Pre-Calc 11 Mini-Review

1. Factoring Trinomials $(ax^2 + bx + c)$

a) $x^2 + 8x + 15$ simple trinomial, $a = 1$

$5 \times 3 = 15$

$5 + 3 = 8$

$(x+5)(x+3)$

b) $10x^2 + 11x - 6$ complex trinomial, $a \neq 1$ factor by decomposition

-60

$15 \times -4 = -60$

$15 + -4 = 11$

$10x^2 + 15x - 4x - 6$

$5x(2x+3) - 2(2x+3)$

$(2x+3)(5x-2)$

2. Solving Equations

a) $2x^2 + 11x + 3 = -2$

$+2 \quad +2$

Rewrite. All terms must be on same side.

$2x^2 + 11x + 5 = 0$ Solve by factoring!

$1 \times 10 = 10$

$1 + 10 = 11$

$2x^2 + x + 10x + 5 = 0$

$x(2x+1) + 5(2x+1) = 0$

$(2x+1)(x+5) = 0$

$2x + 1 = 0 \qquad x + 5 = 0$

$x = -\frac{1}{2} \qquad x = -5$

b) $x^2 + 6x + 4 = 0$ (a, b, c)

$\_ \times \_ = 4$

$\_ + \_ = 6$

} not possible

must use quadratic formula!

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-6 \pm \sqrt{(6)^2 - 4(1)(4)}}{2(1)}$$

$$x = \frac{-6 \pm \sqrt{20}}{2}$$ ← simplify the radical

$$x = \frac{-6 \pm \sqrt{4 \cdot 5}}{2}$$

$$x = \frac{-6 \pm 2\sqrt{5}}{2}$$ } simplify

$x = -3 \pm \sqrt{5}$ Exact value

Final answer

c) $1+\frac{2x}{x+4}=\frac{3}{x-1}$

Rational Equation.
Multiply each term by common denominator to eliminate the denominator.

$(x-1)(x+4)$

$1 + \frac{2x}{(x+4)}(x-1)(x+4) = \frac{3}{(x-1)}(x-1)(x+4)$ n.p.v. $x \neq -4, 1$

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

$x^2+4x-x-4+2x^2-2x = 3x+12$

$3x^2-2x-16 = 0$ $\quad -8 \times 6 = -48$, $-8+6 = -2$

$3x^2+6x-8x-16 = 0$

$3x(x+2)-8(x+2) = 0$

$(x+2)(3x-8) = 0$

$x = -2$, $x = 8/3$ npv ok!

check:

$x = -2$: $1+\frac{2(-2)}{-2+4} = \frac{3}{-2-1}$; $1+\frac{-4}{2} = \frac{3}{-3}$; $1+-2 = -1$; $-1 = -1$ ✓

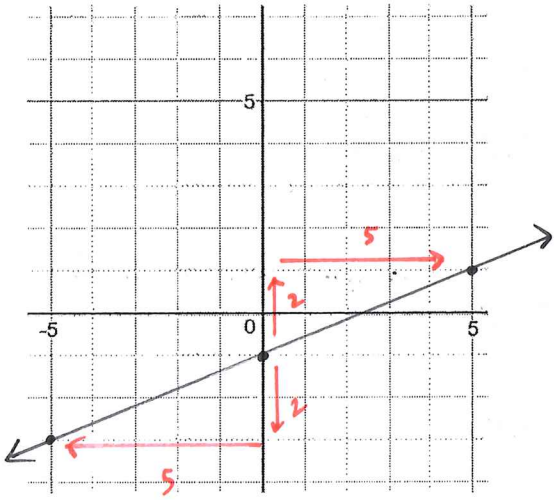
$x = 8/3$: $1+\frac{2(8/3)}{8/3+4} = \frac{3}{8/3-1}$; $1+0.8 = 1.8$; $1.8 = 1.8$ ✓

