$(h,k) = \text{vertex}$
$(h,k) = \left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$

Section 3.1 #s 1-9, 11-19 odds, 75-90

Section 3.1 #s 9-19 odds:

Show vertex and intercepts
Complete the square to write in the form $f(x) = a(x-h)^2 + k$

Check vertex with $-\frac{b}{2a}$ thing

State intervals of increase and decrease.

Section 3.1 #s 75-90:

Answers in interval form

Work all like #s 79-90 (I want #s 75-78 lumped in with #s 79-90

Show SIGN PATTERN

Show graph that shows only x-intercepts

Special: #s 75-78, 87, 88 are not typical. (Kiss the x-axis or don't cross it at all!).

Before Wednesday: One Theorem per page. All theorems from Sections 3.2, 3.3 in your notes.

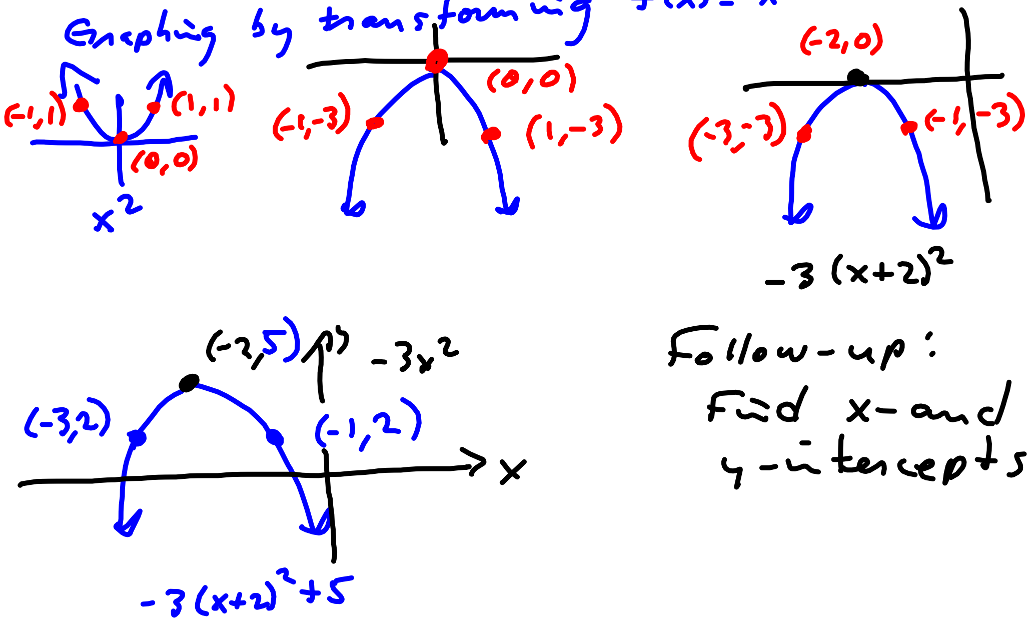
This is a key activity for students who want to go on and graduate from college.

Recall graphing, say

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

$f(x) = x^2$, $-3x^2$, $-3(x+2)^2$, $-3(x+2)^2+5$

Graphing by transforming $f(x) = x^2$

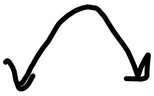


Follow-up:
Find x- and y-intercepts

Oct 13-7:59 AM

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

-3 in front



vertex: $(-2,5)$

x-int:

