Accelerated Math Study Sheet (Chapter 8) Name Key
Solving Equations and Inequalities Block ____ Date_____

Test on Chapter 8 is Thursday, March 5

Review your notes, quiz, homework problems, and handouts for this chapter.
Be able to do the following:

Equations
*Solve and check 1 and 2-step equations showing proper algebraic steps
*Simplify (use distributive property and combine like terms) each side of the equation before starting to do operations to both sides of the equation
*Solve and check equations with variables on both sides.
*Solve equations whose solution is all real numbers or no solution.
*Understand the meaning of "the solution to an equation"
*Be able to write a one or two-step equation to solve a problem
*Be able to translate equations into words and a sentence to an equation
*Define a variable, write an equation and solve word problems

Inequalities
*Be able to use words and symbols to write an inequality
*Be able to write a inequality by translating from words
*Be able to make a number line graph to show the inequality
*Solve and check 1, 2-step, and multi-step inequalities

Practice Problems

1) Is the inequality $-5 < -2n + 1$ **true or false for the value n=4 ?**

$-5 \overset{?}{<} -2(4)+1$

$-5 < -8+1$

$-5 < -7$

False

2) Graph this inequality on the number line. $x > -2$

3) True or False ?

The first step in solving the equation $\frac{3}{4}n - 6 = -10$ is to multiply both sides by $\frac{4}{3}$

First step is Add 6 to both sides.

4) Write the inequality for

"a number (n) is at most 6"

$a \leq 6$

5) Write the equation that represents this statement:

Five more than the product of negative 2 and a number is equivalent to 10.

$-2n + 5 = 10$

6) Write a one-step equation whose solution is -2. Answers Vary

Think $-2+3=1$

$x+3=1$

or $5(-2) = -10$

$5x = -10$

or $\frac{-2}{10} = \frac{-1}{5}$

$\frac{x}{10} = \frac{-1}{5}$

7) What is the BEST first step in solving this equation?

$-6x - 9x + 4 = 20$

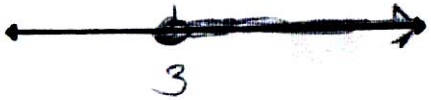
↓ Combine like terms

$-15x + 4 = 20$

8) Graph $3 \leq x$ **on the number line below.**

↓

$x \geq 3$



9) Write the inequality that is equivalent to this one so that the x is on the left side.

$-4 \geq x$

$x \leq -4$

Solve (using correct algebraic steps) and Check these equations and inequalities

10) $x + 4 = -8$

$-4 \quad -4$

$x = -12$

Ck $x + 4 = -8$

$-12 + 4 \stackrel{?}{=} -8$

$-8 = -8$ ✓

11) $x - \frac{2}{3} = -\frac{7}{9}$

$+\frac{2}{3} \quad +\frac{2}{3}$

$x = \frac{-1}{9}$

$-\frac{7}{9} + \frac{2}{3}$

$-\frac{7}{9} + \frac{6}{9} = \frac{-1}{9}$

Ck $x - \frac{2}{3} = -\frac{7}{9}$

$-\frac{1}{9} - \frac{2}{3} \stackrel{?}{=} -\frac{7}{9}$

$-\frac{1}{9} - \frac{6}{9} = -\frac{7}{9}$

$-\frac{7}{9} = -\frac{7}{9}$ ✓

12) $\frac{x}{9} = -10$

$(9)\frac{x}{9} = -10(9)$

$x = -90$

Ck $\frac{x}{9} = -10$

$\frac{-90}{9} \stackrel{?}{=} -10$

$-10 = -10$ ✓

13) $-16 = -\frac{x}{4}$

$(-4)(-16) = \frac{x}{-4}(-4)$

$64 = x$

Ck $-16 = -\frac{x}{4}$

$-16 \stackrel{?}{=} -\frac{64}{4}$

$-16 = -16$ ✓

14) $1\frac{2}{5}x = \frac{1}{5}$

$\frac{5}{7} \cdot \frac{7}{5}x = \frac{1}{5} \cdot \frac{5}{7}$

$x = \frac{1}{7}$

Ck $1\frac{2}{5}x = \frac{1}{5}$

$(1\frac{2}{5})(\frac{1}{7}) \stackrel{?}{=} \frac{1}{5}$

$\frac{7}{5} \cdot \frac{1}{7} = \frac{1}{5}$

$\frac{1}{5} = \frac{1}{5}$ ✓

15) $0.2x = -16$

$\frac{0.2x}{0.2} = \frac{-16}{0.2}$

$x = -80$

$\frac{16}{.2} = \frac{160}{2} = 80$

Ck $0.2x = -16$

$0.2(-80) \stackrel{?}{=} -16$

$-16 = -16$ ✓

80

$.2\overline{)16.0}$

Solve(using correct algebraic steps) and Check these equations and inequalities

16)

$$19 - 3n = 10$$
$$-19 \quad\quad -19$$
$$-3n = -9$$
$$\frac{-3n}{-3} = \frac{-9}{-3}$$
$$n = 3$$