3. Graphing Linear Functions $y = mx + b$ (slope, y-intercept)

a) $y=\frac{2}{5}x-1$

$m = \frac{2}{5}$ slope $= \frac{\text{rise}}{\text{run}}$

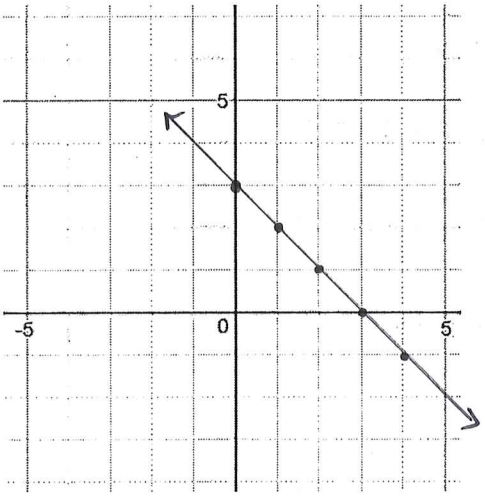
$b = -1$



b) $y=-x+3$

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

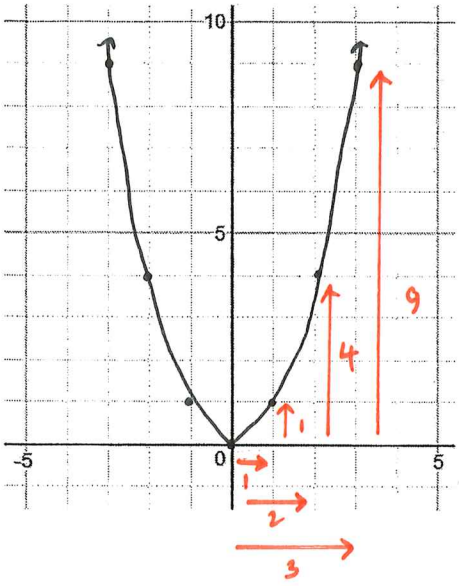
$b = 3$



4. Graphing Quadratic Functions $y = a(x-p)^2 + q$

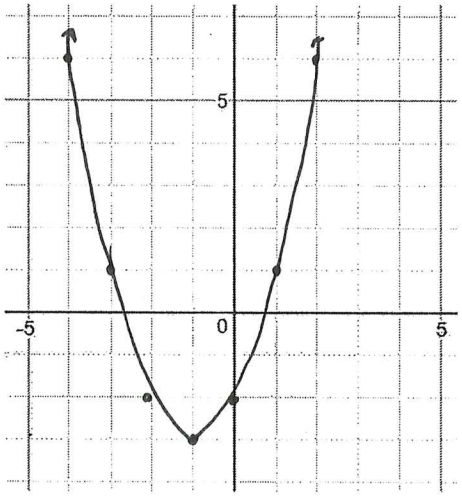
vertex (p, q)

a) $y = x^2$ "average joe"



vertex $(0,0)$

b) $y = (x+1)^2 - 3$ vertex $(-1, -3)$



Domain: $\{x \mid x \in \mathbb{R}\}$

Range: $\{y \mid y \geq -3, y \in \mathbb{R}\}$

c) $y = 5x^2 + 30x + 41$ (We must complete the square first!)

First two terms only

$y = 5(x^2 + 6x + \frac{9}{\uparrow} - \frac{9}{\nearrow}) + 41$

$(\frac{6}{2})^2 = 9$

$y = 5(x+3)^2 + 41 + (5)(-9)$

$y = 5(x+3)^2 + 41 - 45$

$y = 5(x+3)^2 - 4$

Vertex: $(-3, -4)$

Axis of Symmetry: $x = -3$

Direction of Opening: up

Max or min value: min value of $y = -4$

Domain: $\{x \mid x \in \mathbb{R}\}$

Range: $\{y \mid y \geq -4, y \in \mathbb{R}\}$