Ms. Groves Algebra 1 - 2020   Name __2023 WORKED OUT KEY__ ID: 1
MidTerm Review Chapters 1-8
Date_____   Period_____

CHAPTER1

Evaluate each expression. Clearly show work going DOWN!   Circle final answer. (8points)

1) $5 \cdot 3 \div 3 + 5 \cdot 3$

$15 \div 3 + 15 =$

$5 + 15 =$

$\boxed{20}$

2) $10 \div (4-2) + 2 + 5$

$10 \div 2 + 2 + 5 =$

$5 + 2 + 5 =$

$\boxed{12}$

3) $(5+4) \cdot 3 - 5(4+1)$

$(9) \cdot 3 - 5(5) =$

$27 - 25 =$

$\boxed{2}$

4) $5 + 1 - (3 + 1 - (6-3))$

$5 + 1 - (3 + 1 - 3\ ) =$

$5 + 1 - (1) =$

$5 + 1 + (-1) =$

$\boxed{5}$

5) $(1 + 7 - 5) \div 3 + 2^3$

$3 \div 3 + 8 =$

$1 + 8 =$

$\boxed{9}$

6) $\dfrac{(2+3) \cdot 3}{3+2-2} \rightarrow \dfrac{5 \cdot 3}{3} =$

$\dfrac{15}{3} = \boxed{5}$

ORDER OF OPERATIONS:

① ( )'s → INSIDE TO OUTSIDE

② EXPONENTS (AND SQ ROOTS)

③ MULT, DIVIDE → LEFT TO RIGHT

Evaluate each using the values given. Show work clearly. Circle final answer. (8points)

7) y^3; use $y = \dfrac{3}{5}$

STEP1: Substitute

$\left(\dfrac{3}{5}\right)^3 :$

$\dfrac{3}{5} \cdot \dfrac{3}{5} \cdot \dfrac{3}{5} = \boxed{\dfrac{27}{125}}$

8) $x - 5 + (x-3)^2$; use $x = 6$

$6 - 5 + (6-3)^2$

$6 - 5 + (3)^2 =$

$6 - 5 + 9 =$

$\boxed{10}$

Write each as an algebraic expression, equation, or inequality. (6points)

9) the difference of n and 15

$\boxed{N - 15}$

10) the quotient of n and 15 is 100

$\left(\dfrac{N}{15} = 100\right)$

11) a number plus 10 is greater than or equal to 20

$\left(N + 10 \geq 20 \right)$

Solve AND CHECK each equation. (8points)

12) $4 - 5x = -11$

$\dfrac{-4 \quad\quad -4}{-5x = -15}$

$\dfrac{-5x}{-5} = \dfrac{-15}{-5}$

$\left(X = 3 \right)$

C: $4 - 5(3) = -11$

$-11 = -11 \checkmark$

13) $5x - 5 = 45$

$\dfrac{+5 \quad +5}{5x = 50}$

$\dfrac{5x}{5} = \dfrac{50}{5}$

$\left(X = 10 \right)$

C: $5(10) - 5 = 45$

$45 = 45 \checkmark$

BONUS Solve(4pts) AND CHECK (2pts)

14) $5 + 4n - 9n - 1 = 24$ ⟵ STEP1 — SIMPLIFY BOTH SIDES

$-5N + 4 = 24$

$\dfrac{-4 \quad\quad -4}{-5N = 20}$

$\dfrac{-5N}{-5} = \dfrac{20}{-5}$

$\boxed{N = -4}$

C: $5 + 4(-4) - 9(-4) - 1 = 24$

$5 + (-16) + 36 - 1 = 24$

$24 = 24 \checkmark$

 Made with Infinite Algebra 1.

Evaluate each function; and write using function notation.

For example ---> f(#)=##

15) $g(n) = 3n + 3$; Find $g(4)$, $g(-2)$

$$g(4) = 3(4) + 3 = \boxed{15}$$
$$g(-2) = 3(-2) + 3 = \boxed{-3}$$

16) $h(x) = 3x + 2$; Find $h(1)$, $h(-2)$

$$h(1) = 3(1) + 2 = \boxed{5}$$
$$h(-2) = 3(-2) + 2 = \boxed{-4}$$

17) $f(x) = 2x + 4$; Find $f(1)$, $f(-2)$, $f(0)$

$$f(1) = 2(1) + 4 = \boxed{6}$$
$$f(-2) = 2(-2) + 4 = \boxed{0}$$
$$f(0) = 2(0) + 4 = \boxed{4}$$

18) $p(x) = 3x$; Find $p(8)$, $g(-2)$

$$p(8) = 3(8) = \boxed{24}$$
$$p(-2) = 3(-2) = \boxed{-6}$$

19) $f(x) = x^2 + x$; Find $f(10)$ Find $f(-5)$

$$f(10) = 10^2 + 10 = \boxed{110}$$
$$f(-5) = (-5)^2 + (-5) = 25 + (-5) = \boxed{20}$$

CHAPTER 2 INTEGERS ARE POSITIVE + NEGATIVE WITH NO DECIMALS/FRACTIONS ←

(1pt) Determine which numbers are integers. Circle the numbers that are integer.

20) $\sqrt{81}$ I

21) 4.5 ~~=~~ NO

22) $\dfrac{12}{5}$ = 2 2/5 NO

23) -4 I

(1pts) Name the number eitheir rational or irrational. Abbreviate: R=rational; IRR=irrational
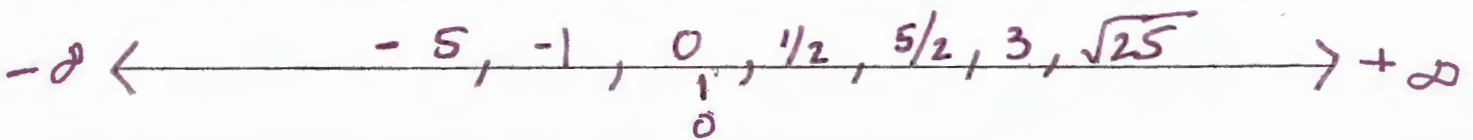
24) $\sqrt{25}$ RAT
→ 5

25) $\sqrt{32}$ IRR

> RAT CAN BE WRITTEN AS A FRACTION

26) 2.5 RAT
→

27) π IRR

28) (4pts) Arrange numbers 1/2, -1, 0, $\sqrt{25}$, -5, 3, 5/2 in ascending order (least to greatest).

$-\partial \longleftarrow \qquad -5, -1, 0, 1/2, 5/2, 3, \sqrt{25} \qquad \longrightarrow +\infty$

(8 pts) For the following expression, identify... KNOW THESE!

29) $-2x^2 + 3 + x^2 - 4x - 5 - x^3$

Terms $-2x^2, 3, x^2, -4x, -5, -x^3$ ← Terms seperated by +, - signs

Like terms (-2x², x²) (3, -5) ← Like terms - terms with same veriables raised to the same exponents

Coefficients $-2, 1, -4, -1$

Constant terms $3, -5$
← Constants are simply numbers

COEF: number before the Uericble

(3pts) Evaluate each expression. CLEARLY SHOW WORK AND CIRCLE ANSWER.

