Name: Key

Topic 1: Real Numbers (Equations and Inequalities)

Questions 1-12. Solve the equation. If the equation is an identity or if it has no solution, state that fact.

1) $21y = 56 + 7y$

$14y = 56$

$y = 4$

2) $7 = \frac{n}{2} - 1$

$8 = \frac{n}{2}$

$n = 16$

3) $360 + 36z = 30z$

$360 = -6z$

$z = -60$

4) $\frac{3}{4}w + 13 = 7$

$\frac{4}{3} \cdot \frac{3}{4}w = -6 \cdot \frac{4}{3}$

$w = -8$

5) $2c - (c - 8) = 46 - c$

$2c - c + 8 = 46 - c$

$c + 8 = 46 - c$

$2c = 38$

$c = 19$

6) $\frac{3-x}{5} = 6$

$3 - x = 30$

$-x = 27$

$x = -27$

7) $5(x + 1) - 3(x + 1) = 14$

$5x + 5 - 3x - 3 = 14$

$2x + 2 = 14$

$2x = 12$

$x = 6$

8) $5(y + 2) = 6 + 3(2y - 1)$

$5y + 10 = 6 + 6y - 3$

$5y + 10 = 3 + 6y$

$10 = y + 3$

$y = 7$

9) $3(x + 2) = 3x + 2 + 4$

$3x + 6 = 3x + 6$

$6 = 6$

Identity

10) $14n - 11n + 15 = 0$

$3n = -15$

$n = -5$

11) $-7 - 4(2x - 1) = 21$

$-7 - 8x + 4 = 21$

$-8x - 3 = 21$

$-8x = 24$

$x = -3$

12) $|x| + 8 = 12$

$|x| = 4$

$x = \pm 4$

Questions 13-15. Define a variable, write an equation, and solve for each.

13) Find three consecutive integers whose sum is −66.

x = smallest

$x + 1$

$x + 2$

$3x + 3 = -66$

$3x = -69$

$x = -23$

-23, -22, -2

14) Find four consecutive odd integers if the sum is 48.

x = smallest

$x + 2$

$x + 4$

$x + 6$

$4x + 12 = 48$

$4x = 36$

$x = 9$

9, 11, 13, 15

15) Find four consecutive even integers if twice the largest is 20 less than the smallest.

x = smallest

$x + 2$

$x + 4$

$x + 6$

$2(x + 6) = x - 20$

$2x + 12 = x - 20$

$x + 12 = -20$

$x = -32$

-32, -30, -28, -26

Questions 16-19. Solve for the indicated variable.

16) $y = ax - b$ for x

$\frac{y+b}{a} = \frac{ax}{a}$

$\boxed{x = \frac{y+b}{a}}$

17) $\frac{PV}{nT} = \frac{nRT}{nT}$ for R

$\boxed{R = \frac{PV}{nT}}$

18) $\frac{x-y}{3} = 5$ for y

$x - y = 15$

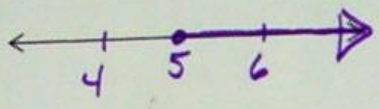
$-y = 15 - x$

$\boxed{y = -15 + x}$

Questions 19-24. Solve the inequality. Graph your solution on the given line.

19. $n - 2 \geq 3$

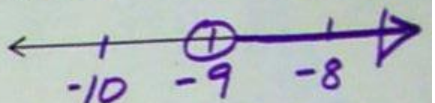
$n \geq 5$



20. $2 + \frac{x}{-3} < 5$

$\frac{x}{-3} < 3$

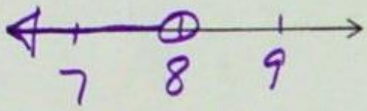
$x > -9$



21. $2x - 3 < x + 5$

$x - 3 < 5$

$x < 8$



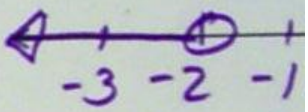
22. $5(2 - t) > 4(3 - t)$

$10 - 5t > 12 - 4t$

$10 - t > 12$

$-t > 2$

$t < -2$



23. $-3 < 2x + 1 \leq 5$

$-3 < 2x + 1$ & $2x + 1 \leq 5$

$-4 < 2x$ $\quad 2x \leq 4$

$-2 < x$ $\quad x \leq 2$

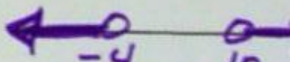
$\boxed{-2 < x \leq 2}$

24. $-5x > 20$ *or* $10 + \frac{x}{2} > 15$

$x < -4$ $\quad \frac{x}{2} > 5$

$x > 10$

$\boxed{x < -4 \text{ or } x > 10}$



Questions 25-27, solve each equation.

