)(x - 4) = 0$

$x = 3$ | $x = 4$

e) $2x^2 + 5x - 3 = 0$

$(x + 3)(2x - 1) = 0$

$x = -3$ | $x = \frac{1}{2}$

M: −6
A: 5
N: 6, −1

$\frac{2x}{6} = \frac{x}{3}$ | $\frac{2x}{-1}$

f) $10x^2 + 19x + 6 = 0$

$(2x + 3)(5x + 2) = 0$

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

$x = -\frac{3}{2}$

M: 60
A: 19
N: 15, 4

$\frac{10x}{15} = \frac{2x}{3}$ | $\frac{10x}{4} = \frac{5x}{2}$

Ex. 2 Solve.

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

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

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

$y=-3$ $y=-2$

b) $2x^2 - 8x = 0$

$2x(x-4)=0$

$x=0$ $x=4$

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

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

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

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

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

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

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

$m=5$ $m=2$

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

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

$0=3w^2-w^2-15w-4$

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

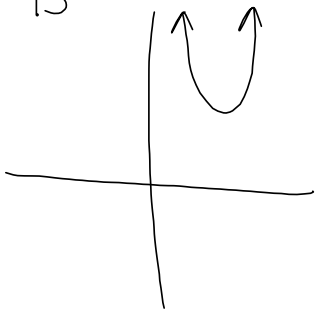
doesnt factor...

can't solve by factoring.

M: -8

A: -15

N:



Ex. 3 Write a quadratic equation having roots:

No fractions

a) 3, -2

factored form

$y = (x-3)(x+2)$

OR

$y = (2x-6)(2x+4)$

OR

$y = 2(x-3)(x+2)$

Standard form

$y = x^2 + 2x - 3x - 6$

$y = x^2 - x - 6$

complete the $\square$

Vertex form

$y = x^2 - x - 6$

$= (x^2 - x) - 6$

$\left(-\frac{1}{2}\right)^2$

blah blah

b) ¾, -½

$y = (4x-3)(2x+1)$

$y = \left(x - \frac{3}{4}\right)\left(x + \frac{1}{2}\right)$

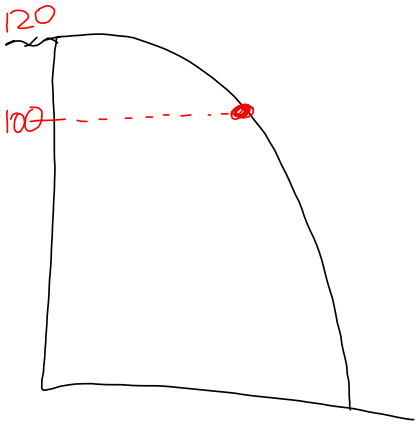
$4(x) = \left(\frac{3}{4}\right)4$

$4x = 3$

$4x - 3 = 0$

Ex. 4 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



$h = 100$

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

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

Solve → factor

$0 = -5t^2 + 21t + 120 - 100$

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

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

$0 = (t - 5)(5t + 4)$

M: ~~-100~~

A: -21

N: -25, 4

$\frac{5t}{-25}$ $\frac{5t}{4}$

t

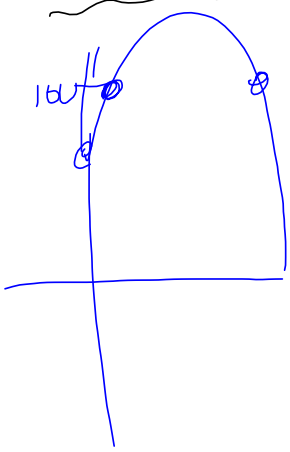
-5

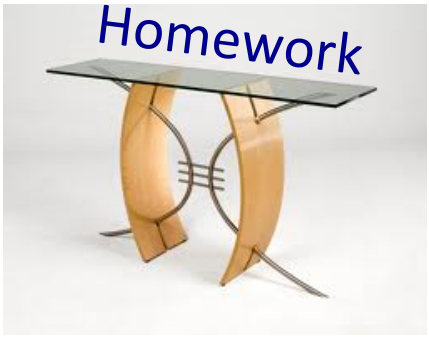
$t = 5$

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

inadmissable

∴ It takes 5 s





pg. 279 # 1de, 3def, 4bdf, 5bdf, 6ac, 7, 8, 9b, 11