30) $|-6+2|$

$$|-4| = \boxed{4}$$

31) $|2 \cdot -3|$

$$|-6| = \boxed{6}$$

(4pts) Find each sum. Show work! TIP: add negative numbers and add positive numbers

32) $(-5) + 3 + 5 + (-5)$

$$-10 + 8 =$$
$$\boxed{-2}$$

33) $(-8) + 8 + 4 + (-2)$

$$-10 + 12 =$$
$$\boxed{2}$$

Rewrite each expression as an Addition problems (2pts).
Then evaluate and circle your answer (1pts)

34) $(-8) - 3 - (-6)$

$$-8 + (-3) + 6 =$$
$$-11 + 6 =$$
$$\boxed{-5}$$

35) $3 - 4 - (-3)$

$$3 + (-4) + 3 =$$
$$-4 + 6 =$$
$$\boxed{2}$$

(2pts) Evaluate each expression

36) $(3)(-2)(-1)(-1)$ ← ODD Number
$$\boxed{-6}$$
-#'s → results is a -#

37) $(2)(2)(-1)(-4)$ ← EVEN NUMBER
$$\boxed{16}$$
-#'s → result is a +#

(3pts) Find each quotient. Clearly show work.

38) $-9 \div \dfrac{-3}{4}$

$$\frac{-9}{1} \cdot \frac{4}{-3} =$$
$$\frac{-36}{-3} =$$
$$\boxed{12}$$

39) $\dfrac{-6}{5} \div 2$

$$\frac{-6}{5} \cdot \frac{1}{2} = \frac{-6}{10} = \boxed{-3/5}$$

DIVISION
① change $\div$ to Mult
② take reciprocal of 2ND number
③ multiply
④ simplify FRACTION

(3pts) Evaluate each expression. Clearly show your steps.

40) $-3 \cdot 4 - 2 + 4$

$-12 + (-2) + 4$

$-14 + 4 =$

$\boxed{-10}$

41) $5(-6 + 2) + 5$

$5(-4) + 5 =$

$-20 + 5 =$

$\boxed{-15}$

(4pts) Simplify each expression. Write in standard form (variable term first and constant last)

42) $2(2x - 4)$

$\boxed{4x - 8}$

43) $-2(3x - 2)$

$\boxed{-6x + 4}$

COMBINE LIKE TERMS

44) $n + 10 + 5n + 6$

$\boxed{6N + 16}$

45) $-2n + 10 + 12n - 15$

$\boxed{10N - 5}$

Division DISTRIBUTING

46) $\dfrac{20x - 80}{10}$

$\boxed{2x - 8}$

47) $\dfrac{10x - 20}{-5}$

$\boxed{-2x + 4}$

DISTRIBUTE + COMBINE LIKE TERMS

48) $-(-3x + 10) + 40$

$3x - 10 + 40 =$

$\boxed{3x + 30}$

49) $-2(x - 3) - 3x$

$-2x + 6 - 3x =$

$\boxed{-5x + 6}$

Evaluate each using the values given. Show the substitution (2pts) then evaluate (1pt).

50) $(r)(q^2)$; use $q = 2$, and $r = -4$

$(-4)(2^2) =$

$-4(4) =$

$\boxed{-16}$

STEP 1 show substitution

51) $4x - z$; use $x = -2$, and $z = -6$

$4(-2) - (-6)$

$-8 + 6 =$

$\boxed{-2}$

STEPS

CHAPTER 3 $\Rightarrow$ { STEP1: SIMPLIFY BOTH SIDES.
STEP2: GET VARIABLE ON 1 SIDE
STEP3: Complete 2-step EQUATION
STEP4. Check!

Solve and Check! Show work clearly. Circle solution. (6 points each)

52) $10 - 5x = 3x - 3 - 3$

$$-5x + 10 = 3x + 6$$
$$+5x \qquad\qquad +5x$$
$$\overline{\qquad\qquad\qquad\qquad\qquad}$$
$$10 = 8x - 6$$
$$+6 \qquad +6$$
$$\overline{\qquad\qquad\qquad}$$
$$\frac{8x = 16}{8} \quad \frac{}{8}$$

$$\boxed{x = 2}$$

$C:$ $10 - 5(2) = 3(2) - 3 - 3$
$$0 = 0 \checkmark$$

53) $7(7 - 3x) = -x - 31$

$$49 - 21x = -x - 31$$
$$+21x \qquad +21x$$
$$\overline{\qquad\qquad\qquad}$$
$$49 = 20x - 31$$
$$+31 \qquad\qquad +31$$
$$\overline{\qquad\qquad\qquad}$$
$$\frac{20x = 80}{20} \quad \frac{}{20}$$

$$\boxed{x = 4}$$

$C:$ $7(7 - 3(4)) = -(4) - 31$
$$7(-5) = -35$$
$$-35 = -35 \checkmark$$

54) $-6 - 2(-2 - x) = 5 + 3x$

$$-6 + 4 + 2x = 3x + 5$$
$$2x - 2 = 3x + 5$$
$$-2x \qquad\quad -2x$$
$$\overline{\qquad\qquad\qquad}$$
$$-2 = x + 5$$
$$-5 \quad\; -5$$
$$\overline{\qquad\qquad}$$
$$\boxed{x = -7}$$

$C:$ $-6 - 2(-2 - (-7)) = 5 + 3(-7)$
$$-6 - 2(5) = 5 + (-21)$$
$$-6 - 10 = -16$$
$$-16 = -16 \checkmark$$

55) $2(x + 7) = 2(4 - 2x) + 6$

$$2x + 14 = 8 - 4x + 6$$
$$2x + 14 = -4x + 14$$
$$+4x \qquad\qquad +4x$$
$$\overline{\qquad\qquad\qquad}$$
$$6x + 14 = 14$$
$$-14 \quad -14$$
$$\overline{\qquad\qquad}$$
$$\frac{6x = 0}{6} \quad \frac{}{6}$$

$$\boxed{x = 0}$$

$C:$ $2(0 + 7) = 2(4 - 2(0)) + 6$
$$2 \cdot 7 = 2(4) + 6$$
$$14 = 14 \checkmark$$

56) $2(4 + 3x) + x = 6x - (x + 4)$

$8 + 6x + x = 6x - x - 4$

$7x + 8 = 5x - 4$

$-5x -5x$

$\overline{}$

$2x + 8 = -4$

$-8 -8$

$\overline{}$

$\dfrac{2x}{2} = \dfrac{-12}{2}$

$\boxed{X = -6}$

C: $2(4 + 3(-6)) + (-6) = 6(-6) - (-6 + 4)$

$2 (-14) + (-6) = -36 - (-2)$

$-28 + (-6) = -34$

$-34 = -34 ✓$

57) $-4(x + 4) + 6(x - 7) = 2x + 8$

$-4x - 16 + 6x - 42 = 2x + 8$

$2x - 58 = 2x + 8$

$-2x -2x$

$\overline{}$

$-58 \neq 8 \enspace Ⓕ$

$\boxed{X = \text{NO SOLUTION}}$

↑

when the
Variable drops
out and the
numbers are
NOT
EQUAL

58) $\dfrac{5}{3}x + 50 = -100$

$-50 -50$

$\overline{}$

$\left(\dfrac{3}{5}\right)\left(\dfrac{5}{3}X\right) = -150\left(\dfrac{3}{5}\right)$ → MULTIPLY BY
Reciprocal

$X = -\dfrac{450}{5}$

$\boxed{X = -90}$ →

C: $\dfrac{5}{3}(-90) + 50 = -100$

$-150 + 50 = -100$

$-100 = -100 ✓$

Solve each proportion and Check! Show work clearly. Circle solution. (6 points each)

59) $\dfrac{3}{6} = \dfrac{9}{-x}$ ← Cross MULTIPLY →   60) $\dfrac{n}{9} = \dfrac{n + 8}{3}$

