

Name: _____ Period: _____ Date: _____

Unit 2: Lesson 1 Practice Quiz

Directions: Show your statements, reasons, and work logically. Be sure to explain everything.

1. For each inequality below:

- Make a sketch to show how the functions and constants in the inequality are related.
- Use algebraic reasoning to locate the key intercepts and points of intersection.
- Combine what you learn from your sketch and algebraic reasoning to solve the inequality.
- Describe each solution set using symbols, a number line graph, and interval notation.

<p>Sketch</p> $2x^2 - 7 \geq 73 - 6x$ $+6x \quad -13 \quad -73 + 6x$ $2x^2 + 6x - 80 \geq 0$ $x^2 + 3x - 40 \geq 0$	<p>Vertex</p> $x = -\frac{b}{2a} = -\frac{3}{2(1)} = -\frac{3}{2}$ $\left(-\frac{3}{2}\right)^2 + 3\left(-\frac{3}{2}\right) - 40$ $\frac{9}{4} - \frac{9}{2} - \frac{40 \cdot 4}{1 \cdot 4} \quad \checkmark \left(-\frac{3}{2}, -\frac{169}{4}\right)$ $\frac{9}{4} - \frac{18}{4} - \frac{160}{4} = -\frac{169}{4}$ <p>y-intercept</p> $(0, -40)$
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<p>x-intercepts</p> $x^2 + 3x - 40 = 0$ $(x+8)(x-5) = 0$ $x+8=0 \quad x-5=0$ $x=-8 \quad x=5$ <p> $f(-9) = (-9)^2 + 3(-9) - 40$ $81 - 27 - 40$ 14 </p> <p> $f(0) = -40$ </p>	<p>Solution Set:</p> <p>Symbols: $x \leq -8$ or $x \geq 5$</p> <p>Number line:</p> <p>Interval: $(-\infty, -8] \cup [5, \infty)$</p>
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$$f(6) = (6)^2 + 3(6) - 40$$

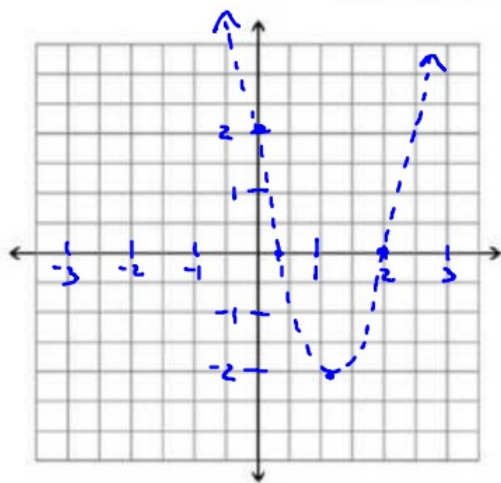
$$36 + 18 - 40$$

$$14$$

Sketch

$$3x^2 - 7x < -2$$

$$3x^2 - 7x + 2 < 0$$



Vertex

$$x = \frac{-b}{2a} = \frac{7}{2(3)} = \frac{7}{6}$$

$$3\left(\frac{7}{6}\right)^2 - 7\left(\frac{7}{6}\right) + 2$$

$$3\left(\frac{49}{36}\right) - \frac{49}{6} + 2 \quad V\left(\frac{7}{6}, -\frac{25}{12}\right)$$

$$\frac{49}{12} - \frac{49}{6} + \frac{2}{1}$$

$$\frac{49}{12} - \frac{98}{12} + \frac{24}{12} = -\frac{25}{12}$$

y-intercept

$$(0, 2)$$

x-intercept

$$3x^2 - 7x + 2 = 0$$

$$\frac{3-2=6}{-6 \cdot -1}$$

$$(3x^2 - 6x)(x + 2) = 0$$

$$3x(x-2) - 1(x-2) = 0$$

$$(3x-1)(x-2) = 0$$

$$3x-1=0 \quad x-2=0$$

$$x = \frac{1}{3} \quad x = 2$$

$$f(0) = 2$$

$$3x = 1$$

$$x = \frac{1}{3}$$

$$f(1) = 3(1)^2 - 7(1) + 2$$



$$f(3) = 3(3)^2 - 7(3) + 2$$

$$27 - 21 + 2$$

Solution Set:

Symbols:

$$\frac{1}{3} < x < 2$$

Number line:



Interval:

