

Salem-Keizer School District Paraprofessional Mathematics Study Guide for Assessment

This study guide has been designed to provide sample problems that could be found on the Paraprofessional Math Assessment. There are twelve problems in each math strand, with a variety of difficulty. For additional assistance you can attend the math study sessions or go on the listed websites. This guide covers the general math concepts assessed. There may be more difficult problems on the assessment.

1. Read each item stem carefully and examine all supporting information (e.g., tables and graphics) to be sure you understand each question.
2. Review the alternatives, as you begin to solve the problem
3. Find your solution among the listed alternatives.
4. If your answer is not among the listed alternatives, check your work.
5. Use scratch paper provided to do your calculations. NOTE: Calculators are PERMITTED

Mathematic areas that will be assessed include

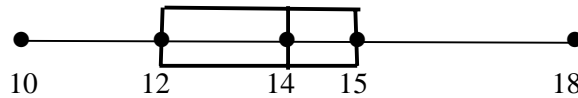
- Calculations and estimations
- Measurement
- Statistics and probability
- Algebraic relationships
- Geometry

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1. In your job as a cashier, a customer gives you a \$20 bill to pay for a can of coffee that costs \$3.84. How much change should you give back?
 - A. \$15.26
 - B. \$16.16
 - C. \$16.26
 - D. \$16.84

 2. Over the last five days, you made the following number of sales calls: 8, 7, 9, 5, and 7. To help in planning staff time, you track the average number of calls you make each day. What was your average over the last 5 days?
 - A. 5.8
 - B. 7.0
 - C. 7.2
 - D. 9.0

 3. The farm where you just started working has a vertical cylindrical oil tank that is 5 feet across on the inside. If the tank is 8 feet high, what is the volume of the tank? $\text{Volume} = \pi r^2 h$
 - A. 21 cubic feet
 - B. 157 cubic feet
 - C. 251 cubic feet
 - D. 628 cubic feet

4. This “box and whisker” graph shows data that represents daily sales for a given month. What is the median number of sales?

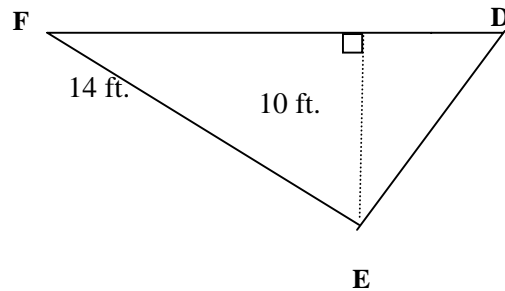
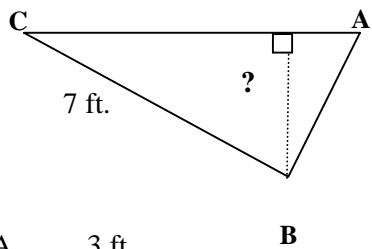


- A. 8
B. 12
C. 14
D. 15
5. The regular price of a man’s suit is \$189. This weekend the suit is on sale with a 30% discount. How much will the suit cost at the discounted price?
- A. \$56.70
B. \$130.32
C. \$132.30
D. \$169.00
6. Select the most appropriate unit to measure the dimensions of the classroom floor to determine its area.
- A. centigrams
B. millimeters
C. liters
D. meters
7. On a road map with a scale of $\frac{1}{4}$ inch per ten miles, the highway from Waukee to Winterset is $1\frac{3}{8}$ inches long. How many miles long is the highway?
- A. 44 miles
B. 55 miles
C. 65 miles
D. 90 miles
8. The price of gasoline has increased by 5% during the past month. If the price per gallon a month ago was \$1.20 what is the current price per gallon?
- A. \$1.24
B. \$1.26
C. \$1.70
D. \$1.80
9. $-2(3 - 4 - 5) = ?$
- A. -12
B. -8
C. 8
D. 12

10. Write the fraction $\frac{8}{36}$ in simplest form.

- A. $\frac{1}{4}$
- B. $\frac{2}{9}$
- C. $\frac{3}{12}$
- D. $\frac{8}{36}$

11. Triangles ABC and DEF are similar, find the height of ABC.



- A. 3 ft.
- B. 5 ft.
- C. $5\frac{1}{2}$ ft.
- D. 6 ft.