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

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

Need $(x+2)^2 = \frac{-5}{-3} = \frac{5}{3}$

$\sqrt{(x+2)^2} = \sqrt{\frac{5}{3}} = \frac{\sqrt{5}}{\sqrt{3}} = \frac{\sqrt{5}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{15}}{3}$

optional steps

scratch work

$|x+2| = \frac{\sqrt{15}}{3}$

$x+2 = \frac{\sqrt{15}}{3}$ OR $x+2 = -\frac{\sqrt{15}}{3}$

Need $x+2 = \pm\frac{\sqrt{15}}{3}$

$x = -2 \pm \frac{\sqrt{15}}{3}$

$-2 + \frac{\sqrt{15}}{3}$

$-2 - \frac{\sqrt{15}}{3}$

$$\boxed{\begin{array}{c}\left(-2+\frac{\sqrt{15}}{3}, 0\right)\\ \left(-2-\frac{\sqrt{15}}{3}, 0\right)\end{array}}$$

y-int: $g(0)$

$= -3(0+2)^2 + 5$

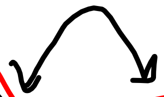
$= -3(2)^2 + 5$

$= -12 + 5$

$= -7 \rightsquigarrow \boxed{(0,-7)}$

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

-3 in front

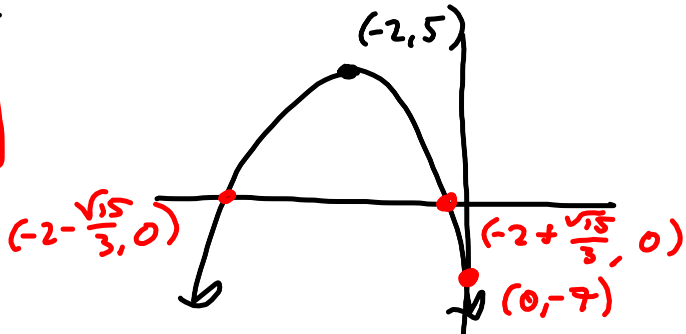


vertex: $(-2, 5)$

$\left(-2 + \frac{\sqrt{15}}{3}, 0\right)$

$\left(-2 - \frac{\sqrt{15}}{3}, 0\right)$

$(0, -7)$



want to locate about where $-2 \pm \frac{\sqrt{15}}{3}$ are

$-2 + \frac{\sqrt{15}}{3} \approx -.709$

$-2 - \frac{\sqrt{15}}{3} \approx -3.3$

$g(x) = 5(x-7)^2 - 11$

$(h,k) = (7,-11)$

opens up

y-int:

$5(49) - 11$

$= 245 - 11$

$= 234 \rightsquigarrow (0, 234)$

x-int

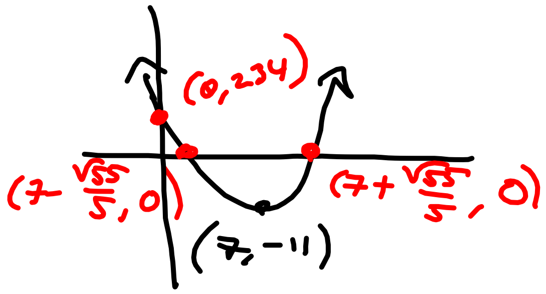
$5(x-7)^2 - 11 = 0$

$5(x-7)^2 = 11$

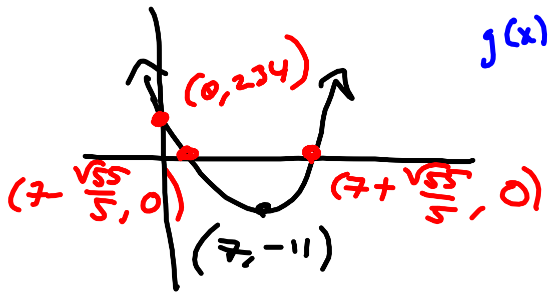
$(x-7)^2 = \frac{11}{5}$

$x - 7 = \pm\sqrt{\frac{11}{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \pm\frac{\sqrt{55}}{5}$

