

Name: _____

7th grade Math teacher: _____ Level: _____

Rising 8th Grade Summer Math Packet

On-Level Math 8

- This packet is designed to help you retain the information you have learned in previous years.
- You must show any work necessary in the packet, but please write ALL answers on the answer sheet provided on PAGE 2 of this packet!
- This packet will be graded and due Monday, August 7. There will be a quiz based on these skills on Friday, August 11.
- There will be a study session on Monday, August 7th for any question you may have about this work.
- The following websites will help you strengthen your skills: www.math.com & www.Algebralab.com

All answers go here.

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57.

Number of tickets, x	1	2	3	4	5	6
Total cost in dollars, y						

Reference sheet

Pre-Algebra Reference Sheet

Circle



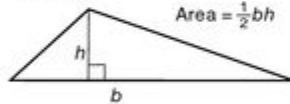
Area = πr^2
Circumference = $2\pi r$
Circumference = πd

Rectangle



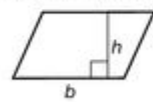
Area = lw
Perimeter = $2l + 2w$

Triangle



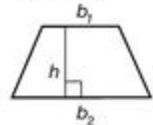
Area = $\frac{1}{2}bh$

Parallelogram



Area = bh

Trapezoid



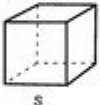
Area = $\frac{1}{2}h(b_1 + b_2)$

Cylinder



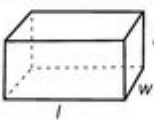
Volume = $\pi r^2 h$
Surface Area = $2\pi r^2 + 2\pi rh$

Cube



Volume = s^3
Surface Area = $6s^2$

Rectangular Prism



Volume = lwh
Surface Area = $2lw + 2lh + 2wh$

Definitions

MEAN:	The sum of a set of numbers divided by the number of elements in the set.
MEDIAN:	The middle number or average of the two middle numbers in a collection of data when the data are arranged in order.
MODE:	The number or numbers that occur most often in a collection of data.
RANGE:	The difference between the greatest and the least numbers in a collection of data.
REFLECTION OR FLIP:	A mirror image of a figure across a line of symmetry.
TRANSLATION OR SLIDE:	A change in position of a figure. All points in the figure move in the same direction for the same distance.
ROTATION OR TURN:	Turning a figure clockwise or counterclockwise about a point.

DISTANCE

TRAVELED: distance = rate \times time

Customary Conversions

8 ounces = 1 cup
2 cups = 1 pint
2 pints = 1 quart
4 quarts = 1 gallon
8 pints = 1 gallon
3 teaspoons = 1 tablespoon
16 tablespoons = 1 cup
16 ounces = 1 pint
16 ounces = 1 pound
5280 feet = 1 mile

Metric Conversions

kilo-	hecto-	deka-	UNIT	deci-	centi-	milli-
k	h	da	meter (m) liter (l) gram (g)	d	c	m

Skill 1: Fractions, Decimals and Percents

- Decimal to percent: Move decimal 2 places to the right $.52 = 52\%$
- Percent to decimal: Move decimal 2 places to the left. $12.5\% = .125$
- Fraction to a decimal: Divide the numerator by the denominator. $\frac{3}{5} = 3 \div 5 = .6$
- Fraction to a percent: Divide the numerator by the denominator, then move the decimal two places to the right OR you can use a proportion:

Example: $\frac{2}{5} = \frac{x}{100}$ Cross multiply then solve

- Solving a percent problem:
use the percent proportion $\frac{is}{of} = \frac{\%}{100}$

Convert to a decimal:

1. 37% 2. 136% 3. 9% 4. 4.2%

Convert to a percent:

5. 0.17 6. 2.47 7. 0.03 8. 0.004

Convert to a fraction:

9. 37% 10. 45% 11. 120%

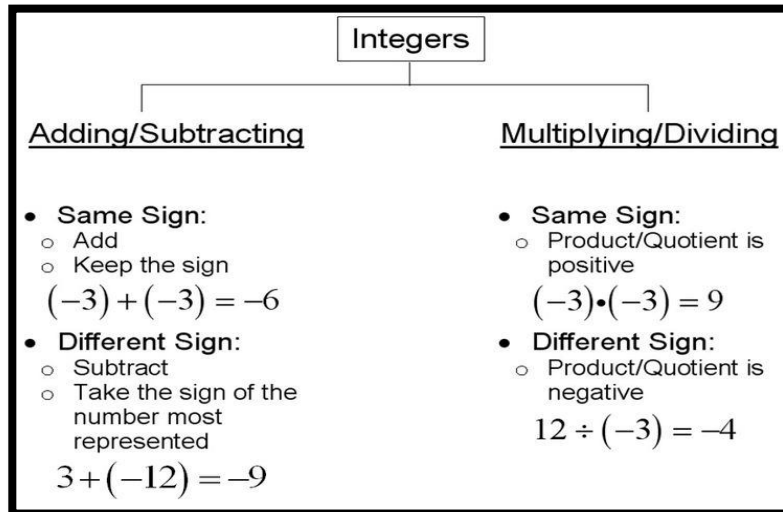
Convert to a percent:

12. $\frac{4}{5}$ 13. $\frac{19}{20}$ 14. $\frac{4}{9}$ 15. $\frac{5}{8}$

Solve:

16. What is 25% of 40? 17. 9 is what percent of 12?
18. Find 40% of 150. 19. 15 is 60% of what number?

Skill 2: Integer Rules and Order of Operations:



ORDER OF OPERATIONS

- (P) **Parenthesis**
- E^x **Exponents**
- M/D **Multiply or Divide**
*from left to right in the problem
- A/S **Add or Subtract**
*from left to right
*of course

Find each answer:

20. $-12 + -7$

21. $-25 + 18$

22. $-5 + 5$

23. $2 + -25$

24. $-28 - (-8)$

25. $11 - (-5)$

26. $-21 - 4$

27. $-9 \cdot -8$

28. $(2)(-12)$

29. $-2 \cdot 6 \cdot -5$

30. $\frac{-35}{-7}$

31. $\frac{-48}{-4}$

32. $-30 + \frac{-24}{6} - 2$

33. $\frac{16}{4} + 2 \cdot -8$

34. $-3(1 - 8) + 2^3$

35. $\frac{2-3(5+4)}{2^2+1}$

Skill 3: Combining like terms and Applying the distributive property

In algebraic expressions, **LIKE TERMS** are terms that contain the same variables raised to the same power.

Only the **COEFFICIENTS** (the number in front of the variable) of like terms may be different.

****In order to combine like terms, we **ADD** or **SUBTRACT** the numerical coefficients of the terms.

Example: $2x + 9x = (2 + 9)x = 11x$

$$12y - 7y = 5y$$

$$5x + 8 - 2x + 7 = 5x - 2x + 8 + 7 = 3x + 15 \quad (\text{Here the like terms are } 5x \text{ and } -2x, \text{ and } 8 + 7)$$

The **Distributive Property**: Multiply the number outside the parentheses by each term inside the parentheses.

$$7(x + 5) = 7 \cdot x + 7 \cdot 5 = 7x + 35$$

$$4(2x - 3) = 4 \cdot 2x + 4 \cdot -3 = 8x - 12$$

36. $10 - 6y + 4y + 9$

37. $8y + 2y$

38. $3x + 7 - 2x$

39. $8n - 7y - 12n + 5 - 3y$

40. $7(x - 4)$

41. $5(4n - 3)$

42. $5x - (x + 2) + 4$

43. $8(3n + 7) - 10n$

44. $-4(5 + 7y) + 6(2y - 9)$

Skill 4: Solving Equations:

To solve an equation, remember to isolate the variable on a side by itself. For **one-step equations**, that involves adding, subtracting, multiplying, or dividing to move the constant away from the variable. For **two-step equations**, begin by adding or subtracting (using the opposite operation) to move the constant. Then multiply or divide the number with the variable.

