

Pre-Calculus 12

Pre-Calculus 11 Review

A Factoring

a) $x^2 + 8x + 15$
 $\frac{3}{3} \times \frac{5}{5} = 15$
 $\frac{3}{3} + \frac{5}{5} = 8$
 $(x+3)(x+5)$

b) $10x^2 + 11x - 6$
 $\frac{15}{15} \times \frac{-4}{-4} = -60$
 $\frac{15}{15} + \frac{-4}{-4} = 11$
 $10x^2 + 15x - 4x - 6$
 $5x(2x+3) - 2(2x+3)$
 $(2x+3)(5x-2)$

B Solving

a) $2x^2 + 11x + 3 = -2$
 $2x^2 + 11x + 5 = 0$

Equation must be equal to zero

$2x^2 + 10x + 1x + 5 = 0$
 $2x(x+5) + 1(x+5) = 0$
 $(x+5)(2x+1) = 0$

$\frac{-1}{10} \times \frac{-1}{1} = 10$
 $\frac{-1}{10} + \frac{-1}{1} = 11$

$x + 5 = 0 \rightarrow x = -5$
 $2x + 1 = 0 \rightarrow 2x = -1 \rightarrow x = -\frac{1}{2}$

b) $x^2 + 6x + 4 = 0$

$a=1 \quad b=6 \quad c=4$

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

$x = \frac{-6 \pm \sqrt{36-16}}{2}$

$x = \frac{-6 \pm \sqrt{20}}{2} = \frac{-6 \pm 2\sqrt{5}}{2} = \frac{-3 \pm \sqrt{5}}{1}$

$= -3 \pm \sqrt{5}$

Quadratic Formula

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

Where $ax^2 + bx + c = 0$

$\sqrt{20}$
 $\sqrt{4 \cdot 5}$
 $\sqrt{4} \cdot \sqrt{5}$
 $2\sqrt{5}$

$$\frac{1}{2} = -3 \pm \sqrt{5}$$

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

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

FOIL

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

$$3x^2 + 1x - 4 = 3x + 12$$

$$3x^2 - 2x - 16 = 0$$

$$\begin{aligned} -x &= -48 \\ -8 + b &= -2 \end{aligned}$$

$$\begin{aligned} 3x^2 - 8x + 6x - 16 &= 0 \\ x(3x - 8) + 2(3x - 8) &= 0 \end{aligned}$$

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

$$\begin{aligned} \downarrow \\ 3x - 8 &= 0 & x + 2 &= 0 \\ 3x &= 8 & x &= -2 \\ x &= \frac{8}{3} \end{aligned}$$

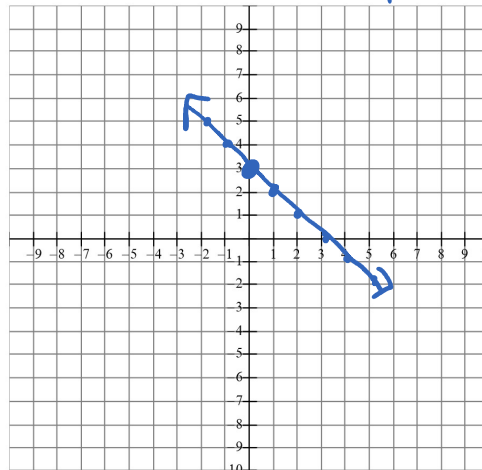
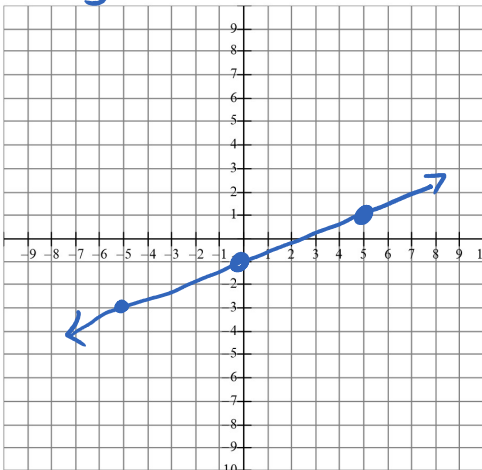
C Graphing Lines

