1.0 Prerequisite Skills for Unit 1

Linear Relations

1. Graph each of the following lines:

a) $y = -x + 5$ b) $3x + 5y - 15 = 0$ c) $x = -4$

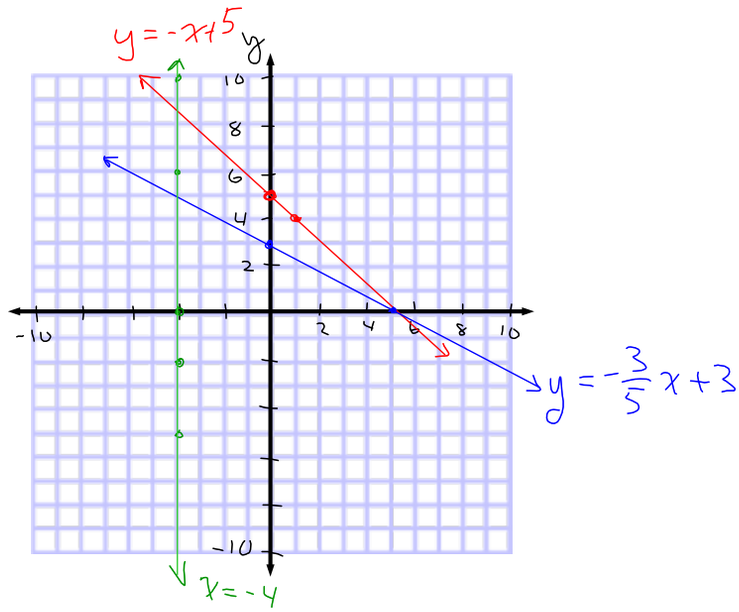
$y = mx + b$

$m = -\frac{1}{1}$

$b = 5$

$5y = -3x + 15$

$y = -\frac{3}{5}x + 3$



2. Determine the equation in slope y-intercept form of a line passing through the points (-2, 5) and (6, -1).

$y = mx + b$

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$= \frac{-1 - 5}{6 - (-2)}$

$= \frac{-6}{8}$

$= -\frac{3}{4}$

Sub $m = -\frac{3}{4}$

$y = -\frac{3}{4}x + b$

Sub in $(-2, 5)$

$5 = -\frac{3}{4}(-2) + b$

$5 = \frac{3}{2} + b$

$\frac{10}{2} - \frac{3}{2} = b$

$\frac{7}{2} = b$

$\therefore y = -\frac{3}{4}x + \frac{7}{2}$

3. Use the methods of substitution and elimination to solve the following linear system: $y = 2x + 1$ and $x + 2y = 7$

Substitution

① $y = 2x + 1$

② $x + 2y = 7$

Sub ① into ②

$x + 2(2x + 1) = 7$

$x + 4x + 2 = 7$

$5x = 5$

$x = 1$

Sub $x = 1$ into ①

$y = 2(1) + 1$

$= 3$

$\therefore (1, 3)$

Elimination

$2x - y = -1$

$x + 2y = 7 \quad \times 2$

$2x - y = -1$

$2x + 4y = 14 \quad -$

$0 - 5y = -15$

$y = 3$

Sub $y = 3$ into $x + 2y = 7$

$x + 2(3) = 7$

$x = 1$

$\therefore (1, 3)$

Working with Polynomials

1. Expand and simplify.

$(a+b)^2 = a^2+2ab+b^2$

a) $(x-3)(x+8)$ b) $(x+5)^2$ c) $(x-10)(x+10)$

$= x^2+8x-3x-24$ $= x^2+10x+25$ $= x^2-100$

$= x^2+5x-24$

2. Factor completely.

a) x^2+x-30 b) $4x^2-36$ c) $12x^2+5x-3$ d) $49x^2-28x+4$

$=(x-5)(x+6)$ $=(2x-6)(2x+6)$

M -30
A 1
N $-5, 6$

M $12(-3) = -36$
A 5
N $9, -4$

$12x^2+9x-4x-3$
$= 3x(4x+3)-1(4x+3)$
$= (4x+3)(3x-1)$

Perfect Square!

$=(7x-2)^2$

3. What value of k makes this quadratic expression a perfect square trinomial?

$x^2-20x+k$ $(a+b)^2 = a^2+2ab+b^2$

$=(x-10)^2$

$20x = 2ab$
$10x = ab$
$a = x$
$10x = xb$
$10 = b$

4. Factor out the coefficient of the quadratic term of the following polynomial:

$-\frac{3}{5}x^2-6x$

$= -\frac{3}{5}(x+10x)$

$-6 \div -\frac{3}{5}$

$= -6^2 \times -\frac{5}{3_1}$

$= \frac{30}{3}$

$= 10$

$= 10$

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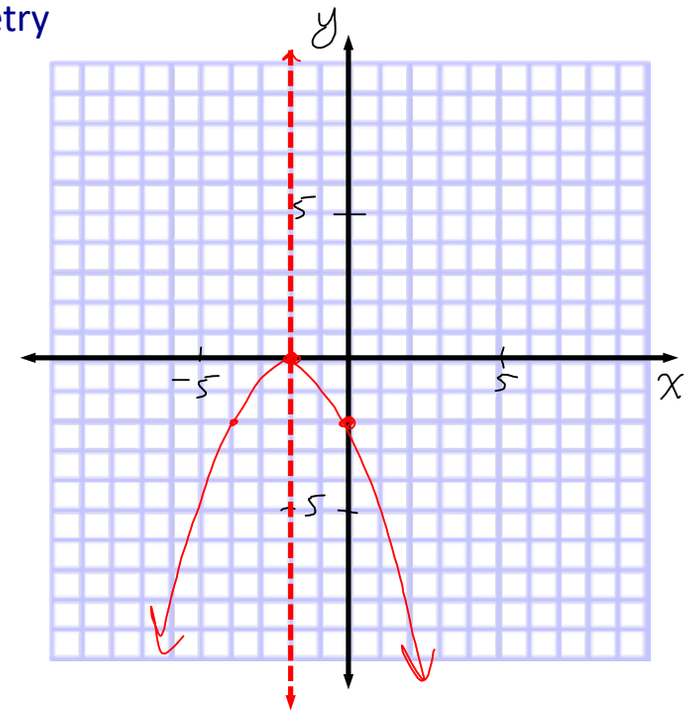
Quadratic Relations

1. For the given quadratic relation, state:
a) the coordinates of the vertex
b) the equation of the axis of symmetry
c) the direction of opening
d) the y-intercept
Then, sketch a graph of the relation.

$$y = -\frac{1}{2}(x+2)^2$$



a) V (-2, 0)

b) $x = -2$

c) $a < 0$
∴ DOWN

d) Sub $x = 0$
$y = -\frac{1}{2}(4)$
$= -2$

2. Complete the square in order to express the following quadratic relation in vertex form:

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

$y = x^2 - 6x + 9 \quad -9 + 2$

$= (x-3)^2 - 7$

Homework

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- Pick and choose for the remainder of class - focus on what you find hardest!