One-step equations:

$$\begin{array}{r} x + 9 = -6 \\ -9 \quad -9 \\ \hline x = -15 \end{array}$$

$$\begin{array}{r} \frac{x}{5} = 4 \\ 5\left(\frac{x}{5} = 4\right)5 \\ \hline x = 20 \end{array}$$

Two-Step Equations:

$$\begin{array}{r} 2x - 6 = 24 \\ +6 \quad +6 \\ \hline 2x = 30 \\ \frac{2x}{2} = \frac{30}{2} \\ x = 15 \end{array}$$

$$\begin{array}{r} \frac{x}{3} + 6 = -2 \\ -6 \quad -6 \\ \hline \frac{x}{3} = -8 \\ 3\left(\frac{x}{3} = -8\right)3 \\ \hline x = -24 \end{array}$$

Multi-step Equations:

$$\begin{array}{ll} 3x - 2(x + 4) = 24 & \text{Distribute} \\ 3x - 2x - 8 = 24 & \text{Combine like terms} \\ x - 8 = 24 & \text{add 8 to both sides} \\ x = 32 & \end{array}$$

45. $2x - 5 = 17$

46. $\frac{1}{3}x - 9 = -12$

47. $5x + 8 = -12$

48. $-4x + 8 = 32$

49. $\frac{x}{4} + 8 = 20$

50. $2(x - 7) = 8$

51. $8x - 5 - 6x = 7$

52. $6x - (3 + 8x) = -11$ (distribute the negative)

Skill 5: Proportion and Direct Variation

Solving a proportion:

- 1) Set up your proportion
- 2) Cross Multiply
- 3) Solve the equation

The ratio of boys to girls is 4 to 5. There are 12 boys in a class. How many girls are in the class?

$$\frac{4 \text{ boys}}{5 \text{ girls}} = \frac{12 \text{ boys}}{x \text{ girls}} \quad 4 \cdot x = 5 \cdot 12 \quad \frac{4x}{4} = \frac{60}{4} \quad x = 15$$

There are 15 girls in class.

Direct proportion (AKA direct variation)

$$y = kx \quad \text{"k" is the constant of variation, AKA the unit rate, AKA the slope, AKA rate of change}$$

53. Buck drove 220 miles in 5 hours. What is his average rate of speed?

54. Stefanie reads 160 pages in 4 hours. How many pages can she read in 6 hours?

55. Kendall knows that a 45-ounce pitcher can hold enough lemonade for 6 people. At this rate, how many ounces of lemonade will Kendall need to serve 26 people?

56. What is Peter's weekly rate?



57. The equation $y = 6.5x$ relates the number of tickets purchased for the school play and the total cost, in dollars. Use the equation to complete the chart:

Number of tickets, x	1	2	3	4	5	6
Total cost in dollars, y						

58. $\frac{40}{24} = \frac{20}{x}$

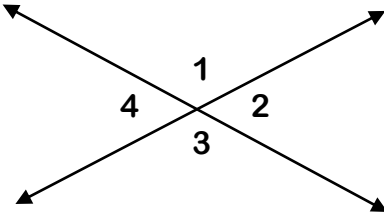
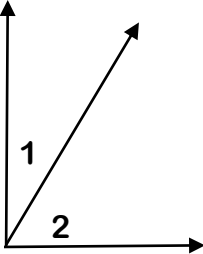
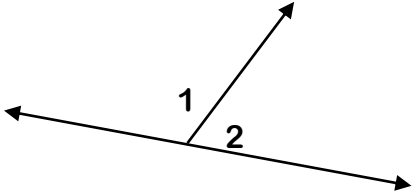
59. $\frac{20}{x} = \frac{10}{16}$