12. $\frac{2}{3} + \frac{3}{4} + \frac{1}{2} = ?$

- A. $\frac{6}{24}$
- B. $\frac{6}{9}$
- C. $\frac{23}{36}$
- D. $1\frac{11}{12}$

13. Solve: $3 - 4(x - 2) = 3(3 - x)$

- A. -14
- B. -2
- C. 2
- D. 14

14. What are the mean and the median (in that order) of the following set of numbers?

3.2	4.7	4.1	4.4	5.4	3.1	3.8	3.5
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- A. 32.2; 4.025
- B. 3.8; 32.2
- C. 3.95; 4.025
- D. 4.025; 3.95

15. If Sarah is 65 inches tall, convert her height to the nearest centimeter. (Hint: 1 inch = 2.54 cm)

- A. 26 cm
- B. 68 cm
- C. 165 cm
- D. 16,510 cm

16. Simplify: $(-2)^2 - 4(6) - 2 =$

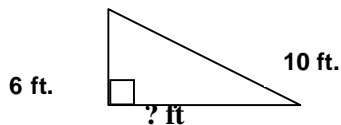
- A. -50
- B. -30
- C. -2
- D. 0

17. These two stem-and leaf plots represent the ages of staff in two schools. If three staff members in their twenties move from School A to School B, which of the following statements would be false?

School A	School B
2 457	2 7678899
3 0012333799	3 0011223444467888
4 011111455888899	4 23445667889
5 1123346667	5 114568
6 00124	6 0

- A. The “range” would change for both schools.
- B. The “mode” would remain the same for both schools.
- C. The “mean” would change for both schools.
- D. The “median” would increase for both schools.

18. Find the unknown leg of the right triangle. Note: Pythagorean Theorem $a^2 + b^2 = c^2$



- A. 4 ft
- B. 6 ft
- C. 8 ft
- D. 16 ft

19. Which of the following has a value equivalent to $16(12-5)$?

- A. 28 - 5
- B. $16(12) - 5$
- C. $16(5 - 12)$
- D. $16(12) - 16(5)$

20. The following chart shows the price of ski-lift tickets for various numbers of rides.

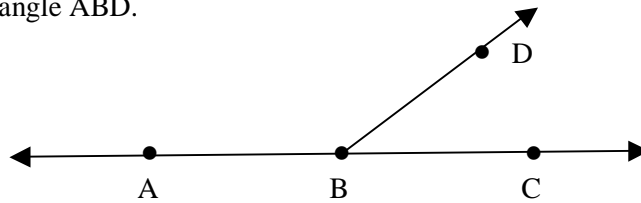
Number of Rides	Ticket Price
Single Ride	\$ 4.00
Three Rides	\$ 10.00
Six Rides	\$ 16.00

Any unused portions of tickets will be thrown away. If Carla wants to ride the lift 5 times, what should she buy to keep costs at a minimum?

- A. 1 six-ride ticket
- B. 2 single tickets and a three-ride ticket
- C. 2 three-ride tickets
- D. 5 single tickets

21. Estimate the measure of angle ABD.

- A. 45°
- B. 90°
- C. 100°
- D. 135°

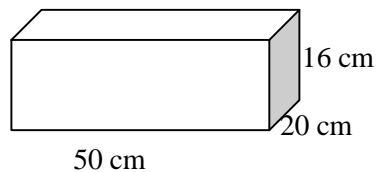


22. A circular garden has a circumference of 125 feet. To the nearest foot, find the distance across the garden at its greatest width.

Helps: Use $\pi \approx 3.14$ $C = \pi d$

- A. 20 ft
- B. 40 ft
- C. 250 ft
- D. 393 ft

23. Find the total surface area of this cardboard box (or rectangular solid). *Drawing is not to scale.*



- A. 86 cm
- B. 2120 cm^2
- C. 4240 cm^2
- D. 16000 cm^2

24. Members of a club made the table below to show the total numbers of cakes remaining at their bake sale between 10:00 a.m. and 2:00 p.m.

