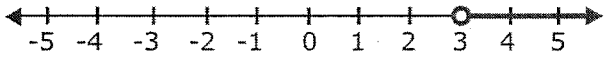
Math 9: Inequalities Review

Name: Key Block: _____

Multiple Choice: ***Write the letter that corresponds to the correct answer in the space provided next to each question. (1 mark each)***

1. Mr. Magee asked his class to write an inequality to represent the solution set for the number line below.



Which students correctly represented the solution set given by the graph?

Erik	$x < 3$
Marissa	$x > 3$ ✓
Laurie	$3 < x$ ✓
Steven	$3 > x$

a) All four students **b)** Erik and Steven **c)** Marissa and Laurie **d)** Erik

2. Which number is **NOT** a solution for the inequality $m + 5 > -4$ $m > -9$

a) $m = 9$ ✓ **b)** $m = -9$ ✗ **c)** $m = 1$ ✓ **d)** $m = -1$ ✓

3. Jeff had a bad game. He made at most ~~32~~ 10 shots.
Which number is **NOT** a good guess for the actual number of shots he ~~stopped~~ made?

a) ~~30~~ 8 b) ~~31~~ 9 c) ~~32~~ 10 d) ~~33~~ 11

4. John has been told that the meeting he will be attending will be at least 3 hours.
If x represents the time in hours, which inequality best represents this situation?

a) $x < 3$ **b)** $x \leq 3$ **c)** $x > 3$ **d)** $x \geq 3$

Fill in the blank ***with the appropriate word(s) or numbers that make it a true statement.*** **(open, closed, equation, inequality, boundary point, solution, zero)**

5. The solution may or may not include the boundary point.
6. A(n) inequality is a mathematical expressions comparing expressions that may not be equal.
7. A(n) closed circle/dot means the boundary point is part of the solution.
8. "4 is greater than x" is written algebraically as $4 > x$

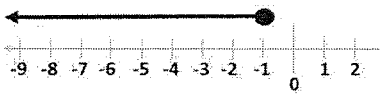
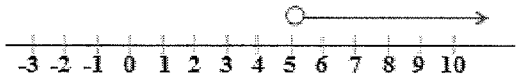
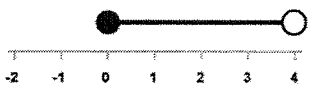
Written Response

Part A: Identify and explain the error in the following. Then, write the correct solution.

$4m + 2 < 6$
$-2 \quad -2$
$4m > 4$ no flip
$/4 \quad /4$
$m > 1$

$4m + 2 < 6$
$-2 \quad -2$
$\frac{4m}{4} < \frac{4}{4}$
$m < 1$

Part B: Complete the chart:

IN WORDS	GRAPHICALLY	ALGEBRAICALLY
Three is greater than x		$3 > x$ (or $x < 3$)
A number is greater than -4.		$x > -4$
a # is less than -1 or equal to		$x \leq -1$
a # is larger than 5		$x > 5$
a # is greater than or = to 0, and less than 4		$0 \leq x < 4$

Part C: Write an inequality for each situation and use it to answer the question.

1) Two full water storage tanks are being drained for maintenance. The first tank holds 800 L of water and drains at a rate of 18 L/min. The second tank holds 500 L and drains at 7 L/min. When will the first tank contain less water than the second? Use "t" for time.

$800 - 18t < 500 - 7t$

$-500 \quad +18t \quad -500 \quad +18t$

$300 < 11t$

$\frac{300}{11} < t$

$t > 27.\overline{27}$ min

first tank contains less than second after been draining for $27.\overline{27}$ mins.

2) The student council is considering two different companies to print the school's yearbooks. Great Graphics charges $250 plus $12.25 per book. Print Express charges $900 plus $9.50 per book. How many orders for yearbooks would make Print Express the better option? Use "Y" for number of yearbooks.

less money

Great G. Print E.

$250 + 12.25y > 900 + 9.5y$

$-250 \quad -9.5y \quad -250 \quad -9.5y$

$2.75y > 650$

$y > 236.\overline{36}$

Print Express is better if 237 or more yearbooks are sold!

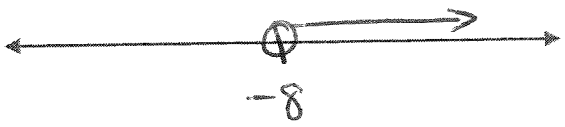
Part D: a) Solve each inequality, b) Graph the solution on a number line, c) Check the boundary point, d) Check the inequality solution (arrow).

1) $2x + 5 > -11$

$-5 \quad -5$

$\frac{2x}{2} > \frac{-16}{2}$

$x > -8$



Checks

Boundary Point:

$2(-8)+5 \stackrel{?}{\geq} -11$

$-16+5 \stackrel{?}{>} -11$

$-11 > -11$

correct boundary, but open circle

Solution: try $\emptyset$

$2(0)+5 \stackrel{?}{>} -11$

$5 > -11$ yes ✓

2) $17 - 3x \leq 7x + 3$

$-3 \quad +3x \quad +3x \quad -3$

$\frac{14}{10} \leq \frac{10x}{10}$

$\frac{7}{5} \leq x$

$1.4 \leq x$ or $x \geq 1.4$

Checks

Boundary Point:

$17 - 3(1.4) \stackrel{?}{\leq} 7(1.4)+3$

$12.8 \leq 12.8$

correct boundary, closed circle

Solution: try 2

$17 - 3(2) \stackrel{?}{\leq} 7(2)+3$

$11 \leq 17$ ✓

yes

3) $3.4 - 1.3y < 3(0.5y - 2.2)$

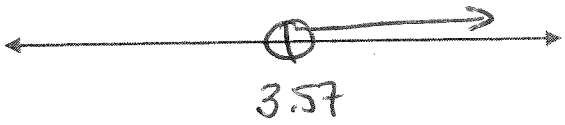
$3.4 - 1.3y < 1.5y - 6.6$

$-3.4 \quad -1.5y \quad -1.5y \quad -3.4$

$-2.8y < -10$

$\div -2.8 \quad \div -2.8$

$y > 3.5714$ ← rounded



Checks

Boundary Point:

$3.4 - 1.3(3.5714) \stackrel{?}{\leq} 3(0.5(3.5714) - 2.2)$

$-1.24282 < -1.2429$

close - rounding error, consider correct

Solution: try 5

$3.4 - 1.3(5) \stackrel{?}{\leq} 3(0.5(5) - 2.2)$

$-3.1 < 0.9$ ✓

4) $\left(\frac{1}{2}m - \frac{1}{3} \geq 3 - \frac{1}{3}m\right) 6$

$3m - 2 \geq 18 - 2m$

$5m \geq 20$

$m \geq 4$

Checks

Boundary Point:

$\frac{1}{2}(4) - \frac{1}{3} \stackrel{?}{\geq} 3 - \frac{1}{3}(4)$

$2 - \frac{1}{3} \geq 3 - \frac{4}{3}$

$1\frac{2}{3} \geq 1\frac{2}{3}$

correct ✓

Solution: try 12

$\frac{1}{2}(12) - \frac{1}{3} \stackrel{?}{\geq} 3 - \frac{1}{3}(12)$

$6 - \frac{1}{3} \geq 3 - 4$

$5\frac{2}{3} \geq -1$ ✓