$x = 7 \pm \frac{\sqrt{55}}{5}$

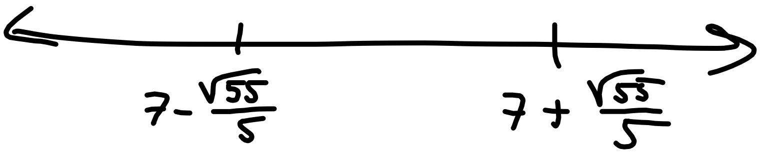


5.516760303 $\approx 7 - \frac{\sqrt{55}}{5}$

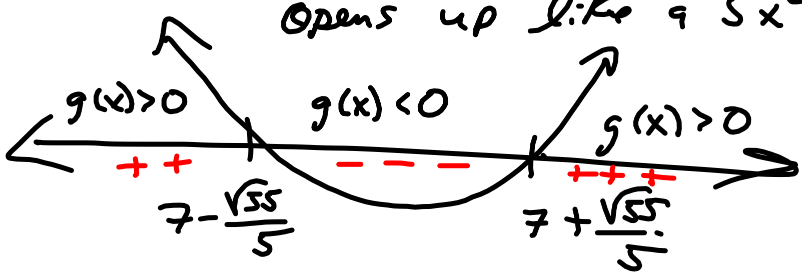


$g(x) = 5(x-7)^2 - 11$

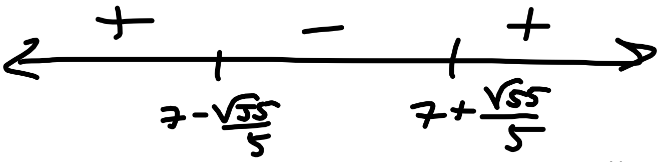
Solve $g(x) > 0$. For the inequalities at the end of the assignment, all we need is



Opens up like a $5x^2$



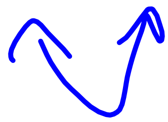
Sign Pattern:



>0 says take the "+"

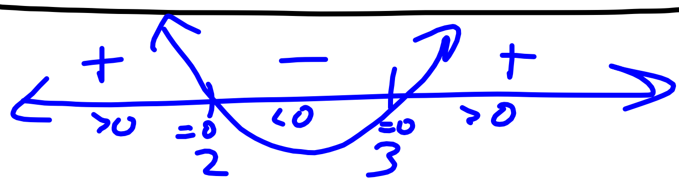
$x^2-5x+6 \le 0$

$(x-2)(x-3) \le 0$

x^2 

$x-2 \le 0$ oR $x-3 \le 0$

most common error



want ≤ 0

$x \in [2,3]$

Solve $9x^2 - 12x + 1 \geq 0$

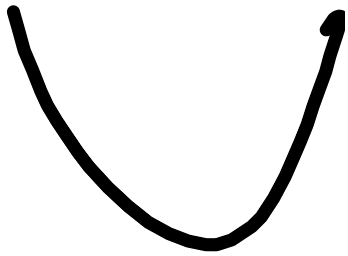
$a = 9, b = -12, c = 1$

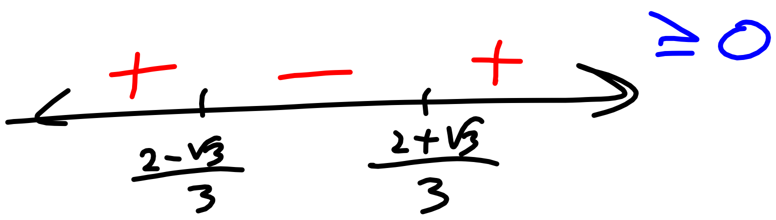
$$b^2 - 4ac = (-12)^2 - 4(9)(1)$$
$$= 144 - 36$$
$$= 108$$

$$x = \frac{12 \pm 6\sqrt{3}}{2(9)}$$
$$= \frac{12 \pm 6\sqrt{3}}{18} = \frac{6(2 \pm \sqrt{3})}{18}$$
$$= \frac{2 \pm \sqrt{3}}{3}$$

$\sqrt{108} = 6\sqrt{3}$

$$\begin{array}{r|l} 2 & 108 \\ 2 & 54 \\ 3 & 27 \\ 3 & 9 \\ & 3 \end{array}$$





$$\left(-\infty, \frac{2-\sqrt{3}}{3}\right] \cup \left[\frac{2+\sqrt{3}}{3}, \infty\right)$$