60. $\frac{2}{3} = \frac{8}{x}$

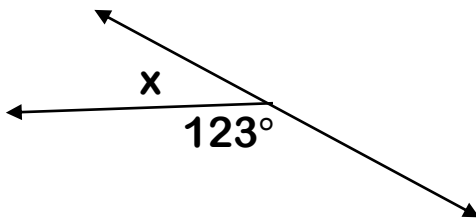
Skill 6: Angle Relationships and Algebra

Notation: $m\angle$ means the “measure of angle ___”

\cong means congruent or equal in measure

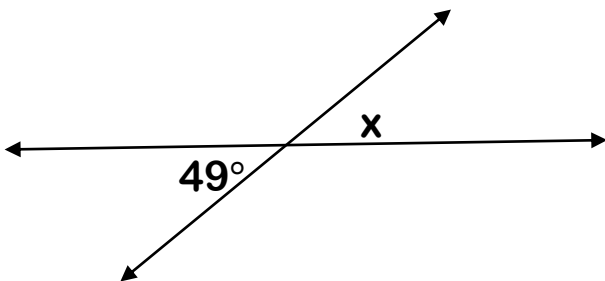
Vertical Angles	Complementary Angles	Supplementary Angles
 <p>Angles that are opposite each other across two intersecting lines.</p> <p>$m\angle 1 \cong m\angle 3$ and $m\angle 2 \cong m\angle 4$</p>	 <p>Two angles whose sum is 90°.</p> <p>$m\angle 1 + m\angle 2 = 90^\circ$</p>	 <p>Two angles whose sum is 180°.</p> <p>$m\angle 1 + m\angle 2 = 180^\circ$</p>

State how the angle labeled x is related to the angle with the given measurement. Then find the value of x in each figure.



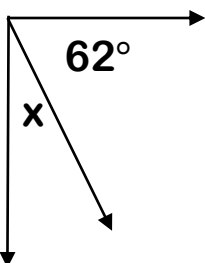
61. relationship: _____

62. $x =$ _____



63. relationship: _____

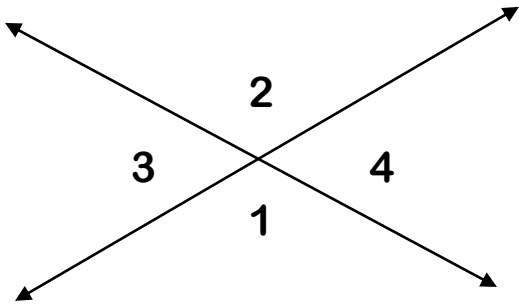
64. $x =$ _____



65. relationship: _____

66. $x =$ _____

Directions: Find the missing angles given that $m \angle 4 = 50^\circ$.

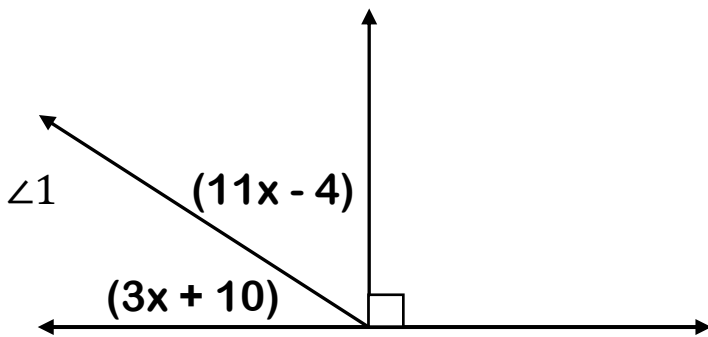


67. $m \angle 1 =$ _____

68. $m \angle 2 =$ _____

69. $m \angle 3 =$ _____

Directions: Use the following figure to answer questions 70-72.



70. relationship of the angles

71. $x =$ _____

72. $m \angle 1 =$ _____

Skills 7: Geometry

You should know and be able to use the following formulas to find perimeter, area and volume of geometric figures.