CK
$$19 - 3n = 10$$
$$19 - 3(3) = 10$$
$$19 - 9 = 10$$
$$10 = 10 \checkmark$$

17)

$$\frac{3}{4}x + \frac{1}{3} = -\frac{1}{3}$$
$$-\frac{1}{3} \quad\quad -\frac{1}{3}$$
$$\frac{3}{4}x = -\frac{2}{3}$$
$$\left(\frac{4}{3}\right)\frac{3}{4}x = -\frac{2}{3}\left(\frac{4}{3}\right)$$
$$x = -\frac{8}{9}$$

CK
$$\frac{3}{4}x + \frac{1}{3} = -\frac{1}{3}$$
$$\frac{\cancel{3}}{\cancel{4}_{1}} \cdot \frac{-2}{\cancel{8}_{3}} + \frac{1}{3} \stackrel{?}{=} -\frac{1}{3}$$
$$-\frac{2}{3} + \frac{1}{3} = -\frac{1}{3}$$
$$-\frac{1}{3} = -\frac{1}{3} \checkmark$$

18)

$$1.5x - 4 = -8.5$$
$$+4 \quad\quad +4$$
$$1.5x = -4.5$$
$$\frac{1.5x}{1.5} = \frac{-4.5}{1.5}$$
$$x = -3$$

CK
$$1.5x - 4 = -8.5$$
$$1.5(-3) - 4 \stackrel{?}{=} -8.5$$
$$-4.5 + -4 = -8.5$$
$$-8.5 = -8.5 \checkmark$$

Solve(using correct algebraic steps) and Check these equations and inequalities

19) $-10 - x < 44$

$-10 + -1x < 44$
$+10 \qquad +10$

$-1x < 54$

$\frac{-1x}{-1} > \frac{54}{-1}$

$x > -54$

Choose a value for x
I Choose $x = 0$

$-10 - x < 44$
$-10 - 0 \overset{?}{<} 44$
$-10 < 44$ ✓

20) $\frac{x}{7} - 12 > -10$

$+12 \qquad +12$

$\frac{x}{7} > 2$

$(7)\frac{x}{7} > 2(7)$

$x > 14$

Choose $x = 21$

$\frac{x}{7} - 12 > -10$
$\frac{21}{7} - 12 \overset{?}{>} -10$
$3 - 12 > -10$
$-9 > -10$. ✓

21) $-8 < -5 - \frac{x}{2}$

$-8 < -5 + \frac{x}{2}$

$+5 \qquad +5$

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

$(-2)(-3) > \frac{x}{-2}(-2)$

$6 > x$

$x < 6$

Choose $x = 2$

$-8 < -5 - \frac{x}{2}$
$-8 \overset{?}{<} -5 - \frac{2}{2}$
$-8 < -5 + -1$
$-8 < -6$ ✓

Solve(using correct algebraic steps) and Check these equations and inequalities

22) $-6(x+5)-4(x-5)=-30$

$-6x+-30+-4x+20=-30$

$-10x+-10=-30$

$+10 \quad +10$

$-10x=-20$

$\frac{-10x}{-10}=\frac{-20}{-10}$

$x=2$

CK $-6(x+5)-4(x-5)=-30$

$-6(2+5)-4(2-5)$

$-6(7)-4(-3)$

$-42+12$

-30

$=-30$ ✓

23) $-3(4x-2)+15=-12x+9$

$-12x+6+15=-12x+9$

$-12x+21=-12x+9$

$+12x \quad +12x$

$21 \neq 9$

No solution

No check needed

24) The solution to this equation is
All Real Numbers. → will have an identity
Find the value of k.
$-2(3x + 5) = kx - 10$

$-6x - 10 = kx - 10$

$x = -6$

25) Is the number 2 one of the solutions to this inequality? Show how you arrived at your answer.
$-4x - 1 > 7$

$-4(2) - 1 \stackrel{?}{>} 7$

$-8 - 1 > 7$

$-9 > 7$ NO!

