Integrated Algebra Unit 1 Review Name: Key

Topic #1: Solving Equations:

Reminders:

Solve:

1. $\frac{2}{3}(9x-6)=-(x+1)$

$6x - 4 = -x - 1$

$7x = 3$

$x = \frac{3}{7}$

2. $\frac{2x-5}{5}+7=2$

$\frac{2x-5}{5} = -5$

$2x - 5 = -25$

$2x = -20$

$x = -10$

3. $\frac{2x}{3}=\frac{x-3}{2}$

$4x = 3(x-3)$

$4x = 3x - 9$

$x = -9$

4. $2x+7-(5x-5)=\frac{4}{7}(14x-7)$

$2x + 7 - 5x + 5 = 8x - 4$

$-3x + 12 = 8x - 4$

$-11x = -16$

$x = 16/11$

5. $12\left[\frac{x}{4}-\frac{2}{3}=\frac{x}{3}+1\right]$

$3x - 8 = 4x + 12$

$-20 = x$

$x = -20$

6. Is -3 a solution of $2x + 4 = 2$?

$2(-3) + 4 \stackrel{?}{=} 2$

$-6 + 4 \stackrel{?}{=} 2$

$-2 \stackrel{?}{=} 2$

False

$\therefore$ -3 is not a solution

TOPIC #2: Solving Literal Equations:

7. Solve I = Prt for P

$$\frac{I}{rt} = P$$

8. Solve $A = \frac{LWH}{3}$ for W

$$3A = LWH$$

$$\frac{3A}{LH} = W$$

9 $2x - 3y = 15$ for y

$$y = \frac{2}{3}x - 5$$

10. Solve $A = \frac{1}{2}x(b+c)$ for c

$$2A = x(b+c)$$

$$\frac{2A}{x} = b+c$$

$$\frac{2A}{x} - b = c$$

11 Solve $A = \frac{1}{xy}$ for y

$$Axy = 1$$

$$y = \frac{1}{Ax}$$

*12. Solve $A = P + Prt$ for P

$$\frac{A}{(1+rt)} = \frac{P(1+rt)}{(1+rt)}$$

$$P = \frac{A}{(1+rt)}$$

Topic #3: Inequalities

Important Rule :

Interval notation & graphs:

Compound Inequalities:

1. Solve. Graph. Write in interval notation.

a) $3x-1>11$

$3x>12$

$x>4$

$(4,\infty)$

b) $4-x\geq 5$

$4\geq 5+x$

$-1\geq x$

$x\leq -1$

$(-\infty,-1]$

c) $-3x<6$

$-3 \quad -3$

$x>-2$

$(-2,\infty)$

d) $\frac{3x+6}{4}-7<2$

$\frac{3x+6}{4}<9$

$3x+6<36$

$3x<30$

$x<10$

$(-\infty,10)$

e). $-\frac{2}{3}x-10\geq -4$

$-\frac{2}{3}x\geq 6$

$-2x\geq 18$

$x\leq -9$

$(-\infty,-9]$

f. $2x-5>\frac{1}{2}(4x-8)$

$2x-5>2x-4$

$-5>-4$

false

$\therefore$ no soln.

$\emptyset$

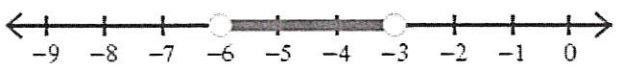
g. Is -3 a solution of the inequality: $-9<2x-3<7$?

$-9<2(-3)-3<7$

$-9<-9<7$ false

$\therefore$ not a solution

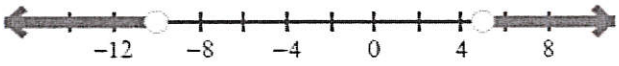
Now, I give you the graph, you come up with the inequality. Write in interval notation.

2) 

$(-6, -3)$

3) 

$(-\infty, 9) \cup [10, \infty)$

4) 

$(-\infty, -10) \cup (5, \infty)$

5) 

$(-\infty, 8)$

Solve and graph each compound inequality. Write the solution in interval notation.