$3(-x) = 6 \cdot 9$

$\dfrac{-3x}{-3} = \dfrac{54}{-3}$

$\boxed{X = -18}$

C: $\dfrac{3}{6} = \dfrac{9}{-(-18)}$

$\tfrac{1}{2} = \tfrac{1}{2} ✓$

$3 \cdot N = 9(N + 8)$

$3N = 9N + 72$

$-9N -9N$

$\overline{}$

$\dfrac{-6N}{-6} = \dfrac{72}{-6}$ $\boxed{N = -12}$

C: $\dfrac{-12}{9} = \dfrac{-12 + 8}{3}$

$\dfrac{-4}{3} = \dfrac{-4}{3} ✓$

61) Write the equation in function form:

① ISOLATE Y
② PUT IN: $y = mx + b$

$10x - 2y = 20$

$$-10x \quad\quad -10x$$

$$\frac{-2y}{-2} = \frac{-10x}{-2} + \frac{20}{-2} \rightarrow \boxed{y = 5x - 10}$$

→ Remember UNITS

Write a proportion. OR EQUATION **Solve and Check! Show work clearly. Circle solution.** (6 points each)

62) What percent of 20 yards is 120 yards?

$$\frac{120}{20} = \frac{P}{100} \quad \boxed{EQ: P \cdot 20 = 120}$$

$$\frac{20P}{20} = \frac{12000}{20}$$

$$\boxed{P = 600\%}$$

63) 400% of what is 8 miles?

$$\frac{400}{100} = \frac{8}{N} \quad \boxed{EQ: 4 \cdot N = 8}$$

$$\frac{800}{400} = \frac{400N}{400}$$

$$\boxed{N = 2 \text{ miles}}$$

64) 6 is what percent of 120?

$$\frac{6}{120} = \frac{P}{100} \quad \boxed{EQ: 6 = P \cdot 120}$$

$$\frac{120P}{120} = \frac{600}{120}$$

$$\boxed{P = 5\%}$$

Solve Proportions
Proportion method
$$\frac{IS}{OF} = \frac{\%}{100}$$

EQUATION method
• IS → =
• OF → %
• Change %'s to decimals

65) What is 40% of 80 days?

$$\frac{40}{100} = \frac{N}{80} \quad \boxed{EQ: N = 0.4(80)}$$

$$\frac{3200}{100} = \frac{100N}{100}$$

$$\boxed{N = 32 \text{ days}}$$

Solve each word problem. Write a proportion. Clearly show your work used to answer the question. (5 points each)

↖ ——— MUST DO + ANSWER IN A SENTENCE

66) A recipe for oatmeal raisin cookies calls for 2 cups of flour to make 3 dozen cookies. How many cups of flour are needed to make 12 dozen cookies?

X = # CUPS OF FLOUR

KI: $\dfrac{\text{Cookies}}{\text{flour}} \implies \dfrac{2}{3} = \dfrac{x}{12}$

$$\boxed{X = 8}$$

→ You need 8 cups flour to make 12 dozen cookies

67) The ratio of weight on the moon to weight on Earth is 1 : 6. How many pounds would a 144-pound person weigh on the moon?

X = # lbs on the moon

KI $\dfrac{\text{MOON WGT}}{\text{EARTH WGT}} = \dfrac{1}{6} = \dfrac{x}{144}$

$$\frac{6x}{6} = \frac{144}{6} \quad \boxed{X = 24}$$

→ The person would weigh 24 lbs on the moon

CHAPTER4

TABLE METHOD: Graph the linear function using table method. Create a table with 3 points. **Points must be integers.**

x is always 4

↑ FRACTION - pick multiples of DENOM.

68) $x = 4$

69) $y = -\dfrac{2}{3}x + 3$
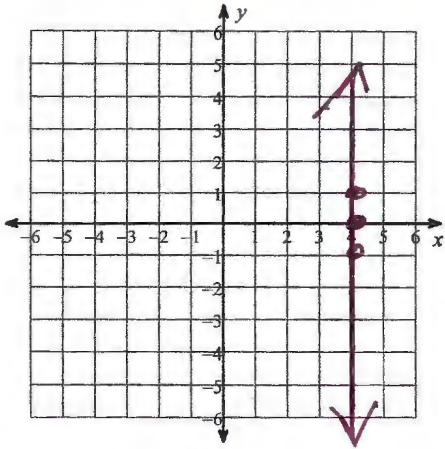
Table Method
pick 3 x values
Typically X = -1, 0, 1
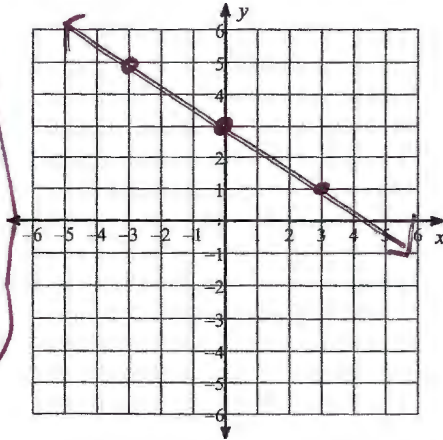
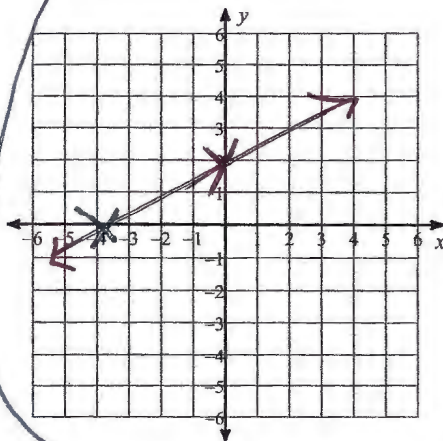| x	y
-3	5
0	3
3	1

x	4	4	4
y	-1	0	1

pick 3 values for y

*INTERCEPT METHOD:** Graph linear function with intercept. (1) Identify x & y intercepts -
x:____; y:_____   (2) **Label intercepts on the graph with the x and y.**

70) $5x - 3y = -15$

71) $x - 2y = -4$
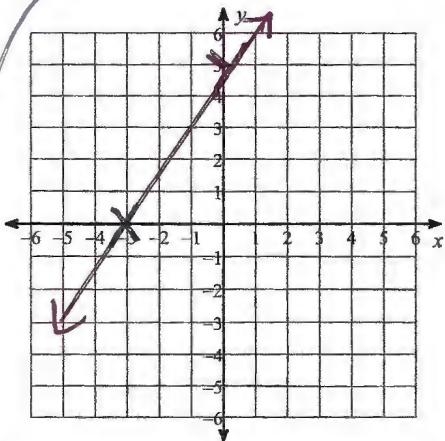
$X: -3 \quad (-3, 0)$
$y: 5 \quad (0, 5)$