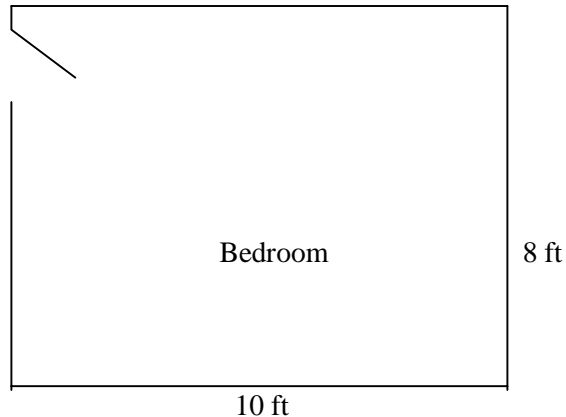
Time	Number of Cakes Remaining
10:00	25
11:00	20
12:00	15
1:00	10
2:00	5

The number of cakes sold per hour was

- A. greatest in the morning.
 B. greatest in the middle of the day.
 C. greatest in the afternoon.
 D. steady throughout the day.
25. An outside concrete playing area is being added to a school. The contractor dug an area 40 feet long, 40 feet wide, and 6 inches deep. What volume of cement will be needed? Hint: $V = lwh$
- A. 400 ft^3
 B. 800 ft^3
 C. 4800 ft^3
 D. 9600 ft^3
26. Here is a sketch of a bedroom. To create the drawing below, which scale would be most reasonable?

Scales:

- A. $\frac{1}{4}$ inch = 1 foot
 B. $\frac{1}{4}$ inch = 1 yard
 C. $\frac{1}{4}$ centimeter = 1 foot
 D. $\frac{1}{4}$ meter = 1 foot



27. How many yards of material from a 24-yard length of cloth remain after eight pieces (measurements below) are removed? Measurements for the cut pieces are three pieces are $3 \frac{1}{2}$ yards long and five pieces are $2 \frac{1}{4}$ yards long.
- A. $2 \frac{1}{4}$
 B. $4 \frac{1}{4}$
 C. $4 \frac{5}{6}$
 D. $10 \frac{1}{4}$

28. Phillip charged \$400 worth of goods on his credit card. On his first bill, he was not charged any interest, and he made a payment of \$20. He then charged another \$18 worth of goods. On his second bill a month later, he was charged 2% interest on his entire unpaid balance. How much interest was Phillip charged on his second bill?

- A. \$8.76
- B. \$7.96
- C. \$7.60
- D. \$7.24

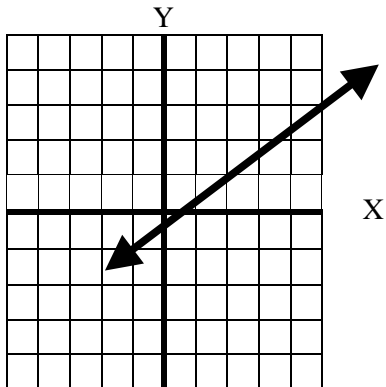
29. Which of the following expressions represents the difference of twice a number and 4?

- A. $2n + 4$
- B. $2(n - 4)$
- C. $2n - 2(4)$
- D. $2n - 4$

30. A recipe requires 3 cups of flour and 2 eggs to make 8 servings of cake. How many cups of flour are needed to make 20 servings of the same cake?

- A. 6 cups
- B. $6\frac{3}{4}$ cups
- C. $7\frac{1}{4}$ cups
- D. $7\frac{1}{2}$ cups

31. Find the slope “ m ” for the line which passes through the points (2, 1) and (5, 3).



- A. $\frac{2}{3}$
- B. $\frac{3}{2}$
- C. 2
- D. 3

32. The table below gives the height of the first hill for several coasters. It also gives the distance, along the ground, covered during the first drops. Complete the table, finding the slope for each drop. Slope = rise/run. All the slopes in this example are positive slopes.

