

Name _____
Date _____

MTH 104 – Intermediate Algebra
Class #5

Unit 1 Test A

Section 1. The Numbers of Arithmetic

1. Simplify: $|9 - 4| - 6$ 1. -1
 $= |5| - 6$
 $= 5 - 6$
 $= -1$

2. Simplify: $|-4| - (-4) - |-4 - 4|$ 2. 0
 $= 4 + 4 - |-8|$
 $= 4 + 4 - 8$
 $= 0$

3. Simplify: $(-1)(+2)(-3)(-1)$ 3. -6
 $= -6$

4. Evaluate: $-x^2$ when $x = -2$ 4. _____
 $= -(-2)^2$
 $= -(+4) = -4$

5. Evaluate: $\left(-\frac{4}{7}\right)^3$ 5. $-\frac{64}{343}$
 $= -\frac{64}{343}$

6. Evaluate: $10 + \{6 - [4(5 - 2)]\}^2$ 6. 46
 $= 10 + \{6 - [4(3)]\}^2$
 $= 10 + \{6 - 12\}^2$
 $= 10 + (-6)^2$
 $= 10 + 36$
 $= 46$

7. Evaluate: $6x^2 + 3y^3 - 5$ 7. -80
 $x = 1, y = -3$
 $6(1)^2 + 3(-3)^3 - 5$
 $= 6(1) + 3(-27) - 5$
 $= 6 + (-81) - 5$
 $= 6 - 81 - 5$
 $= -80$

8. Write without negative exponents: $(3x^{-2}y^3)^{-3}$ 8. $\frac{x^6}{27y^9}$
 $= \frac{1}{27} x^{+6} y^{-9}$
 $= \frac{x^6}{27y^9}$

9. Write without negative exponents: $\left(\frac{x^2 y^{-3} z^4}{x^{-1} y^2 z^3}\right)^{-1}$ 9. _____

$$= \frac{x^{-2} y^{+3} z^{-4}}{x^{+1} y^{-2} z^{-3}}$$

$$= \frac{y^3 y^2 z^5}{x^1 x^2 z^4}$$

$$= \frac{y^5}{x^3 z}$$

10. Write in Scientific Notation: 36,000,000 10. 3.6×10^7

11. Write in Standard Notation: 4.625×10^{-4} 11. 0.0004625

12. Simplify: $(5.4 \times 10^{-4})(1.2 \times 10^{-1})$ 12. 6.48×10^{-5}

13. Simplify and Write in Scientific Notation: $\frac{0.00046}{23,000}$ 13. 2.0×10^{-8}
 *Set Calculator to Scientific.
 =

Section 2. Equations and Terms.

14. Solve the Equations. The check, if correct, will earn +1 extra point.
 a. $8x + 2(x - 4) = 8x + 10$ $8x + 2x - 8 = 8x + 10$ $10x - 8 = 8x + 10$ $2x - 8 = 10$ $2x = 18$ $x = 9$
 14a. $x = 9$
 - Check left to student

15. Solve for y in terms of x. $-3x + 5y = 10$ $\frac{5y}{5} = \frac{+3x + 10}{5}$ 15. $y = \frac{3}{5}x + 2$

16. Solve for y: $Ax + By = C$ $y = \frac{3}{5}x + 2$ 16. _____
 $\frac{By}{B} = \frac{C - Ax}{B}$
 $y = \frac{C - Ax}{B}$

17. Use the Formula: $V = \frac{1}{3}\pi r^3$ $\pi = 3.142$:

17. 226,224 ft³

a. The radius of the Future Sphere at Wally World (National Lampoon's Vacation) is 60 feet. What is the volume of the sphere?

$$V = \frac{1}{3} (3.142) (60)^3$$

$$= \frac{1}{3} (3.142) (214600)$$

$$(3.142) (72000)$$

18. Translate the Following:

a. 12 is subtracted from the sum of a number and 5

22a. $(x+5) - 12$

b. 9 is added to a number

22b. $x + 9$

c. 14 times a number is diminished by 5

22c. $14x - 5$

d. a number exceeds m by 5

22d. $m + 5$

19. The cost of renting a truck to move across town is \$35 a day and 20 cents per mile. How far can Tanya drive if she has only \$80 for the day?