$X: -4 \quad (-4, 0)$
$y: 2 \quad (0, 2)$

INTERCEPT method
X INTERCEPT (y=0) → X: (__, 0)
y intercept (X=0) → y: (0, __)

$$y = mx + b \quad — \quad m = \text{slope}$$
$$— \quad \text{YINT}$$

SLOPE-INTERCEPT METHOD: Graph the linear function using slope and y-intercept. (1) Identify the slope & y-intercept with the correct variable names. (2) Clearly mark 3 points with a Y for the y-intercept.
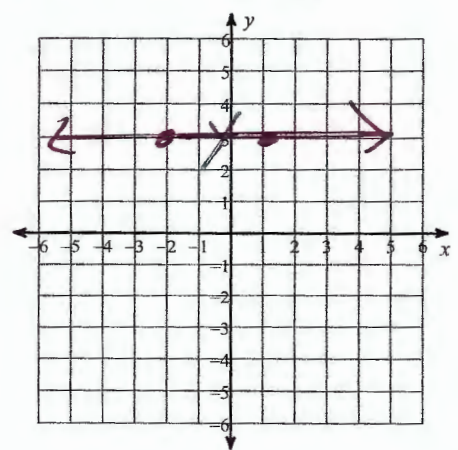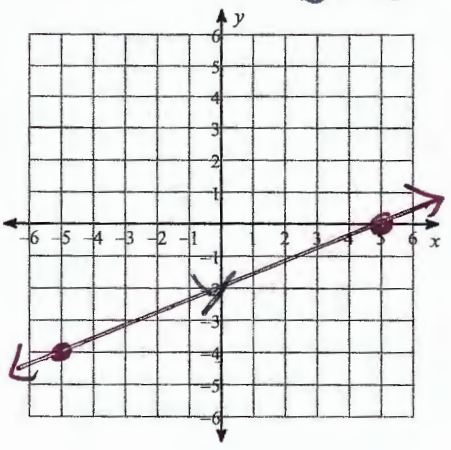
$-m$
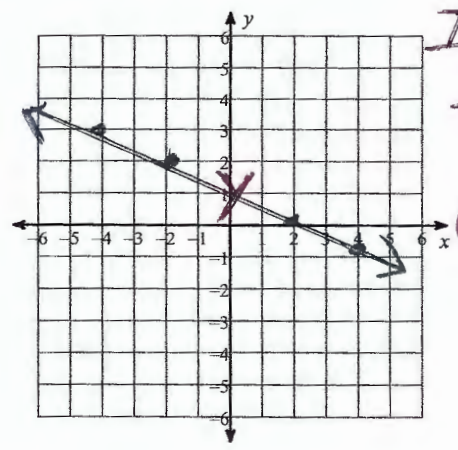
72) $y = -x + 2$ $m = -1$ $-m$
$B = 2$

$M = 0 \to \longleftrightarrow^{M=0}$

73) $y = 3$ $B = 3$
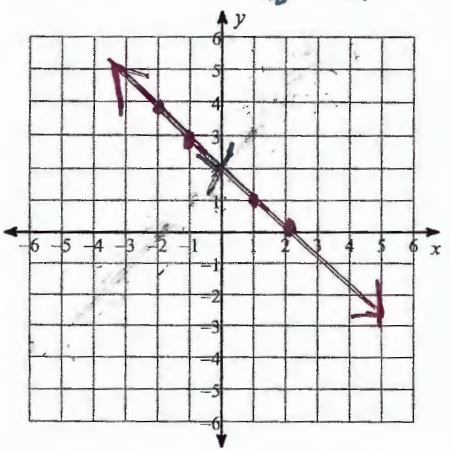
74) $y = \frac{2}{5}x - 2$ $m = \frac{2}{5} \to$ $+m$
$B = -2$

75) $x + 2y = 2$ $\longrightarrow$ $x + 2y = 2$
$-x \qquad -x$
$$\frac{2y}{2} = \frac{-x}{2} + \frac{2}{2}$$
$$\boxed{y = -\frac{1}{2}x + 1}$$
$$m = -\frac{1}{2}$$
$$B = 1$$

76) $4x - y = -4$ $\longrightarrow$ $4x - y = -4$
$-4x \qquad -4x$
$$\frac{-y}{-1} = \frac{-4x}{-1} - \frac{4}{-1}$$
$$\boxed{y = 4x + 4}$$
$$m = \frac{4}{1}$$
$$B = 4$$
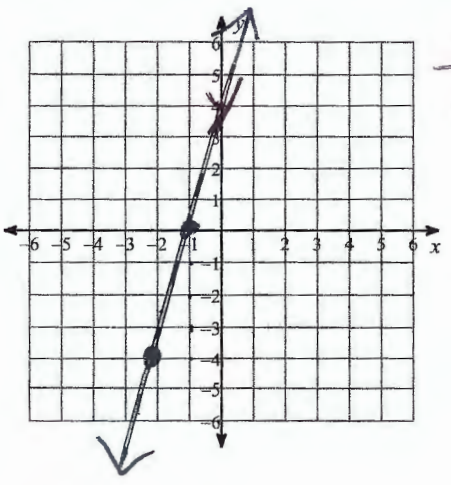
SLOPE INTERCEPT

S/I $y = mx + b$
$m = \text{slope}$
$b = \text{yINTERCEPT}$

USE SLOPE
$$m = \frac{Rise}{Run}$$

-11- Made with Infinite Algebra 1.

CHAPTER 5

INSTRUCTIONS: CLEARLY SHOW WORK FOR FULL CREDIT. (8pts each)

Write slope-intercept form of the equation of line given the slope & y-intercept.

77) Slope $= -4$,   y-intercept $= \dfrac{1}{4}$

$$Y = -4X + \tfrac{1}{4}$$

78) Slope $= -\dfrac{6}{5}$,   y-intercept $= -2$

$$Y = -\tfrac{6}{5}X - 2$$

Write the point-slope form of the equation of the line through the given point with the given slope.

x_1 y_1 m

79) through: $(1, -5)$,   slope $= 2$

$$Y + 5 = 2(X - 1)$$

80) through: $(-3, 2)$,   slope $= -4$

$$Y - 2 = -4(X + 3)$$

Write the SLOPE-INTERCEPT form of the equation of the line through the given points.

81) through: $(-5, -2)$ and $(-2, 4)$

Given 2 pts, FIND slope

FIND SLOPE

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 + 2}{-2 + 5} = \frac{6}{3}$$

$$\boxed{m = 2}$$

P/S $Y + 2 = 2(X + 5)$

$$\begin{array}{r} y + 2 = 2x + 10 \\ -2 \qquad\qquad -2 \end{array}$$

S/I $\boxed{Y = 2X + 8}$

Write the SLOPE-INTERCEPT form of the equation of the line through the given point with the given slope.

82) through: $(4, -3)$,   slope $= -\dfrac{5}{4}$

P/S $\Rightarrow$ $y + 3 = -\dfrac{5}{4}(x - 4)$

$$\begin{array}{r} y + 3 = -\tfrac{5}{4}x + 5 \\ -3 \qquad\qquad -3 \end{array}$$

S/I $\rightarrow$ $\boxed{y = -\dfrac{5}{4}X + 2}$

SLOPE - INTERCEPT : $Y = mx + b$

POINT SLOPE : $Y - y_1 = m(x - x_1)$

$\hookrightarrow$ $m = $ slopE

point (x_1, y_1)

-12-

Write the SLOPE-INTERCEPT form of the equation of the line through the given points.

83) through: $(4, 4)$ and $(0, 2)$ ← y INT B = 2

FIND slope: $m = \dfrac{2-4}{0-4} = \dfrac{-2}{-4} = \dfrac{1}{2}$

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

S/I → $y = \frac{1}{2}x + 2$

Write the SLOPE-INTERCEPT form of the equation of the line through the given point with the given slope.

84) through $(0, -3)$, slope $= -\dfrac{3}{2}$

y INT B = -3
M = -3/2

$y = -\dfrac{3}{2}x - 3$

Write the POINT-SLOPE form of the equation of the line described.

85) through: $(-1, -4)$, parallel to $y = 2x - 1$ → m = 2

// m = 2

P/s → $y + 4 = 2(x + 1)$

86) through: $(3, 1)$, perp. to $y = \dfrac{3}{5}x - 3$ → m = 3/5

⊥ m = -5/3

P/s → $y - 1 = \dfrac{-5}{3}(x - 3)$

Write the SLOPE-INTERCEPT form of the equation of the line described.

