Unit #2 Review Sheet: Lessons 2-1 – 2-6

Lesson 1: Equations and Their Solutions (Key Terms: Expression, Equation, Solution)

1) Explain why $2 + 2 = 5$ is an equation.

It has an equal sign! (Even though the equation is "false")

2) Determine whether the following values for the given variables are solutions to the given equations.

A. $3x + 12 = 33$; when $x = 7$

$3(7) + 12 = 33$

$33 = 33$ ✓

Yes

B. $x^2 - 2x + 5 = 5$; when $x = -2$

$(-2)^2 - 2(-2) + 5 = 5$

$13 \neq 5$

NO

C. $\frac{2}{3}x + 3 = -7$; when $x = -15$

$\frac{2}{3}(-15) + 3 = -7$

$-7 = -7$ ✓

Yes

Lesson 2: Seeing Structure to Solve Equations (Key Term: Inverse Operations)

1) Find the value of x that solves each equation. In each case, first identify the operations that have occurred to x and reverse them. Show each step.

A. $\frac{x-9}{3} + 8 = 12$

$\phantom{\frac{x-9}{3}} -8 \quad -8$

$(3)\frac{x-9}{3} = 4(3)$

$x - 9 = 12$

$+9 \quad +9$

$\boxed{x = 21}$

B. $\frac{1}{3}(6x + 3) = 8$

$2x + 1 = 8$

$-1 \quad -1$

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

$\boxed{x = \frac{7}{2} = 3.5}$

2) Set up an equation that translates the following verbal phrases into mathematics and then solve.

Three times the difference of a number and four is equal to twelve.

$3(n - 4) = 12$

$3n - 12 = 12$

$+12 \quad +12$

$\frac{3n}{3} = \frac{24}{3}$

$\boxed{n = 8}$

Lesson 3: A Linear Equation Solving Review

1) Find the solution for each of the following equations. Check that your final answers make the equations true.

A. $\frac{x}{3} + 2 = -4$

$\phantom{\frac{x}{3}} -2 \quad -2$

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

$\boxed{x = -18}$

Chk: $\frac{-18}{3} + 2 = -4$

$-6 + 2 = -4$

$-4 = -4$ ✓

B. $\frac{3}{4}x - 6 = 0$

$+6 \quad +6$

$(\frac{4}{3})\frac{3}{4}x = 6(\frac{4}{3})$

$\boxed{x = 8}$

Chk: $\frac{3}{4}(8) - 6 = 0$

$6 - 6 = 0$

$0 = 0$ ✓

C. $9x - 3(x - 4) = 4(x - 2)$

$9x - 3x + 12 = 4x - 8$

$6x + 12 = 4x - 8$

$-4x \qquad -4x$

$2x + 12 = -8$

$-12 \quad -12$

$\frac{2x}{2} = \frac{-20}{2}$

$\boxed{x = -10}$

Lesson 4: Justifying Steps in Solving an Equation (Key Terms: Additive & Multiplicative Property of Equality)

1) Consider the equation $5x - 3(x+2) = 4(x+3)$. Fill in the justifications below.

Step #1: $5x - 3x - 6 = 4x + 12$ Justification: **Distributive Property**

Step #2: $x(5-3) - 6 = 4x + 12$ Justification: **Distributive Property**

$2x - 6 = 4x + 12$

when you do the same thing on both sides of equation, its an equality property!

Step #3: $2x - 6 - 12 = 4x + 12 - 12$ Justification: **Additive Equality Property**

$2x - 18 = 4x$

Step #4: $2x - 18 - 2x = 4x - 2x$ Justification: **Additive Equality Property**

Step #5: $2x - 2x - 18 = 2x$ Justification: **Commutative Property**

$-18 = 2x$

Step #6: $-18(½) = 2x(½)$ Justification: **Multiplic. Equality Property.**

$-9 = x$

Lesson 5: Linear Word Problems (Key Terms: Define the Variable)

1) Marty and Melinda went out to lunch. Their bill totaled $19. Marty's lunch cost $3 more than Melinda's. How much was Melinda's lunch? *adds up to*

Marty	M + 3	$11
Melinda	M	$8

$Marty + Melinda = 19$
$M + 3 + M = 19$
$2M + 3 = 19$
   $-3 \quad -3$

$\dfrac{2M}{2} = \dfrac{16}{2}$

$\boxed{M = 8}$

2) Greg is currently 25 years older than his daughter. In two years, he will be six times older than his daughter. Set up let statements and an equation that relates to the situation. Then, determine the current age of Greg and his daughter.

	NOW	In 2 Yrs.	
Greg	D + 25	6(D+2)	28 yrs
Daughter	D	D + 2	3 yrs

$Greg\ NOW + 2 = Greg\ in\ 2yrs$
$D + 25 + 2 = 6(D + 2)$
$-D + 27 = 6D + 12$
   $-D \qquad -D$
$27 = 5D + 12$
$-12 \qquad -12$

$\dfrac{5D}{5} = \dfrac{15}{5}$

$\boxed{D = 3}$

Lesson 6: More Linear Equations and Consecutive Integer Games (Key Terms: Consecutive Integers)

1) Three consecutive integers have the property that when the sum between the first integer and twice the second integer is found, the result is equal to ten less than the third integer. Find the three integers.

1st	n	-5
2nd	n+1	-4
3rd	n+2	-3

$1st + 2(2nd) = 3rd - 10$
$n + 2(n+1) = n + 2 - 10$
$n + 2n + 2 = n - 8$
$3n + 2 = n - 8$

$3n + 2 = n - 8$
$-n \qquad -n$
$2n + 2 = -8$
$\quad -2 \quad -2$
$\dfrac{2n}{2} = \dfrac{-10}{2}$ $\boxed{n = -5}$

2) Three consecutive even integers have that property that the ratio of the first even integer and two is equal to the difference of the third even integer and second even integer. Find the three even integers.

1st	n	4
2nd	n+2	6
3rd	n+4	8

$\dfrac{1st}{2} = 3rd - (2nd)$

$\dfrac{n}{2} = n + 4 - 1(n + 2)$

$\dfrac{n}{2} = n + 4 - n - 2$

$(2)\dfrac{n}{2} = 2(2)$

$\boxed{n = 4}$

3) The lengths of the sides of a triangle are consecutive odd integers. The perimeter of a triangle is 51 centimeters. Find the lengths of all three sides.

1st	n	15
2nd	n+2	17
3rd	n+4	19

$n + n + 2 + n + 4 = 51$
$3n + 6 = 51$
$\quad -6 \quad -6$
$\dfrac{3n}{3} = \dfrac{45}{3}$ $\boxed{n = 15}$