Coaster	Height of first hill (ft)	Horizontal distance covered	Slope
1. Cyclone	135	101	
2. Tornado	78	59	
3. Screamer	85	49	
4. Terror	155	121	
5. Beast	135	135	

32. Which coaster has the steepest slope?

- A. Cyclone
- B. Tornado
- C. Terror
- D. Screamer

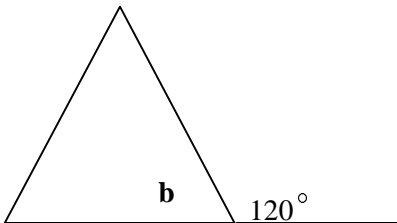
33. Which coaster has the gentlest slope?

- A. Beast
- B. Cyclone
- C. Terror
- D. Tornado

34. What is be the “middle value” or median slope of these coasters?

- A. .9
- B. 1
- C. 1.322
- D. 1.337

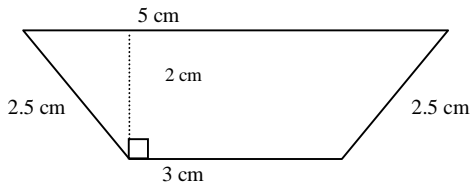
35. Find the measurement for the angle ‘b’.



Measurement $\angle b = \underline{\hspace{2cm}}$

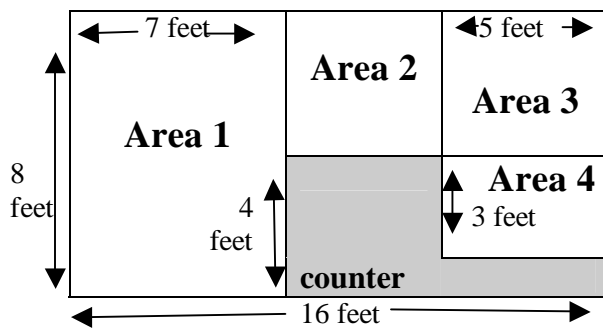
- A. 30°
- B. 60°
- C. 120°
- D. 360°

36. Calculate the area of the trapezoid. The area of a trapezoid = (average of bases)(height) = $\frac{(base1+base2)}{2} \cdot h$



- A. 6 cm^2
- B. 8 cm^2
- C. 10 cm^2
- D. 16 cm^2

37. The Lugo family is tiling their kitchen floor. How many square feet of tile will they need to cover all four areas? *The drawing is not drawn to scale.*



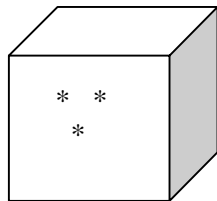
- A. 96 ft^2
- B. 107 ft^2
- C. 116 ft^2
- D. 128 ft^2

38. During one week in February, a town in Alaska recorded the following daily high temperatures: -12°F , 1°F , -9°F , -7°F , -12°F , -12°F , 2°F . What was the mean daily high temperature for the week?

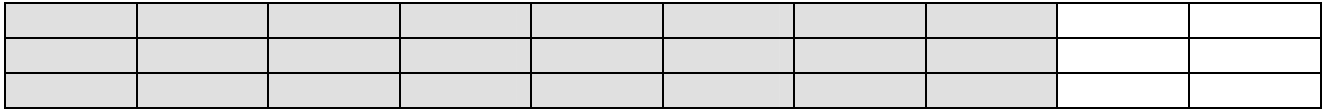
- A. -14°F
- B. -12°F
- C. -7°F
- D. 7°F

39. If the die is tossed, what is the probability that it will land on a side so that 3 dots are facing up?

- A. $\frac{1}{6}$
- B. $\frac{5}{6}$
- C. $\frac{1}{3}$
- D. $\frac{2}{3}$

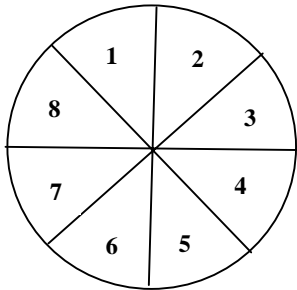


40. Write the fraction for the shaded part of the figure below in simplest terms.



- A. $\frac{4}{5}$
- B. $\frac{8}{10}$
- C. $\frac{24}{30}$
- D. $\frac{26}{30}$

41. If you spin the spinner twice, what is the probability that the sum of the two results will be 10?



- A. $\frac{7}{64}$
- B. $\frac{1}{4}$
- C. $\frac{7}{16}$
- D. $\frac{7}{8}$

42. You are drawing two marbles from a bag containing 7 blue, 2 red, and 1 green. One marble is drawn out of the bag and not replaced. Another marble is drawn from the bag. What is the probability that both marbles will be red?