87) through: $(-4, -2)$, parallel to $y = \dfrac{3}{2}x + 1$ → m = 3/2

// m = 3/2

P/s $y + 2 = \dfrac{3}{2}(x + 4)$

$y + 2 = \dfrac{3}{2}x + 6$
$\quad -2 \qquad\qquad -2$

S/I $y = \dfrac{3}{2}x + 4$

88) through: $(2, 5)$, perp. to $y = -\dfrac{1}{5}x - 5$ → m = -1/5

⊥ m = 5

P/s $y - 5 = 5(x - 2)$

$y - 5 = 5x - 10$
$\quad +5 \qquad\quad +5$

S/I → $y = 5x - 5$

→ Ax + By = C (A, B, C are integers)

Write the standard form of the equation of the line through the given points.

89) through: $(5, 3)$ and $(-3, -3)$

$m = \dfrac{-3-3}{-3-5} = \dfrac{-6}{-8}$

$m = 3/4$

P/s → $y - 3 = \dfrac{3}{4}(x - 5)$

$y - 3 = 3/4 x - 15/4$

$4\left(-3/4 x + y = -3/4\right)$ →

$-3x + 4y = -3$

OR: $3x - 4y = 3$

CHAPTER 6

INEQ's
• CLOSED DOTS • → $\leq, \geq, =$
• OPEN DOTS ○ → $<, >, \neq$
• WRITE INEQ: VARIABLE SYMBOL NUMBER

Draw a graph for each inequality.

90) $4 < n$ → rewrite → $\boxed{n > 4}$

91) $2 \geq p$ → rewrite → $\boxed{p \leq 2}$
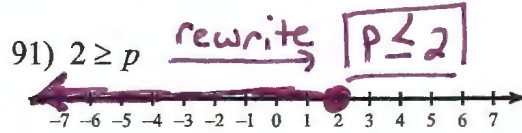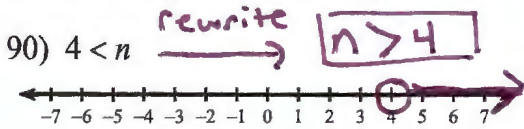
Write an inequality for each graph. Use the variable "X"

92)

$\boxed{X > 3}$

93)

$\boxed{X \leq -1}$
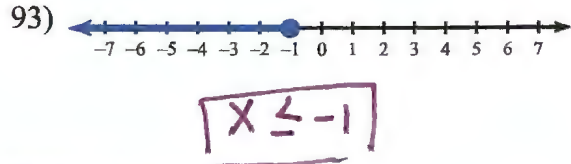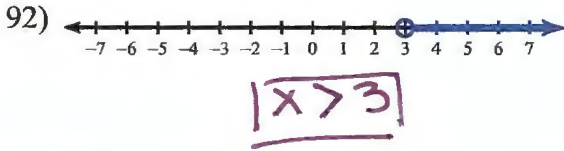
SOLVE each inequality. Circle the solution. Then GRAPH its solution.

94) $9 + 4x - 8x < -5x - 1 + 4$

$$-4x + 9 < -5x + 3$$
$$+5x \qquad +5x$$
$$\overline{}$$
$$x + 9 < 3$$
$$-9 \quad -9$$
$$\boxed{X < -6}$$

-6

STEPS

① Simplify Both sides

② GET VAR ON LEFT SIDE TO MAKE EASIER To GRAPH

③ FLIP SYMBOL when you mult/div The variable by NEGATIVE NUMBER

95) $-13 - 2x \geq x + 4 + 7$

$$-2x - 13 \geq x + 11$$
$$- x \qquad -x$$
$$\overline{}$$
$$-3x - 13 \geq 11$$
$$+13 \quad +13$$
$$\overline{}$$
$$-3x \geq 24$$
$$\overline{-3} \qquad \overline{-3}$$
$$\boxed{X \leq -8}$$

-8

96) $-12 + 3x \geq 3x - 6(4x + 6)$

$$3x - 12 \geq 3x - 24x - 36$$
$$3x - 12 \geq -21x - 36$$
$$+21x \qquad +21x$$
$$\overline{}$$
$$24x - 12 \geq -36$$
$$+12 \quad +12$$
$$\overline{}$$
$$24x \geq -24$$
$$\overline{24} \qquad \overline{24}$$
$$\boxed{X \geq -1}$$

-1

97) $7x + 16 < 4x + 3(x + 4)$

$$7x + 16 < 4x + 3x + 12$$
$$7x + 16 < 7x + 12$$
$$-7x \qquad -7x$$
$$\overline{}$$
$$16 < 12 \; Ⓕ$$
$$\boxed{X = \text{NO SOLUTION}}$$

∴ When the variable drops out and the STMT is FALSE THEN "NO SOLUTION"

Solve and graph its solution. THEN write as a "SINGLE" inequalities (i.e. #<x<#)

98) $10 - 5n \le 4n - 8$ and $-4n + 9 > -6 - n$

$\begin{array}{cc} -4n & -4n \\ -9n + 10 \le -8 \\ -10 \quad -10 \\ \hline -9n \le -18 \\ -9 \quad -9 \end{array}$ $\begin{array}{cc} +n & +n \\ -3n + 9 > -6 \\ -9 \quad -9 \\ \hline -3n > -15 \\ -3 \quad -3 \end{array}$

$N \ge 2$ AND $N < 5$

GRAPH IT!

SINGLE IN EQ
$2 \le N \le 5$

SOLVE each COMPOUND inequality. Circle the solution. Then GRAPH its solution.

99) $-27 \le 3 + 5n \le 8$

$\begin{array}{ccc} -3 & -3 & -3 \\ \hline -30 \le 5N \le 5 \\ \overline{5} \quad \overline{5} \quad \overline{5} \end{array}$

$\boxed{-6 \le N \le 1}$

100) $-55 < -8x + 1 < 1$

$\begin{array}{ccc} -1 & -1 & -1 \\ \hline -56 < -8x < 0 \\ \overline{-8} \quad \overline{-8} \quad \overline{-8} \end{array}$

FLIP BOTH SYMBOLS

$7 > x > 0$ → rewrite to Graph
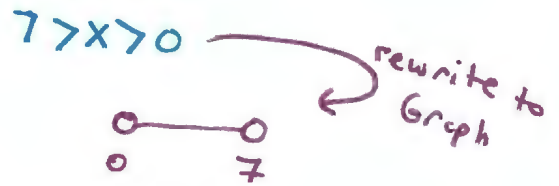
101) $-5x + 9 < 10x - 6$ or $-4x - 8 > 7 - 3x$

$\begin{array}{cc} -10x & -10x \\ -15x + 9 < -6 \\ -9 \quad -9 \\ \hline -15x < -15 \\ -15 \quad -15 \end{array}$ FLIP $\begin{array}{cc} +3x & +3x \\ -x - 8 > 7 \\ +8 \quad +8 \\ \hline -x > 15 \\ \overline{-1} \quad \overline{-1} \end{array}$ FLIP

$\boxed{X > 1 \quad \text{OR} \quad X < -15}$

SOLUTION MUST INCLUDE OR, AND

102) $9x + 10 \ge 6x + 4$ or $-2x - 8 \ge -x + 10$

$\begin{array}{cc} -6x & -6x \\ 3x + 10 \ge 4 \\ -10 \quad -10 \\ \hline 3x \ge -6 \\ \overline{3} \quad \overline{3} \end{array}$ $\begin{array}{cc} +x & +x \\ -x - 8 \ge 10 \\ +8 \quad +8 \\ \hline -x \ge 18 \\ \overline{-1} \quad \overline{-1} \end{array}$ FLIP

