Name: Key

Practice Test #3 – Ch. 4 & 5
Beginning Algebra – M110

Instructions: *You may use a calculator on this test so don't use one to practice. On the actual exam, all work must be shown in order to receive all points for all questions so practice showing all work. Practice* ***boxing your final answer****. Any answer that is a fraction must be in lowest terms and as mixed number for full credit. Since you can use a 5x8 notecard on the test use your notecard to practice or make one based on the problems you got wrong. Happy studying!*

1. Simplify the following expression: $\frac{3}{5}(x - 5) - \frac{1}{4}(7 - 3x)$

You must use fractions! No decimals allowed.

$-3 + \frac{-7}{4} = -3 + -1\frac{3}{4} = -(1+3+\frac{3}{4}) = -4\frac{3}{4}$

$\Rightarrow \frac{3}{5}x - 3 - \frac{7}{4} + \frac{3}{4}x$

$\frac{3\cdot4}{5\cdot4}\frac{12}{20}$

$+ \frac{3\cdot5}{4\cdot5}\frac{15}{20}$

$\frac{27}{20} = 1\frac{7}{20}$

$\Rightarrow \boxed{1\frac{7}{20}x - 4\frac{3}{4}}$

Don't have common denominators

2. **Clear** the following equation: $\frac{2}{3}x + \frac{1}{5}(\frac{1}{10} - x) = \frac{1}{15}(x - 15)$

Don't Solve!

LCD $= 2\cdot3\cdot5^2 = 75\cdot2 = 15$

$\Rightarrow \frac{2}{3}x + \frac{3}{150} - \frac{30}{150}x = \frac{10}{150}x - \frac{150}{15}\cdot\frac{15}{1}$

$\Rightarrow \boxed{100x + 3 - 30x = 10x - 100}$

Don't go any further.

3. Solve for **p**: $B = n(2p - 5)$

If there is a quotient in your answer it must contain simplified **individual** terms where possible.

$n \quad n$

$\Rightarrow \frac{B}{n} = 2p - 5$

$+5 \qquad +5$

$\Rightarrow \frac{B}{n} + 5 = 2p \Rightarrow \boxed{p = \frac{B}{2n} + \frac{5}{2}}$

$\frac{B}{n} + 5 = \frac{2p}{2}$

$\frac{B}{n} \div \frac{2}{1} = \frac{B}{n}\cdot\frac{1}{2} = \frac{B}{2n}$

4. In 2005, the percentage of Americans who thought the press had too much freedom was 39%. The percentage is decreasing at a rate of 2.4% per year. Find a linear model to describe the percentage of Americans, P, that think that the press has too much freedom as a function of years, t, since 2000.

(5, 39) ordered pair that isn't y-int

$m = 2.4$ percent

$\Rightarrow y - 39 = 2.4(x - 5)$

$\Rightarrow y - 39 = 2.4x - 12$

$+39 \qquad +39$

$\Rightarrow y = 2.4x + 27$

$\boxed{P = 2.4t + 27}$

5. Scientists believe that the temperature of the Earth's surface is rising and that the rise can be modeled using a linear function. Let T(y) be the function that represents the average temperature of the Earth's surface in °F, "y" years since 1900.

a) Using the fact that in 1975 the Earth's average surface temperature was 74°F and in 2000 it was 82.9°F, find the linear function T(y). Give the slope as a decimal.

(75, 74)
(100, 82.9) $m = \frac{82.9-74}{100-75} = \frac{8.9}{25} = 0.356$

$T(y) = 0.356y + 47.3$

$y - 82.9 = 0.356(x-100) \Rightarrow y - 82.9 = 0.356x - 35.6$
$+82.9 \qquad +82.9$
$y = 0.356x + 47.3$

b) Predict the average surface temperature of the Earth in 2025. Show your prediction using function notation.

$T(125) = 0.356(125) + 47.3 =$
$= 44.5 + 47.3 =$ 91.8° F in 2025

c) Interpret the meaning of the slope in this model using units and in terms of the actual numeric slope?

