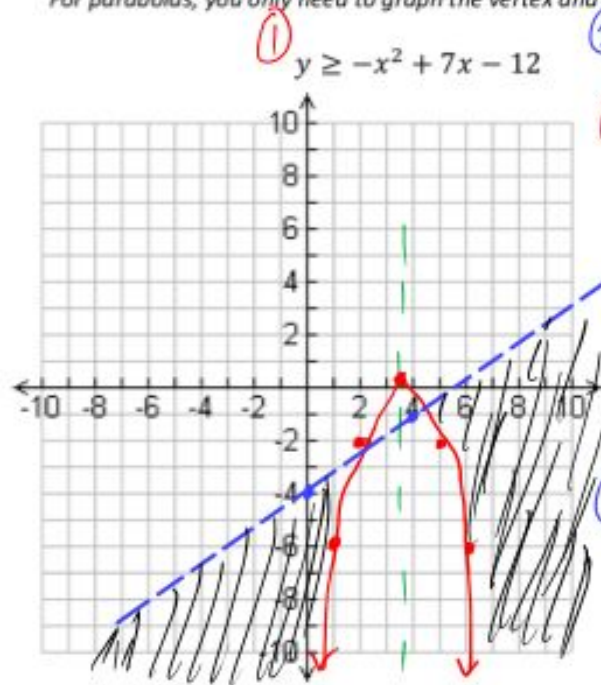


1. Solve the following system of inequalities by graphing.

For parabolas, you only need to graph the vertex and at least 2 points on each side of the vertex



① $y \geq -x^2 + 7x - 12$

② $3x - 4y > 16$

① $h = -\frac{b}{2a} = \frac{-7}{2(-1)} = \frac{7}{2} = 3.5$

$k = -(3.5)^2 + 7(3.5) - 12 = 0.25$

$(3.5, 0.25)$ $x = 5 \Rightarrow y = -5^2 + 7 \cdot 5 - 12 = -2$

$x = 6 \Rightarrow y = -6^2 + 7 \cdot 6 - 12 = -6$

Mirror for other pts

② $3x - 4y > 16 \Rightarrow 3x - 16 > 4y$

$y < \frac{3}{4}x - 4 \leftarrow y\text{-int}$

slope \rightarrow 3 up, 4 right

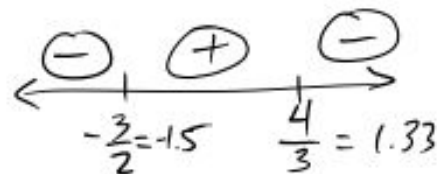
2. Solve. $-18x^2 - 3x + 36 < 0$

$-3(6x^2 + x - 12) < 0$

Zeros: $x = \frac{4}{3}, -\frac{3}{2}$

$\otimes -72 \mid (9, -8)$

$\oplus \mid \mid$



$-3[6x^2 + 9x - 8x - 12] < 0$

test $x = -2 \Rightarrow -3(3(-2) - 4)(2(-2) + 3) = -3(-10)(-1) = \ominus$

$-3[3x(2x+3) - 4(2x+3)] < 0$

$x = 0 \Rightarrow -3(3(0) - 4)(2 \cdot 0 + 3) = -3(-4)(3) = \oplus$

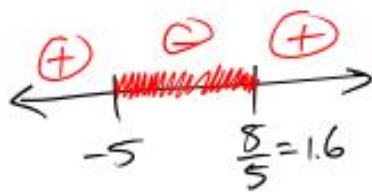
$-3(3x-4)(2x+3) < 0$

$x = 2 \Rightarrow -3(3 \cdot 2 - 4)(2 \cdot 2 + 3) = -3(3)(7) = \ominus$

$x < -\frac{3}{2}$ and $x > \frac{4}{3}$

3. Give a quadratic inequality whose solution is $-5 \leq x \leq \frac{8}{5}$. Your answer should look like:

$ax^2 + bx + c _ 0$, where the $_$ holds an inequality sign. ($<$, $>$, \leq , or \geq)



$$(x+5)(x-\frac{8}{5}) \stackrel{?}{=} 0$$

$$x=0 \Rightarrow (0+5)(0-\frac{8}{5}) = 5 \cdot (-\frac{8}{5}) \quad (-)$$

$$x=-6 \Rightarrow (-6+5)(-6-\frac{8}{5}) = (-1)(-\frac{38}{5}) \quad (+)$$

$$x=2 \Rightarrow (2+5)(2-\frac{8}{5}) = (7)(\frac{2}{5}) \quad (+)$$

want in middle $\Rightarrow (-)$ so less

$$(x+5)(x-\frac{8}{5}) \leq 0 \Rightarrow x^2 + \frac{17}{5}x - 8 \leq 0$$

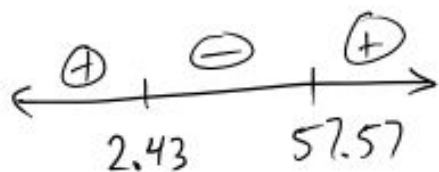
4. For a company to stay in business, their revenue must be larger than their cost. Mr. G is starting a diamond shipping business. The cost, in dollars to ship diamonds is given by: $C = 0.1n^2 - 2n + 15$, where n is the number of kilograms of diamonds shipped each month. The revenue made by shipping diamonds is given by: $R = 4n + 1$. What range of diamond mass can Mr. G ship each month while staying in business?
(Answer correctly rounded to 2 decimal places)

$$4n + 1 > 0.1n^2 - 2n + 15$$

$$0 > 0.1n^2 - 6n + 14$$

Quad. form: $x = \frac{-(-6) \pm \sqrt{6^2 - 4(0.1)(14)}}{2(0.1)} = \frac{6 \pm \sqrt{36 - 5.6}}{0.2}$

$$= 57.568098, 2.431902$$



$$n=1 \Rightarrow 0.1(1)^2 - 6(1) + 14 = 8.1$$

$$n=5 \Rightarrow 0.1(5)^2 - 6(5) + 14 = -13.5$$

$$n=60 \Rightarrow 0.1(60)^2 - 6(60) + 14 = 14$$

$$2.43 < n < 57.57$$