$\boxed{X \ge -2 \quad \text{or} \quad X \le -18}$

BONUS (4pts) Solve the compound inequality SPECIAL CASES

Corrected problem

103) $4x + 7 < 7 - 3x$ and $-4 - 5x > -3x + 10$

$\begin{array}{cc} +3x & +3x \\ 7x + 7 < 7 \\ -7 \quad -7 \\ \hline 7x < 0 \\ \overline{7} \quad \overline{7} \end{array}$ $\begin{array}{cc} +3x & +3x \\ 2x - 4 > 10 \\ +4 \quad +4 \\ \hline 2x > 14 \\ \overline{2} \quad \overline{2} \end{array}$

$\boxed{X < 0 \quad \text{AND} \quad X > 7}$

"AND" DOES NOT OVERLAP → X = NO SOLUTION
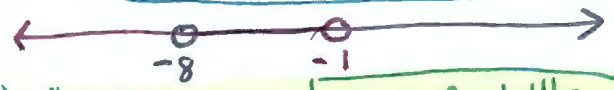
104) $-8 + 3m > -1 + 10m$ or $8m + 4 \ge 7m - 4$

$\begin{array}{cc} -10M & -10M \\ -7m - 8 > -1 \\ +8 \quad +8 \\ \hline -7m > 7 \\ \overline{-7} \quad \overline{-7} \end{array}$ $\begin{array}{cc} -7m & -7m \\ m + 4 \ge -4 \\ -4 \quad -4 \end{array}$
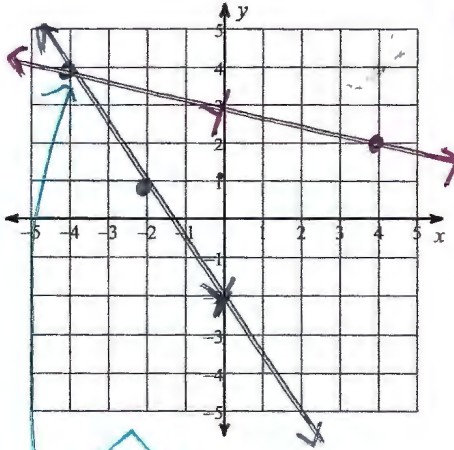
$\boxed{M < -1 \quad \text{OR} \quad M \ge -8}$

"or" overlaps → M = ALL Real #'s

CHAPTER 7 - GRAPHING SYSTEMS

Solve each system by graphing (recommend checking)

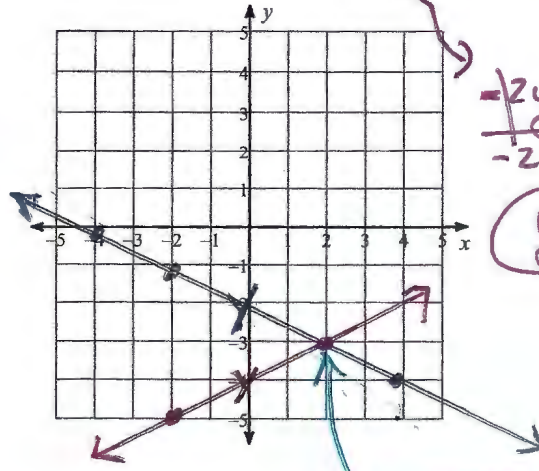105) $y = -\dfrac{3}{2}x - 2$ ●

$y = -\dfrac{1}{4}x + 3$ ●

Remember
Solutions
are ordered
pairs and
Need ( )'s
↓
(x, y)

SOLUTION
$(-4, 4)$

106) $x + 2y = -4$
$x - 2y = 8$

$\dfrac{2y}{2} = \dfrac{-x}{2} - \dfrac{4}{2}$

$y = -\dfrac{1}{2}x - 2$

$\dfrac{-2y}{-2} = \dfrac{-x}{-2} + \dfrac{8}{-2}$

$y = \dfrac{1}{2}x - 4$

SOLUTION
$(2, -3)$

107) $x - y = -4$
$x - y = 4$

$\dfrac{-y}{-1} = \dfrac{-x}{-1} - \dfrac{4}{-1}$

$y = x + 4$

$\dfrac{-y}{-1} = \dfrac{-x}{-1} + \dfrac{4}{-1}$

$y = x - 4$

NO SOLUTION

108) $-y = 3 - x$
$-y + x = 3$

$\dfrac{-y}{-1} = \dfrac{3}{-1} - \dfrac{x}{-1}$

$y = x - 3$

$\dfrac{y + 3 = x}{-3 \quad -3}$

$y = x - 3$
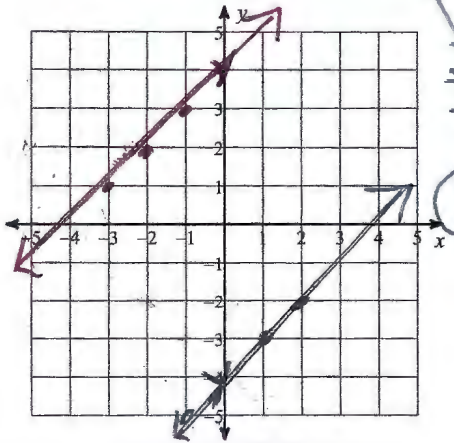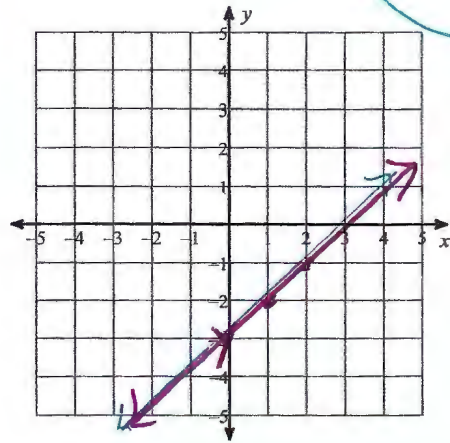
same line

INFINITE SOLUTIONS

→ SOLUTIONS ARE ALL ORDERED
PAIRS ON THE LINE

→ // lines do NOT
intersect

Sketch the graph of each linear inequality. Show a test point

SOLID LINES: $\leq, \geq$

DOTTED LINES! $<, >$

109) $x \leq -1$
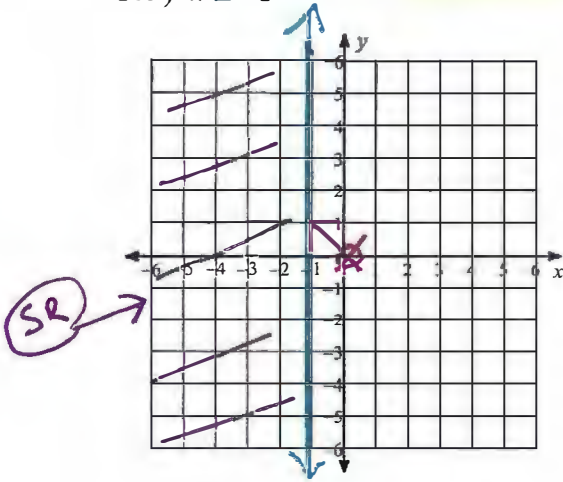
$T(0,0) \rightarrow 0 \leq -1$ (F)
(Shade opposite side)