25. $|x| + 4 = 8$

$|x| = 4$

$\boxed{x = \pm 4}$

26. $-2|x| = -14$

$|x| = 7$

$\boxed{x = \pm 7}$

27. $|2x - 6| = 8$

$2x - 6 = 8$, $\quad 2x - 6 = -8$

$2x = 14$ $\quad 2x = -2$

$\boxed{x = 7, \quad x = -1}$

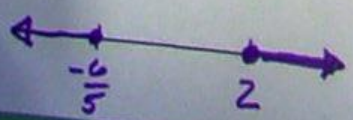
Question 28-30, solve and graph each inequality.

28. $|5x - 2| \geq 8$

$5x - 2 \geq 8$ or $5x - 2 \leq -8$

$5x \geq 10$ $\quad 5x \leq -6$

$\boxed{x \geq 2 \text{ or } x \leq -\frac{6}{5}}$



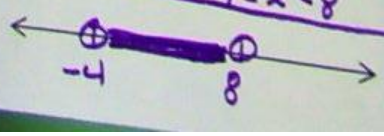
29. $\left|\frac{x}{2} - 1\right| < 3$

$\frac{x}{2} - 1 < 3$ and $\frac{x}{2} - 1 > -3$

$\frac{x}{2} < 4$ $\quad \frac{x}{2} > -2$

$\boxed{x < 8 \text{ and } x > -4}$

$\boxed{-4 < x < 8}$



30. $-2|2 - 3x| > 16$

$|2 - 3x| < -8$

$2 - 3x < -8$ and $2 - 3x >$

$-3x < -10$ $\quad -3x >$

$\boxed{x > \frac{-10}{3} \text{ and } x <}$

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

Warm-Up Review for Topic 1 Name: _____

For each problem, define your variable, write an equation, show how you solve, state the solution.

1. Find two consecutive integers whose sum is 203.

x = Smallest integer
x+1

$x + x + 1 = 203$ or $2x + 1 = 203$
$2x = 202$
$x = 101$

101, 102

2. Find three consecutive even integers whose sum is 132.

x = Smallest int.
x+2
x+4

$3x + 6 = 132$
$3x = 126$
$x = 42$

42, 44, 46

3. Find two consecutive odd integers whose sum is –104.

x = smallest int
x+2

$2x + 2 = -104$
$2x = -106$
$x = -53$

-53, -51
-53+2

4. Find three consecutive integers such that the sum of twice the smallest and 3 times the largest is 316.

Bonus

x = smallest
x+1
x+2 ← largest

$2x + 3(x+2) = 316$
$2x + 3x + 6 = 316$
$5x = 310$
$x = 62$

62, 63, 6

192 + 124 = 316 ÷10 · 2

Solve each equation or inequality. Graph the solution for each inequality.

5) $4 + (x - 3) = 1$

$4 + -x + 3 = 1$
$-x + 7 = 1$
$-x = -6$
$x = 6$

6) $\frac{(2x-1)}{3} = 5 \cdot 3$

$2x - 1 = 15$
$2x = 16$
$x = 8$

7) $-2(3x + 5) + 6 = 6(-x + 2) + 28$

$-6x + -10 + -6 = -6x + 12 + -2$
$-6x + -16 = -6x +$
$-16 = -16$

Identity All real IMS

8) $k - 7 < 16$

$K < 23$

9) $-2 < x + 2 < 3$

$-2 < x + 2$ and $x + 2 < 3$
$-4 < x$ and $x < 1$
$-4 < x < 1$
$x > -4$ and $x < 1$

10) $5 - x > 7$ or $x - 5 > 7$

$-x > 2$
$x < -2$ or $x > 12$

11) $|x + 7| - 2 = 10$

$|x + 7| = 12$
$x + 7 = 12$, $x + 7 = -12$
$x = 5$ $x = -19$

12) $|6 - 3x| \geq 9$

$6 - 3x \geq 9$ or $6 - 3x \leq -9$
$-3x \geq 3$ $-3x \leq -15$
$x \leq -1$ or $x \geq 5$

13) $|2x - 3| - 5 < 2$

$|2x - 3| < 7$
$2x - 3 < 7$ AND $2x - 3$
$2x < 10$ $2x >$
$x < 5$ and $x >$
$-2 < x < 5$