Rectangle $P = 2l + 2w$

$A = lw$

Rectangular Prism

Square $P = 4s$

$A = s^2$

$V = lwh$

Triangle $P = s_1 + s_2 + s_3$

$A = \frac{1}{2}bh$

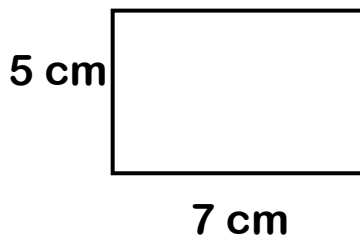
Cube

Circle $C = \pi d$

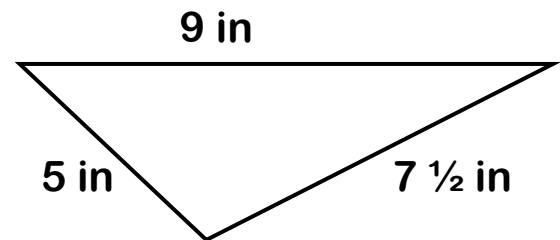
$A = \pi r^2$

$V = s^3$

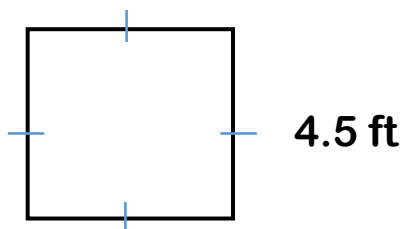
73. Find the perimeter.



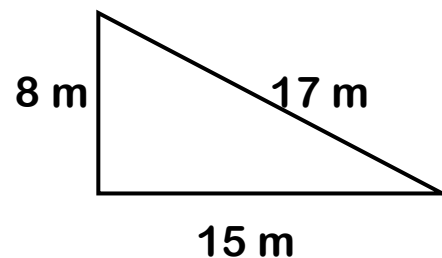
74. Find the perimeter.



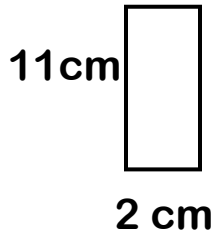
75. Find the perimeter



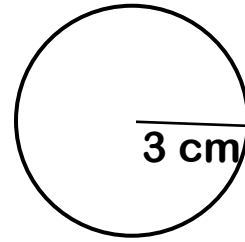
76. Find the area.



77. Find the area.



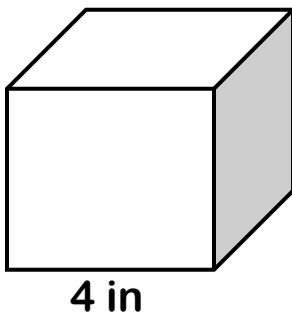
78. Find the area. (use 3.14 for π)



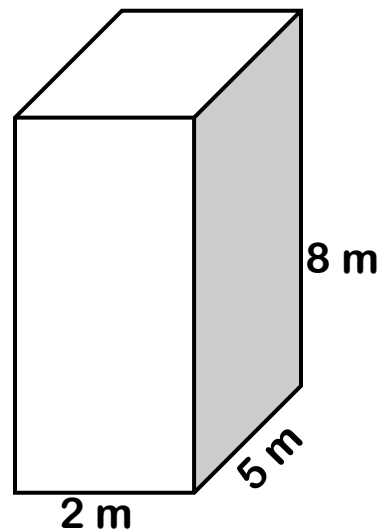
79. Logan County is shaped like a rectangle. It has a length of 80 miles and width of 42 miles. What is the area of the county?

80. A ceramic tile has an area of 81 square inches. How long is one side?

81. Find the volume of the cube.



82. Find the volume of the figure.



Skill 8: Coordinate Plane

Directions: Identify the location of the follow points.

EX. Point P (10, -6)

83. Point R _____

84. Point H _____

85. Point X _____

86. Point A _____

87. Point G _____

88. Point E _____

89. Point J _____

90. Point W _____