The slope means that the Earth's surface temperature is increasing by 0.356°F per year.

d) Interpret the meaning of the T(0) in this model? Use the units of the dependent and the true meaning of the independent at zero.

$T(0) = 0.356(0) + 47.3 =$ 47.3°F was the Earth's ave temp in 1900.

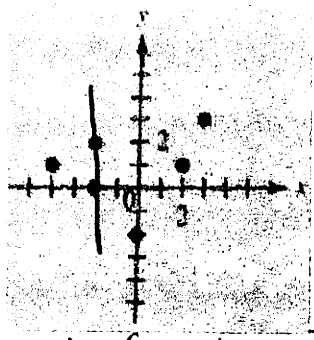
6. a) Determine if each of the following relations are functions and justify your answer.
b) Give the domain and range of the relation **in iv)**.

i) $f(x) = 2\sqrt{x-1}$
D: $\{x | x \geq 1\}$

$2\sqrt{x-1} \Rightarrow$

Which passes a vertical line test ∴ a function

ii)



Not a function. Fails the vertical line test.

iii)

x	y
-1	4
-2	-3
2	13
1	6

All unique x's so it is a function.

*Remember all functions I told you about!!

iv) {(-2,2),(2, 5),(5, 3)}
a) Function b/c unique x's
b) Domain: $\{x | x = -2, 2, 5\}$ or $\{-2, 2, 5\}$
Range: $\{y | y = 2, 5, 3\}$ or $\{2, 3, 5\}$

v) $2 \to 6$, $3 \to 7$, $5 \to 9$ Not a function b/c same x goes to 2 y's.

7. Referring to #6 above, answer the questions below. Assume that each of the problems above represent f(x) whether they are actually functions or named as f(x) to begin. Assume whether it is a function, a graph or a table it is named f(x).

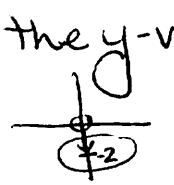
a) For i) in #6, find f(5)

$f(5) = 2\sqrt{5-1}$

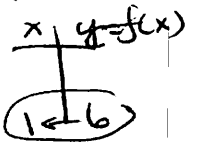
$= 2\sqrt{4} = 2(2) = 4$

b) For ii) in #6, find f(0)

When $x = 0$ the y-value is $\boxed{-2}$



c) For iii) in #6, find f(x) = 6 The x-value when $y = 6$ is $\boxed{1}$

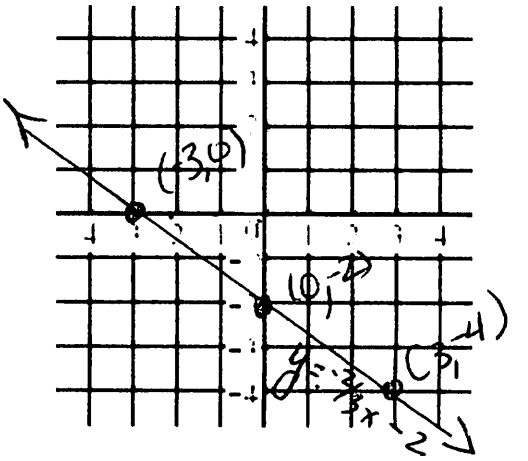


8. For the equation: $6 + 3y = -2x$

a) Put the equation in slope-intercept form and graph using 3 labeled points.

$-6 \quad -6$

$\frac{3y}{3} = \frac{-2x}{3} - \frac{6}{3} \Rightarrow \boxed{y = \frac{-2}{3}x - 2}$



b) Give the slope. $m =$ $-2/3$

c) Give the y-intercept as an ordered pair $(0, -2)$

d) Give the x-intercept as an ordered pair $(-3, 0)$

Show your work.

