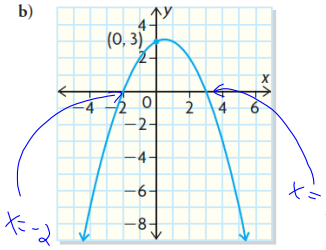
Are there any Homework Questions you would like to see on the board?

Last day's work: pp. 176-179 #1a, 3b, 4c, 7, 10

READ p. 181

p. 177 **3.** Determine the equation of each parabola.

b)



$r=3$, $s=-2$

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

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

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

pt $(0,3)$ (x,y)

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

$3=a(-3)(2)$

$3=a(-6)$

$3=-6a$

$\frac{3}{-6}=a$

$-\frac{1}{2}=a$

$\therefore y=-\frac{1}{2}(x-3)(x+2)$ is the equation.

$x=3 \quad x=-2$

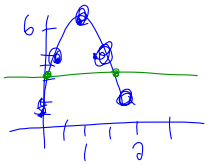
$x-3=0 \quad x+2=0$

$(\ )(\ )=0$

p. 178

Time (s)	Height (m)
0	1.0
0.5	4.5
1.0	6.0
1.5	4.5
2.0	1.0

7. The height, at a given time, of a child above the ground when the child is on a trampoline is shown in the table. Determine an algebraic model for the data. Then use the model to predict when the child will reach a height of 3 m.



vertex form

$V(1,6) \rightarrow \therefore y=a(x-1)^2+6$ pt $(2,1)$

$1=a(2-1)^2+6$

$1=a(1)^2+6$

$1=a+6$

$1-6=a$

$a=-5 \quad \therefore y=-5(x-1)^2+6$ is the equation

$h(t)=-5(t-1)^2+6$

$3=-5(t-1)^2+6$

$3-6=-5(t-1)^2$

$-3=-5(t-1)^2$

$\frac{-3}{-5}=(t-1)^2$

$\frac{3}{5}=(t-1)^2$

$\pm\sqrt{\frac{3}{5}}=t-1$

$1\pm\sqrt{\frac{3}{5}}=t$

$t=1+\sqrt{0.6}$ or $t=1-\sqrt{0.6}$

$\doteq 1+0.77$ $\doteq 1-0.77$

$=1.77$ $\doteq 0.225$

$=0.23$

MCF 3MI Lesson 3_R1

Unit 3 - REVIEW 1

Date: Oct. 17/19

Recall:	Form	Advantage
Standard form:	$f(x)=ax^2+bx+c$	c is the y-int (initial value)
Vertex form:	$f(x)=a(x-h)^2+k$	V(h,k) max or min value is k.
Factored form:	$f(x)=a(x-r)(x-s)$	zeros (or x-ints) are: r and s.

S: -2
P: 168

1a) Write $f(x)=(3x-4)(2x-1)$ in **standard** form.

$= 6x^2-3x-8x+4$

$= 6x^2-11x+4$

b) Write $f(x)=8x^2-2x-21$ in **factored** form.

$= 8x^2-14x+12x-21$

$= 2x(4x-7)+3(4x-7)$

$= (4x-7)(2x+3)$

1 168
2 84
12 14

2. Determine the zeros, the axis of symmetry, and the maximum or minimum value for $f(x)=x^2+6x-40$. Show your work.

eqn → a is +ve ∴ opens up

$0 = (x+10)(x-4)$

$x=-10$ or $x=4$ are the zeros

AoS: $x = \frac{-10+4}{2}$

$= \frac{-6}{2}$

$x = -3$

if $x=-3$

$f(-3) = (-3+10)(-3-4)$

$= (7)(-7)$

$= -49$

Zeros: $-10, 4$
Axis of Symmetry: $x=-3$
~~Max~~/Min value: -49

Vertex $(-3, -49)$

3. Solve

a) $2x^2-3x=9$

P: -18
S: -3

1 18
2 9
3 6

$2x^2-3x-9=0$

$2x^2-6x+3x-9=0$

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

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

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

b) $x^2=13x-30$

$x^2-13x+30=0$

$(x\quad)(x\quad)=0$

4. Can all quadratic equations be solved by factoring?

No; Some don't factor
↳ if the roots are irrational ex. 1.3729...

5. A ball is thrown from a cliff.
The height of the ball above the ground after it is thrown is modelled by the function $h(t) = -4t^2 + 8t + 192$, where $h(t)$ is the height in metres, and t is the time in seconds.

a) How high is the cliff?
b) When will the ball be 27 m above the ground?
c) What is the maximum height that the ball reaches?

a) the cliff is 192 m
(Let $t=0$)

b) $h(t) = 27$
$\therefore 27 = -4t^2 + 8t + 192$
$0 = -4t^2 + 8t + 192 - 27$
$= -4t^2 + 8t + 165$
$a = -4 \quad b = 8 \quad c = 165$

$$t = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
$$= \frac{-8 \pm \sqrt{(8)^2 - 4(-4)(165)}}{2(-4)}$$
$$= \frac{-8 \pm \sqrt{2704}}{-8}$$

$t = \frac{-8+52}{-8}$ or $t = \frac{-8-52}{-8}$

$= -5.5$ (inadmissible) $= 7.5$

$\therefore$ the ball will be 27 m above the ground at 7.5 seconds.

OR $P: -660$
$S: 8$
$\therefore 22, -30$
$0 = -(4t^2 - 8t - 165)$
$= -(4t^2 + 22t - 30t - 165)$
$= -(2t(2t+11) - 15(2t+11))$
$= -(2t+11)(2t-15)$
$\therefore 2t+11 = 0$ or $2t-15 = 0$
$2t = -11$ $2t = 15$
$t = -\frac{11}{2}$ $t = \frac{15}{2}$
$= -5.5$ $t = 7.5$
(inadmissible)

6. The population of a town $P(t)$ is modelled by the function $P(t) = 6t^2 - 75t + 2100$, where t is time in years. NOTE: $t = 0$ represents the year 2000. According to the model,

a) When will the population reach 3000?

b) What will the population be in 2035?