$$\left(\frac{1}{3}, 2\right)$$

2. Below are descriptions of the solutions for six inequalities. Describe each solution using interval notation.

a. $k \leq -3$ or $k > -1$

$$(-\infty, -3] \cup (-1, \infty)$$

b. All numbers between negative 1 and positive 3.5

$$(-1, 3.5)$$



$$[-2, 0]$$

d. $2 < g < 6$

$$(2, 6)$$

e. All numbers less than 4 or greater than 7

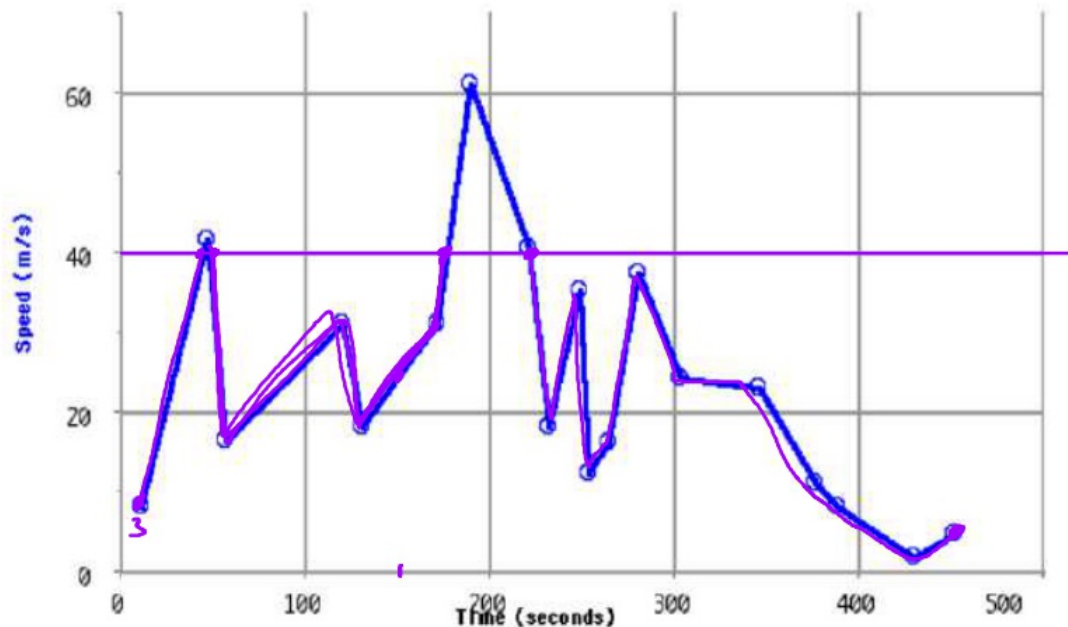
$$x < 4 \text{ or } x > 7$$

$$(-\infty, 4) \cup (7, \infty)$$



$$(-\infty, -2] \cup (0, 3]$$

3. The graph below shows the speed of a car for errands around town. Suppose that $s(t)$ gives the speed of the car as a function of time.



a. Evaluate $s(150) = 23 \text{ m/s}$

- b. Solve $s(t) = 40$ and describe what it tells you about the speed of the car.

$$t = 48, 50, 180, 210$$

At 48 sec, 50 sec, 180 sec, 210 sec the cars speed is 40 m/s

- c. Write a question that can be answered by solving the inequality $s(t) < 40$.

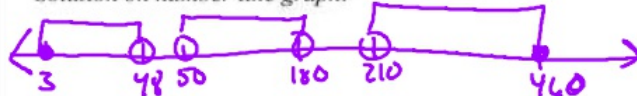
At what times is the speed of the car less than 40 sec?

- d. Solve the inequality $s(t) < 40$ and display your solution on a number line graph, using symbols and using Interval Notation.

Solution using symbols:

$$3 \leq t < 48 \text{ or } 50 < t < 180 \text{ or } 210 < t \leq 460$$

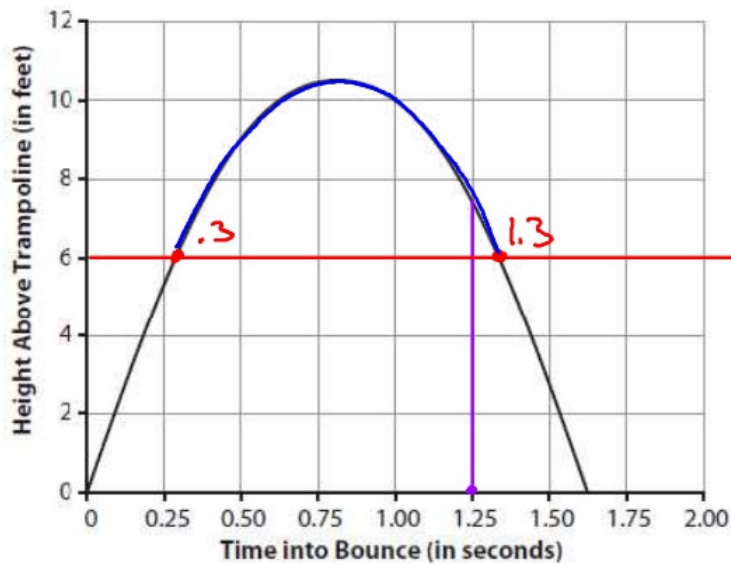
Solution on number line graph:



Solution using Interval Notation:

$$[3, 48) \cup (50, 180) \cup (210, 460]$$

4. The graph below shows the height of a gymnast's bounce above a trampoline as a function of time after the takeoff bounce. The function rule for the graph shown is $h(t) = -16t^2 + 26t$.



- a. Evaluate $h(1.25)$. 7.5 ft

- b. Solve $h(t) = 6$ and describe what it tells you about the gymnast bounce.

$$t = .3 \text{ and } 1.3 \text{ sec}$$

At .3 and 1.3 sec after takeoff the gymnast height is 6ft off ground

- c. Write a question that can be answered by solving the inequality $h(t) > 6$.

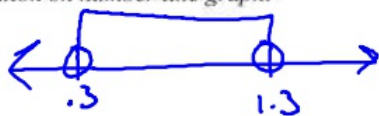
At what times after takeoff is the gymnast height greater than 6ft?

- d. Solve the inequality $h(t) > 6$ and display your solution on a number line graph, using symbols and using Interval Notation.

Solution using symbols:

$$.3 < t < 1.3$$

Solution on number line graph:



Solution using Interval Notation:

$$(.3, 1.3)$$