Let $x = \#$ of miles driven

$$C - V - S$$

$$35 + .20x = 80$$

$$\begin{array}{r} -35 \qquad \qquad \qquad -35 \\ \hline .20x = 45 \\ \cdot 20 \quad \cdot 20 \\ \hline x = 225 \end{array}$$

19. 225 miles

20. To make a large number of photocopies, Sandra uses two photocopiers. One copier can do 35 copies per minute, and the other can do 40 copies per minute. If Sandra starts the copiers at the same time, how long will it take her to produce 1050 copies?

$$\begin{array}{cc} \text{Copier 1} & \text{Copier 2} \\ 35x + 40x = 1050 & \\ 75x = 1050 & \\ \text{Let } x = \text{minutes} & x = 7 \end{array}$$

20. 7 minutes

Section 3. Application Problems

21. The perimeter of a rectangular skating rink is 530 feet. If the length is 5 feet more than 3 times the width, what are the dimensions of the rink?

let $x = \text{width}$ $\text{width} = x = 65 \text{ feet}$

$$\begin{array}{c} 3x+5 \\ \text{---} \\ | \\ | \\ | \\ \text{---} \\ 3x+5 \end{array}$$

$$\begin{array}{r} 8x + 10 = 530 \\ -10 \quad -10 \\ \hline 8x = 520 \\ \hline x = 65 \end{array}$$

$$\begin{array}{l} \text{length} = 3x + 5 \\ = 200 \text{ feet} \end{array}$$

22. Mr. Parsons invested a sum of money at 6% and another sum of money, which was \$500 more than the first amount at 4%. The total annual income from both investments was \$50. How much did he invest at each rate?

Investment	Amount	Rate	Income
4%	$(x+500)$.04	$.04(x+500)$
6%	x	.06	$.06x$

$$\begin{aligned} .04(x+500) + .06x &= 50 & .04(800) + .06(300) &= 50 \\ .04x + 20 + .06x &= 50 & 32.0 + 18.0 &= 50 \\ .10x + 20 &= 50 & 50 &= 50 \checkmark \\ .1x &= 30 & x &= 300 \end{aligned}$$

23. How much PURE acid must be added to 15 ounces of an acid solution which is 40% acid in order to produce a solution which is 50% pure acid?

Ingredient	Amount	Percentage	Total
Pure Acid	x	1.00	$1.00x$
40%	15	.40	$.40(15)$
50%	$(x+15)$.50	$.50(x+15)$

$$\begin{aligned} 1.00x + .40(15) &= .50(x+15) & x &= 3 \text{ ounces of Pure Acid.} \\ 1.00x + 6 &= .50x + 7.5 \\ - .50x & \quad - .50x \\ \hline .50x + 6 &= 7.5 \\ .5x &= 1.5 \end{aligned}$$

21. How many pounds of 60 cent per pound coffee must a grocer mix with coffee that sells for 87 cents per pound to produce 90 pounds of a coffee blend that sells for 69 cents per pound?

Coffee	lbs	Cost	Total
60 cent	$(90 - x)$	60	$60(90 - x)$
87 cent	x	87	$87x$
69 Cent Mix	90	69	$69(90)$

$$60(90 - x) + 87x = 69(90)$$

30 lbs of 87 Cent Coffee

$$5400 - 60x + 87x = 6210$$

$$\begin{array}{r} 5400 + 27x = 6210 \\ -5400 \quad -5400 \end{array}$$

$$27x = 810$$

$$x = 30$$

22. How much (pure) salt must be added to 80 lbs. of a solution that is 5% to make a solution that is 24% salt?

Salt	Pounds	%age	Total
Pure	x	100	$1.00x$
5%	80	.05	$.05(80)$
24%	$(x + 80)$.24	$.24(x + 80)$

$$1.00x + .05(80) = .24(x + 80)$$

20 lbs. of 100%
Acid

$$\begin{array}{r} 1.00x + 4 = .24x + 19.2 \\ - .24x \quad - .24x \end{array}$$

$$\begin{array}{r} .76x + 4 = 19.2 \\ - 4 \quad - 4 \end{array}$$

$$.76x = 15.2$$

$$x = 20$$

Enjoy Your Weekend.