26) The solution to this equation is
No Solution. → will arrive at contradiction
Find the value of k.
$-8(3x + 2) - (x - 5) = kx - 12$

$-24x + -16 - x + 5 = kx - 12$

$-25x - 11 = kx - 12$

must be equal

will get $-11 \neq -12$

$k = -25$

27) Find the value of k if the solution to this equation is 5.
$x = 5$

$kx + 3 = \frac{-1}{3}$

$k \cdot 5 + 3 = \frac{-1}{3}$

$-3 \quad -3$

$5k = \frac{-10}{3}$

$(\frac{1}{5})5k = \frac{-10}{3}(\frac{1}{5})$

$k = \frac{-2}{3}$

28) Find the value of k that makes the solution to this equation -3 → $x = -3$
$kx + 4x = -2(x - 5) + 8x - 1$

$k(-3) + 4(-3) = -2(-3 - 5) + 8(-3) - 1$

$-3k + -12 = -2(-8) + -24 - 1$

$-3k + -12 = -9$

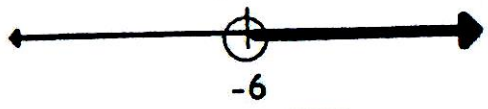
$+12 \quad +12$

$-3k = 3$

$\frac{-3k}{-3} = \frac{3}{-3}$

$k = -1$

29) What inequality is shown by this graph?



$x > -6$

Complete the following steps to solve each word problem:

*Define a variable *Write the word model or formula.

*Write the equation *Solve it *Check that your answer makes sense

30) The perimeter of a rectangle is 126 cm. The length of the rectangle is three more than twice the width. Find the dimensions of the rectangle.

n = width

$2n+3$ = length

$P = 2l + 2w$

$126 = 2(2n+3) + 2(n)$

$126 = 4n + 6 + 2n$

$\frac{126}{6} = \frac{6n+6}{6}$

$120 = 6n$

$\frac{120}{6} = \frac{6n}{6}$

$20 = n$

width 20cm

$2(20)+3$

$40+3$

43cm length

31) Sara is considering two different gyms. At Gym A she would pay $5 each day she worked out. At Gym B she would pay $75 to join the gym and then $2 each day she worked out. After how many days would the costs of both gyms be the same?

Let d = #days

cost Gym A = cost of Gym B

$5d = 75 + 2d$

$-2d \quad -2d$

$3d = 75$

$\frac{3d}{3} = \frac{75}{3}$

$d = 25$

25 days

Complete the following steps to solve these word problem:
*Define a variable *Write the word model (or formula)
*Write the equation *Solve it *Check that your answer makes sense

32) One side of a triangle is three times another side and the third side is twice the sum of the other two sides. The perimeter of the triangle is 240cm. Find the 3 sides.

1st $3x$
2nd x
3rd $2(3x+x)=2(4x)=8x$

Perimeter = 1st + 2nd + 3rd

$240 = 3x + x + 8x$

$240 = 12x$

$\frac{240}{12} = \frac{12x}{12}$

$20 = x$

1st $3x = 3(20) = 60$ cm
2nd $x = 20$ cm
3rd $8x = 8(20) = 160$ cm

60 cm, 20 cm, 160 cm

33) Seven less than three times a number is the same as five more than half a number. Find the number. Let n = the #

[3 times #] $-7 =$ [$\frac{1}{2}$ the #] $+5$

$3n - 7 = \frac{1}{2}n + 5$

$-\frac{1}{2}n \quad -\frac{1}{2}n$

$\frac{5}{2}n - 7 = 5$

$+7 \quad +7$

$\frac{5}{2}n = 12$

$\left(\frac{2}{5}\right)\frac{5}{2}n = 12\left(\frac{2}{5}\right)$

$n = \frac{24}{5}$ or $4\frac{4}{5}$ or 4.8

Solve(using correct algebraic steps) and Check these equations and inequalities

34) $7y - 8 = 3(2y - 4) + y$

$7y - 8 = 6y - 12 + y$

$7y - 8 = 7y - 12$

$-7y \quad -7y$

$-8 \neq -12$

No solution

No check

35) $-5x - (3x - 5) = 2(x + 1) - 4(5x - 2)$

$-5x - 3x + 5 = 2x + 2 - 20x + 8$

$-8x + 5 = -18x + 10$

$+18x \quad +18x$

$10x + 5 = 10$

$-5 \quad -5$

$10x = 5$

$\frac{10x}{10} = \frac{5}{10}$

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

Ck $-5x - (3x - 5) = 2(x + 1) - 4(5x - 2)$

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

$-\frac{5}{2} - (\frac{3}{2} - \frac{10}{2})$

$-\frac{5}{2} - (-\frac{7}{2})$

$-\frac{5}{2} + \frac{7}{2}$

$\frac{2}{2}$

$2(\frac{1}{2} + 1) - 4(5 \cdot \frac{1}{2} - 2)$

$2(\frac{3}{2}) - 4(\frac{5}{2} - \frac{4}{2})$

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

$3 - 2$

1

$1 = 1$ ✓