110) $y < \frac{3}{5}x + 4$

SR
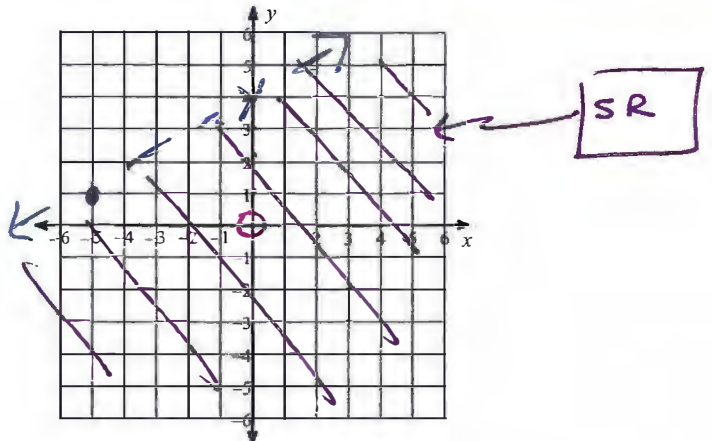
$T(0,0) \rightarrow 0 < 4$ (T)
(shade same side)

111) $y \leq -\frac{2}{3}x - 2$
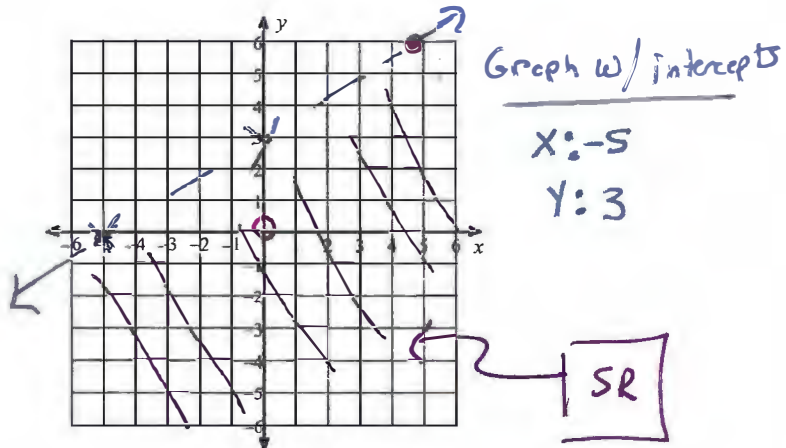
SOLID LINE
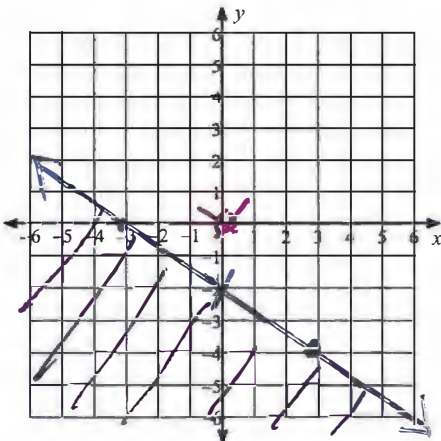
$T(0,0) \rightarrow 0 \leq -2$ (F)

(shade opposite side)

112) $3x - 5y > -15$

dotted line

Graph w/ intercepts
X: -5
Y: 3

SR

$T(0,0) \rightarrow 0 > -15$ ✓
(shade same side)

OR GRAPH W/ SLOPE-INTERCEPT

$3x - 5y > -15$
$-3x \qquad\qquad -3x$
$-5y > -3x - 15$
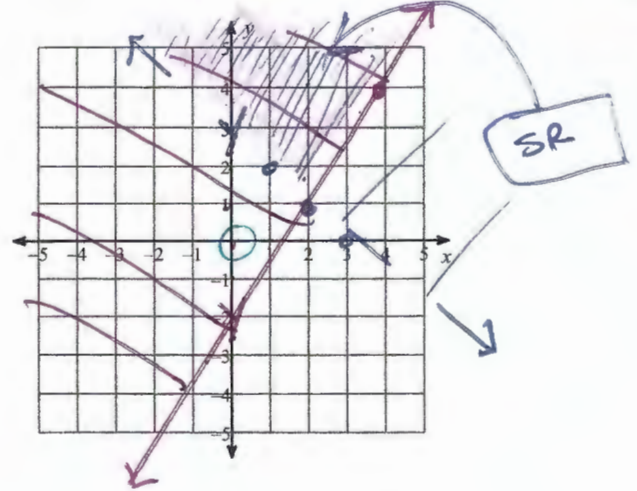$\frac{-5y}{-5} > \frac{-3x}{-5} \frac{-15}{-5}$

FLIP SYMBOL

$y < \frac{3}{5}x + 3$

Sketch the solution to each system of inequalities. Show a test point for each equation.

SOLID →
113) $y \geq -\dfrac{4}{3}x - 2$ → $T(0,0) \to 0 \geq -2$ (T)

DOTTED → $y < -\dfrac{1}{3}x + 1$ → $T(0,0) \to 0 < 1$ (T)
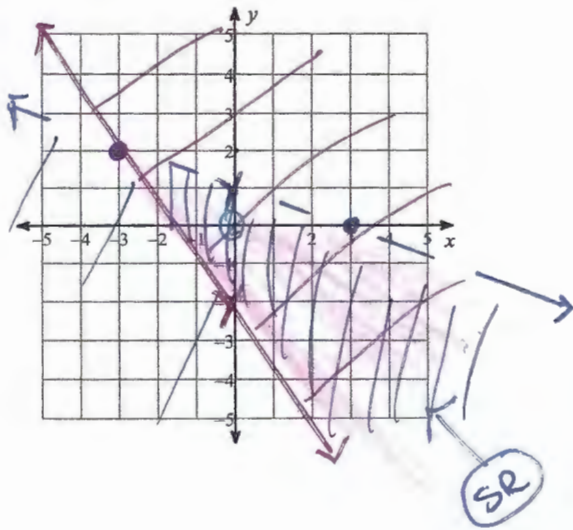
114) $y \geq \dfrac{3}{2}x - 2$ → $T(0,0) \to 0 \geq -2$ (T)
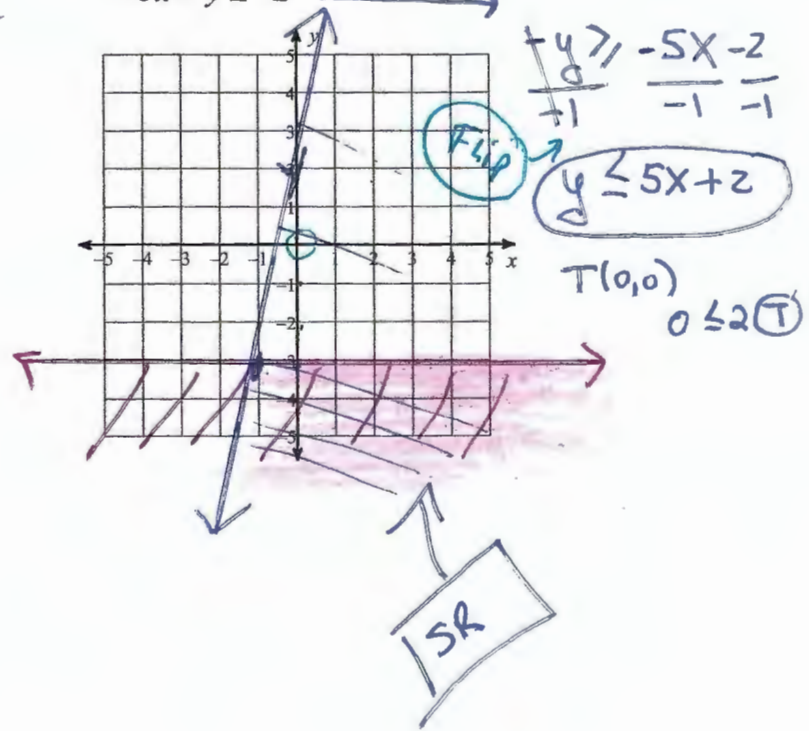
$y > -x + 3$ → $T(0,0) \to 0 > 3$ (F)