Let $y = 0$ $\quad 6 + 3(0) = -2x$

$\frac{6}{-2} = \frac{-2x}{-2}$

$-3 = x$

e) Give the equation of a line **parallel** to $6 + 3y = -2x$ passing through the point (3, -2)
Show all work using the point-slope form to start and ending in slope-intercept form.

m is $-2/3$

so

$m_{\parallel} = -2/3$

$y - (-2) = \frac{-2}{3}(x - 3)$

$\Rightarrow y + 2 = \frac{-2}{3}x + 2$

$-2 \qquad -2$

$\Rightarrow \boxed{y = \frac{-2}{3}x}$

f) What is the slope of a line **perpendicular** to $6 + 3y = -2x$? $\boxed{+3/2}$

negative reciprocal of $-2/3$

g) Give the equation of a line **perpendicular** to $6 + 3y = -2x$ passing through the point (0, -4)

$\boxed{y = \frac{3}{2}x - 4}$

9. For $f(x) = -2x + 4$ find $f(5a - 7)$

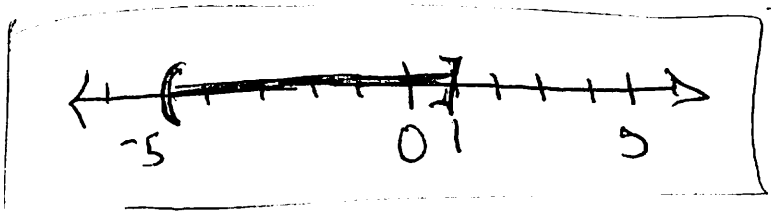
Evaluate the function with $x = 5a - 7$

$= -2(5a - 7) + 4$

$= -10a + 14 + 4$

$= \boxed{-10a + 18}$

10. Solve & graph the following on a number line: $-2 \le 1 - 3x < 16$



$-1 \quad -1 \quad -1$

$-3 \le -3x < 15$

$\frac{-3}{-3} \le \frac{-3x}{-3} < \frac{15}{-3}$

$1 \ge x > -5$

Don't forget to reverse inequalities

$\boxed{-5 < x \le 1}$

11. Solve & give **interval notation** for the following: $3(2x + 1) - 7x > 1 + 5(2x - 4)$

$6x + 3 - 7x > 1 + 10x - 20$

$-x + 3 > -19 + 10x$

$+x \qquad\qquad +x$

$3 > -19 + 11x$

$+19 \quad +19$

$\frac{22}{11} > \frac{11x}{11} \Rightarrow \boxed{x < 2}$

$\boxed{(-\infty, 2)}$

12. One of the following diagrams shows the graph of $2x - y = 2$

a) Circle the diagram that shows the graph.

b) Draw a point on that graph and label it with its ordered pair (coordinate pair). This point should be a solution of the equation $2x - y = 2$.

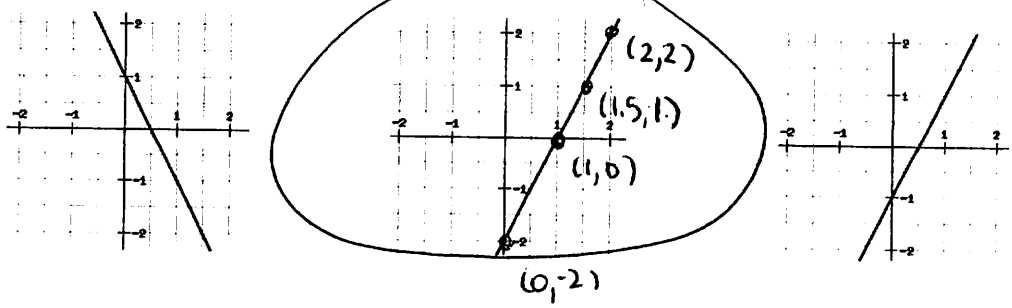
c) Show a check to see that it is the solution.