Lines are in the form of $y = mx + b$. Where $m = \text{slope}$ and $b = \text{y-intercept}$

a) Graph $y = \frac{2}{5}x - 1$
 $m = \frac{2}{5}$ $\uparrow^2 \rightarrow 5$ $b = -1$

$\text{slope} = \frac{\text{rise}}{\text{run}}$
 b) Graph $y = -x + 3$

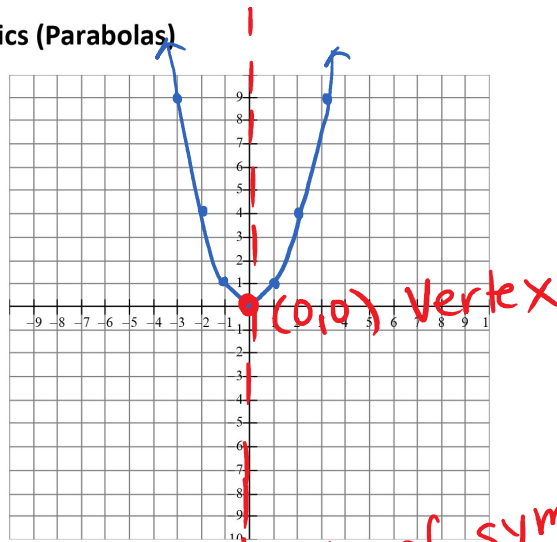
$m = -1 = -\frac{1}{1}$ $b = 3$



D Graphing Quadratics (Parabolas)

$y = x^2$

x	y
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9



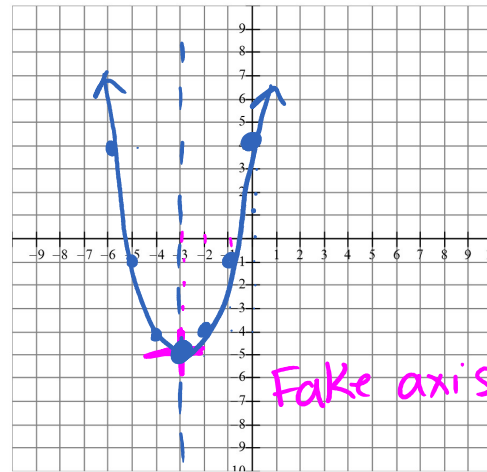
axis of symmetry
 $x=0$

- a) Graph the function using transformations. State the transformations. State the domain and range.

$y = a(x-h)^2 + k$

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

- left 3 *
- down 5 *



0	0
1	1
2	4
3	9

Domain $\{x \mid x \in \mathbb{R}\}$
 x-values
 Range $\{y \mid y \geq -5, y \in \mathbb{R}\}$
 y-values

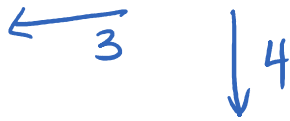
b) Graph $y = 5x^2 + 30x + 41$ using transformations. (Complete the square first)

$$y = 5(x^2 + 6x) + 41$$

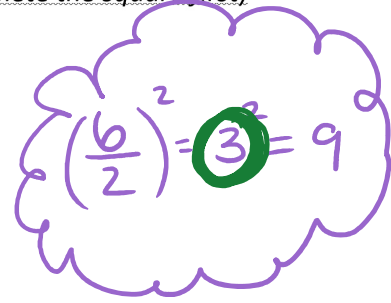
$$y = 5(x^2 + 6x + 9) + 41 - 5 \cdot 9$$

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

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



Stretch factor of 5



$$y = x^2$$

0	0
1	1
2	4
3	9

$a = 5$
mult y 's
by 5

$$y = 5x^2$$

0	0
1	5
2	20
3	45