OARS

6. $2x - 3 \le 7$ OR $\frac{2}{3}x + 5 > 21$

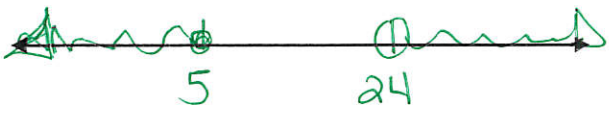
$2x \le 10$

$x \le 5$

$\frac{2}{3}x > 16$

$2x > 48$

$x > 24$

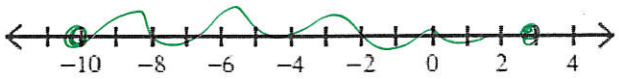


7) $-20 \le -6m - 2 \le 58$

$-18 \le -6m \le 60$

$3 \ge m \ge -10$

$-10 \le m \le 3$



8. $\frac{2x-3}{3} < -5$ OR $-2(x-5) \le \frac{2}{3}(6x+3)$

$2x - 3 < -15$ or $-2x + 10 \le 4x + 2$

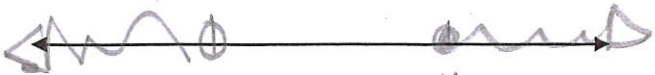
$2x < -12$

$x < -6$

$-6x \le -8$

$x \ge \frac{4}{3}$

$(-\infty, -6) \cup [\frac{4}{3}, \infty)$



9). $-8 < \frac{2}{3}x - 2 < 6$

$-6 < \frac{2}{3}x < 8$

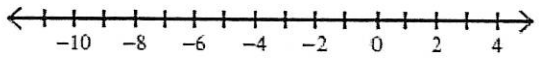
$-18 < 2x < 24$

$-9 < x < 12$

$(-9, 12)$

TOPIC 4: Absolute Value Equations

The absolute value of a number is always positive. The technical definition is the distance from zero.



Therefore, $|-2| =$ 2, and when $|x| = 4$ that means that $x =$ 4 or -4!

Because numbers inside the absolute value can be positive or negative, we must account for two separate cases.

Example 1: $|x+3| = 8$

$x+3 = 8$ or $x+3 = -8$

$x = 5$ or $x = -11$

Example 2: $-3|2x-4| = 12$

Isolate 1st

$|2x-4| = -4$

11 = neg

can't!

no solution

Example 3: $\frac{2}{3}|x+1| - 14 = 6$

Isolate it!

$\frac{2}{3}|x+1| = 20$

$2|x+1| = 60$

$|x+1| = 30$

$x+1 = 30$ or $x+1 = -30$

$x = 29$ $x = -31$

Example 4: $\frac{|2x-6|}{4} - 2 = 5$

$\frac{|2x-6|}{4} = 7$

$|2x-6| = 28$

$2x-6 = 28$ $2x-6 = -28$

$2x = 34$

$x = 17$ $x = -11$

Topic 5: Absolute Value Inequalities

When solving absolute value _____, we create compound inequalities like the ones we saw in the warmup. There are two distinct cases that cause the two cases: _____ & _____.

CASE #1: $|abs\ val| < \#$ → $-\# < \_\_\_\_ < \#$

CASE #2: $|abs\ val| > \#$ → $\_\_\_\_ > \#$ or $\_\_\_\_ < -\#$

Solve and graph. Write solutions in set and interval notation

isolate

flip & negate

a) $2|x+8|>6$

$|x+8|>3$

$x+8>3$ OR $x+8<-3$

$x>-5$ or $x<-11$

$(-\infty,-11)\cup(-5,\infty)$

Interval Notation:

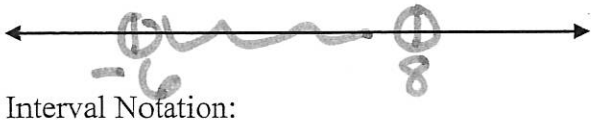
b) $|x-1|-3<4$

$|x-1|<7$ and

$-7<x-1<7$

$-6<x<8$

$(-6,8)$



Interval Notation:

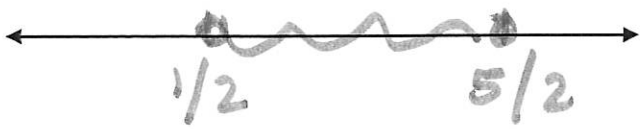
c. $-2|2x-3|+10\geq 6$

$|2x-3|\leq 2$

$-2\leq 2x-3\leq 2$

$1\leq 2x\leq 5$

$\frac{1}{2}\leq x\leq \frac{5}{2}$



d. $3|5x-1|+9\geq 24$

isolate

$3|5x-1|\geq 15$

$|5x-1|\geq 5$

$5x-1\geq 5$ OR $5x-1\leq -5$

flip/negate

$5x\geq 6$

$x\geq 6/5$ or $5x\leq -4$

$x\leq -4/5$

Additional Practice: Optional

I. Order of Operations: PEMDAS (without calculator)

1. $\dfrac{6 \div (-8-4)}{2(3^2-1)-7}$

$\dfrac{6 \div -12}{2(8)-7}$

$= \dfrac{1}{2} \div 9$

$= \dfrac{1}{2} \cdot \dfrac{1}{9} = \dfrac{1}{18}$

2. $\dfrac{x^2+y^2-3z}{4z-y}$ x = -2, y = 3, z = 4

$= \dfrac{(-2)^2+3^2-3(4)}{4(4)-3}$

$= \dfrac{4+9-12}{13}$

$= \dfrac{1}{13}$

3. $-2[3-(7-10)^2]$

-2

II. Solve Equations: Backwards PEMDAS

4. $\dfrac{3}{2}(x+6) = x - \dfrac{1}{3}$

$\left(\dfrac{3}{2}(x+6)\right) \cdot 6 = \left(x - \dfrac{1}{3}\right) \cdot 6$

$9(x+6) = 6x - 2$

$9x + 54 = 6x - 2$

$3x = -56$

$x = \dfrac{-56}{3}$

5. $11 - 3(x+5) = 3x + 1$

$11 - 3x - 15 = 3x + 1$

$-3x - 4 = 3x + 1$

$-6x = 5$

$x = -5/6$

6. $\dfrac{3-2x}{5} + 1 = -4x - 7$

$5\left(\dfrac{3-2x}{5}\right) + (-4x - 8) \cdot 5$

$3 - 2x = -20x - 40$

$18x = -43$

$x = -43/18$

7. $\dfrac{4}{5}x + 8 = \dfrac{1}{3}x - 2$

15

$12x + 120 = 5x - 30$

$7x = -150$

$x = \dfrac{-150}{7}$

Karla and Juan both solved the following problem:

You have added enough antifreeze to your car's cooling system to lower the freezing point to -35°C and raise the boiling point to 125°C. The coolant will remain a liquid as long as the temperature C (in degrees Celsius) satisfies the inequality $-35 < C < 125$. Write the inequality in degrees Fahrenheit using the equation $C = \frac{5}{9}(F - 32)$

Karla's Work

$-35 < C < 125$ ✓

$-35 < \frac{5}{9}(F - 32) < 125$ ✓

$-63 < F - 32 < 225$ ✓

$95 < F < 257$

Juan's Work

$-35 < C < 125$ ✓

$-35 < \frac{5}{9}(F - 32) < 125$ ✓

$-63 < F - 32 < 225$ ✓

$-31 < F < 257$

24. Solve the inequality to show who solved the problem correctly. Juan

A plumber charges a $60 service charge for making a house call. The cost for labor is $45 per hour. Which is a linear model for the cost of the plumber's visit where n represents the number of hours of labor?

A. $C = 60n + 45$
B. $C = 45n + 60$
C. $C = 60n - 45$
D. $C = 45n - 60$

C = 45x + 60

B