$y = 2x - 2$

Positive slope so not a)

Neg 2 is y int so not c)

slope agrees on middle as rise 2 and run 1



only 1 is needed

c) $2(0) - (-2) \stackrel{?}{=} 2$ for $(0,-2)$

$2 = 2$ ✓

$2(1) - (0) \stackrel{?}{=} 2$

$2 \stackrel{?}{=} 2$ ✓

$2(2) - (2) \stackrel{?}{=} 2 \Rightarrow 4 - 2 \stackrel{?}{=} 2 \Rightarrow 2 = 2$ ✓

13. Match each example with the property that it best represents by writing the corresponding letter next to it.

F	$15t + 3x = 3(5t + x)$	a.	Identity Element of Mult.
E	$\frac{1}{6} \cdot 6 = 1$	~~b.~~	Associative Property of Mult.
G	$5 + 8 = 8 + 5$	c.	Commutative Prop. of Mult.
B	$(2 \cdot 3) \cdot 5 = 2 \cdot (3 \cdot 5)$	~~d.~~	Additive Inverse (Also opposite)
D	$-7 + 7 = 0$	~~e.~~	Multiplicative Inverse (Also reciprocal)
H	$-\frac{1}{5} \cdot \frac{3}{3} = -\frac{3}{15}$ $(1\cdot3)/(5\cdot3)$	~~f.~~	Distributive Property
G	$(-9 + 5) + 1 = 1 + (-9 + 5)$ Again.	~~g.~~	Commutative Prop. of Addition
B	$3 \cdot (4 \cdot 2) = (3 \cdot 4) \cdot 32$ Again	~~h.~~	Associative Prop. of Addition

This won't happen on the test, where properties are repeated

14. The length of a rectangular garden is 9 yards less than twice its width. If the perimeter of the garden is 54 yards, find the length and width of the garden. Show all setup, an equation, solution of the equation and answers with units.

$l = 2\text{width} - 9 \Rightarrow 2x - 9 \rightarrow 2(12) - 9 = 24 - 9 = 15$

$P = 2\text{length} + 2\text{width} = 54\text{yds.}$ width $= x$

$2(2x - 9) + 2x = 54$

$4x - 18 + 2x = 54$

$6x - 18 = 54$

$+18 \quad +18$

$\frac{6x}{6} = \frac{72}{6}$

$x = 12$

The width is 12 yards and the length is 15 yards.

Check

$2(15) + 2(12)$

$= 30 + 24 = 54$ ✓

15. Solve the following linear equations in one variable. Give your answer as x = #. Show all work and think about how you used the properties in problem #13.

a) $17 = 4x + 1$

$-1 \quad -1$

$\Rightarrow \frac{16}{4} = \frac{4x}{4}$

$\Rightarrow 4 = x$

Remember you can always check!

$17 = 4(4) + 1$

$17 \stackrel{?}{=} 16 + 1$

$17 = 17$ ✓

b) $5 + 4x - 19 = 3x - x$

$\Rightarrow -14 + 4x = 2x$

$-4x \quad -4x$

$\Rightarrow -14 = -2x$

$\frac{-14}{-2} = \frac{-2x}{-2}$

$\Rightarrow 7 = x$

Check:

$5 + 4(7) - 19 \stackrel{?}{=} 3(7) - 7$

$5 + 28 - 19 \stackrel{?}{=} 21 - 7$

$33 - 19 \stackrel{?}{=} 14$

$14 = 14$ ✓

c) $5x + 3\ominus(4x - 1) = 5x + 4$

$\Rightarrow 5x + 3 - 4x + 1 = 5x + 4$

$\Rightarrow x + 4 = 5x + 4$

$-x \quad -x$

$\Rightarrow 4 = 4x + 4$

$-4 \quad -4$

$\frac{0}{4} = \frac{4x}{4}$

$\Rightarrow 0 = x$

Check:

$3(0) + 3 - (4(0) - 1) \stackrel{?}{=} 5(0) + 4$

$3 - (-1) \stackrel{?}{=} 4$

$3 + 1 \stackrel{?}{=} 4$

$4 = 4$ ✓

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

$7x + 3x + 3 - 5x = 5x + 3$

$5x + 3 = 5x + 3$

$-5x \quad -5x$

$3 = 3$

All Real Numbers

Remember the type is an identity but that isn't the solution!