SR

SR

115) $x \leq -3$ → $T(0,0) \to 0 \leq -3$ (F)

$x + y \leq -2$

SR
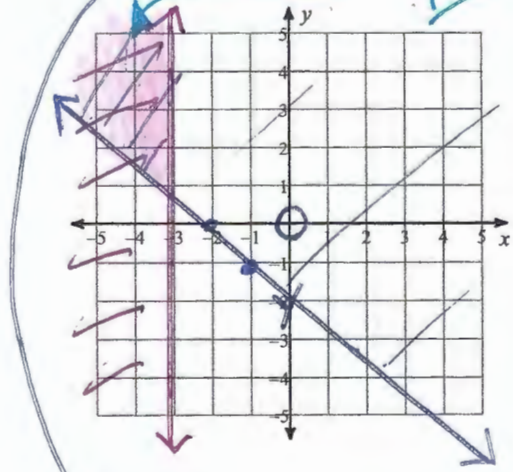
$y \leq -x - 2$

$T(0,0) \quad 0 \leq -2$ (T)

116) $y \leq -3$ → $T(0,0) \to 0 \leq -3$ (F)

$5x - y \geq -2$

$\dfrac{-y}{+1} \geq \dfrac{-5x}{-1} \dfrac{-2}{-1}$

F(4,8)

$y \leq 5x + 2$

$T(0,0)$

$0 \leq 2$ (T)

SR

-18- Made with Infinite Algebra 1.

Tell whether the given point is a solution to the system of equation. Explain your decision.

117) $-x - 2y = 7$ Point $(-5,-1)$
     $2x - y = -11$

L1: $-(-5) - 2(-1) = 7$
                $7 = 7$ ✓

L2: $2(-5) - (-1) = -11$
        $-10 + 1 = -11$
        $-9 \neq -11$ Ⓕ

$(-5,-1)$ is NOT A SULUTION

118) $2x + 3y > -9$ Point $(3,3)$
     $2x - 3y > -3$

L1: $2(3) + 3(3) > -9$
        $15 > -9$ ✓

L2: $2(3) - 3(3) > -3$
        $6 - 9 > -3$
        $-3 > -3$ Ⓕ

$(3,3)$ is NOT A SOLUTION

119) $2x + 3y > 9$ Point $(3,5)$
     $2x - 3y < 3$

L1: $2(3) + 3(5) > 9$
        $21 > 9$ ✓

L2: $2(3) - 3(5) < 3$
        $6 - 15 < 3$
        $-9 < 3$ ✓

$(3,5)$ is A SOLUTION

CHAPTER 8 – NO CALC

Evaluate a numeric exponential power.
---> Clearly show work. SHOW how to expand the expression;
---> THEN EVALUATE. Circle your answer.

120) $(-3)^3 = (-3)(-3)(-3) =$

$$\boxed{-27}$$

121) $(-2)^6 = (-2)(-2)(-2)(-2)(-2)(-2) =$

$$\boxed{64}$$

Evaluate numeric expressions with positive integer exponents, using the product, quotient, and power properties.
---> Clearly show work by SHOWing how you +,-,* to SIMPLIFY EXPONENTS.
---> Provide the answer in BOTH exponential form and then evaluate

122) $\dfrac{10^8}{10^4} = 10^{8-4} = 10^4 =$

$$\boxed{10,000}$$

123) $\dfrac{2^6}{2^2} = 2^{6-2} = 2^4 = \boxed{16}$

124) $2^3 \cdot 2^4 = 2^{3+4} = 2^7$

$$\boxed{132}$$

Rules
- DIVIDE –
  Same base
  Subtr exp
- MULT –
  Same base
  Add exp
- Power to Power
  MULT
  exp's

125) $2 \cdot 2^2 \cdot 2^2 = 2^{1+2+2} = 2^5 = \boxed{32}$

126) $(2^2)^3 = 2^{2 \cdot 3} = 2^6 = \boxed{64}$

127) $(10^2)^3$

$$10^{2 \cdot 3} = 10^6 =$$

$$\boxed{1,000,000}$$

Evaluate complex numeric expressions with whole number exponents demonstrating the ability to use the product, power, and quotient properties
---> Clearly show work by SHOWing how you +,-,* to SIMPLIFY EXPONENTS.
---> Provide the answer in BOTH exponential form and then evaluate

FOLLOW ORDER OF OPERATIONS

128) $(10^2 \cdot 10^3)^2$

$$(10^{2+3})^2 =$$
$$(10^5)^2 =$$
$$10^{5 \cdot 2} =$$
$$10^{10}$$

$$\boxed{10,000,000,000}$$

129) $\left(\dfrac{2^6}{2^3}\right)^2$

$$(2^{6-3})^2 =$$
$$(2^3)^2 =$$
$$2^{3 \cdot 2}$$
$$2^6 \Rightarrow \boxed{64}$$

Simplify. Clearly show work.

130) $-5x^3 \cdot 8x^4$

$-5 \cdot 8 x^{3+4}$

$\boxed{-40x^7}$

131) $-2x^3 \cdot -6x$

$-2 \cdot -6 x^{3+1}$

$\boxed{12x^4}$

132) $4xy^2 \cdot -xy^3 \cdot 3xy^4$

$4 \cdot -1 \cdot 3 x^{1+1+1} y^{2+3+4}$

$\boxed{-12x^3 y^9}$

133) $3yx^4 \cdot 7x^2y^0 \cdot x$

$3 \cdot 7 \cdot 1 x^{4+2+1} y^{1+0}$

$\boxed{21x^7 y}$

134) $\dfrac{20x^4y^4}{4x^2y^4} = 5x^{4-2} y^{4-4} =$

$5x^2 y^{0-1} =$

$\boxed{5x^2}$

Rule
$\boxed{y^0 = 1}$

135) $\dfrac{12x^2y^4}{18xy^2} = \dfrac{2x^{2-1} y^{4-2}}{3}$

$\boxed{\dfrac{2xy^2}{3}}$

136) $(3xy^4)^4 = 3^4 x^4 y^{4\cdot4}$

$\boxed{81x^4 y^{16}}$

137) $(4x^0y^4)^3 = 4^3 \cdot x^{0\cdot3} y^{4\cdot3} =$

$64 x^{0} y^{12} =$

$\boxed{64y^{12}}$

138) $(-2x^4y^3)^3 = (-2)^3 x^{4\cdot3} y^{3\cdot3}$

$\boxed{-8x^{12} y^9}$

139) $(-6x^2y^3)^2 = (-6)^2 x^{2\cdot2} y^{3\cdot2}$

$\boxed{36x^4y^6}$

Simplify. Your answesr can contain only positive exponents. (3pts each)

140) $\dfrac{24x^{-3}}{36y^{-5}} = \boxed{\dfrac{2y^5}{3x^3}}$

141) $\dfrac{6xy^{-4}}{2x^{-4}y^4} = 3x^{1-(-4)} y^{-4-4} =$

$3x^5 y^{-8} = \boxed{\dfrac{3x^5}{y^8}}$

RULE: ANSWERS CANNOT HAVE Negative exponents
  * To make neg exponents become positive,
     move between Numerator + Denom.

Ⓐ $\dfrac{5}{x^{-2}} = \boxed{5x^2}$

Ⓑ $\dfrac{6x^{-5}}{1} = \boxed{\dfrac{6}{x^5}}$