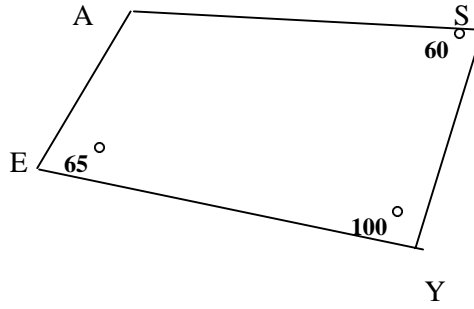
- A. $\frac{1}{50}$
- B. $\frac{1}{45}$
- C. $\frac{1}{10}$
- D. $\frac{1}{5}$

43. Your classroom has twenty-five students, ten boys and fifteen girls. If you place each name on a slip of paper and draw out two names at the same time, what is the probability of picking the name of one boy and one girl?

- A. $\frac{6}{25}$
- B. $\frac{1}{4}$
- C. $\frac{1}{2}$
- D. $\frac{2}{3}$

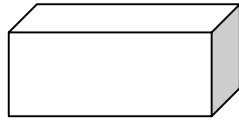
44. The measure of $\angle EAS$ is _____.
Drawing not to scale.

- A. 45°
- B. 100°
- C. 115°
- D. 135°



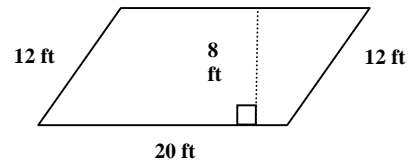
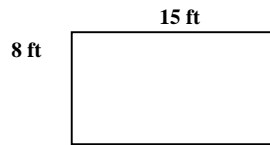
45. A rectangular solid has _____ faces (sides).

- A. 3
- B. 5
- C. 6
- D. 8



46. Find the total area of the two figures.

- A. 51 ft
- B. 68 ft
- C. 280 ft^2
- D. 360 ft^2

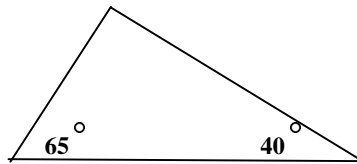


47. What is the next number in the sequence? 20, 30, 45, 67.5, _____

- A. 90
- B. 101.25
- C. 107.5
- D. 112.5

48. How many degrees are in the third angle?

- A. 105°
- B. 95°
- C. 85°
- D. 75°

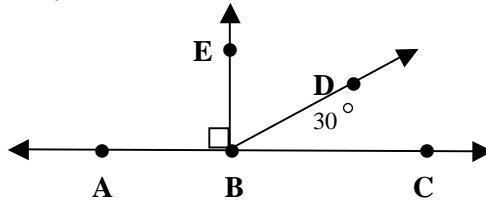


49. So far this season, Josh has made 72 free-throws out of 90 attempts. At this rate, what is the probability that he will make his next free throw?

- A. 0.64
- B. 0.72
- C. 0.80
- D. 0.90

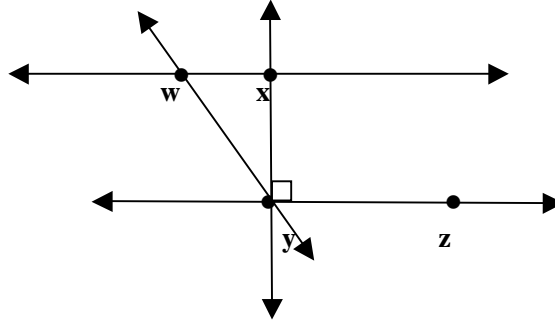
50. Which angle would be complimentary to $\angle DBC$?

- A. $\angle EBD$
- B. $\angle EBC$
- C. $\angle ABE$
- D. $\angle ABD$



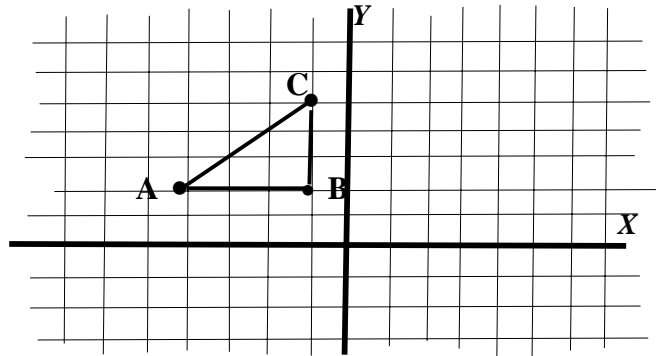
51. Given: $\vec{wx} \parallel \vec{yz}$ Name the line that is perpendicular to \vec{yz} .

- A. \vec{wx}
- B. \vec{yz}
- C. \vec{xy}
- D. \vec{xy}

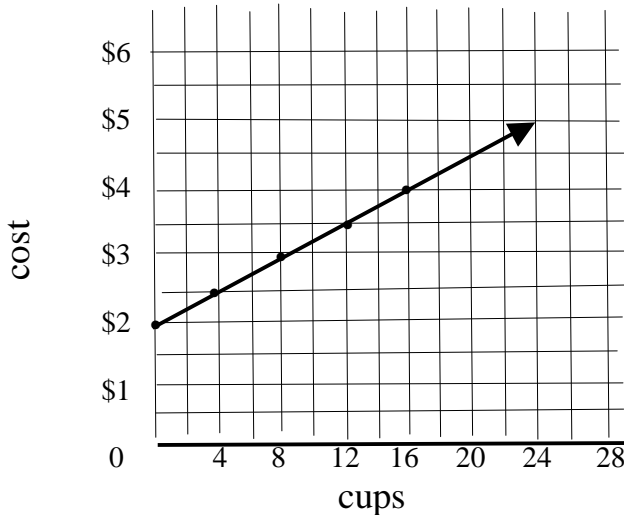


52. Identify the point that corresponds to the “C” vertex when triangle ABC is reflected along the x -axis.

- A. (1, 5)
- B. (-1, 5)
- C. (1, -5)
- D. (-1, -5)



53. Select the statement that best describes the lemonade stand expenses as modeled by the graph.



- A. Each additional cup raises expenses by about 12 cents.
- B. The expenses never increase after twenty cups.
- C. The first cup costs less to make than the tenth cup.
- D. As more cups are made, the cost per cup increases.

54. Select the table of ordered pairs that would represent points that are linear.

A.

x	y
-4	0
0	2
4	4
6	5

B.

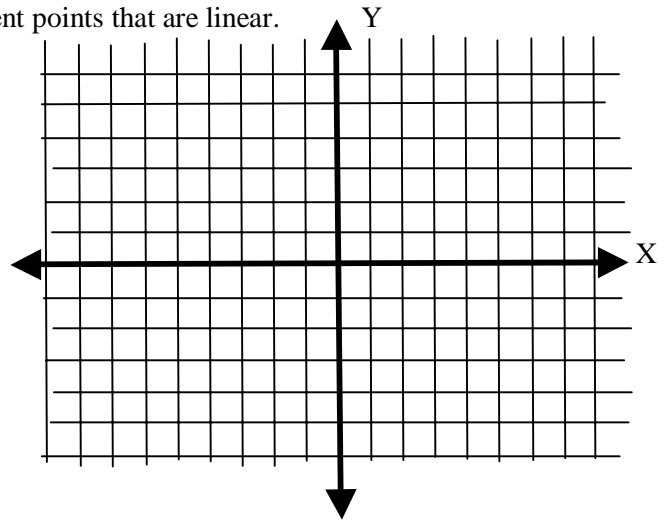
x	y
-4	0
0	-4
4	4
6	5

C.

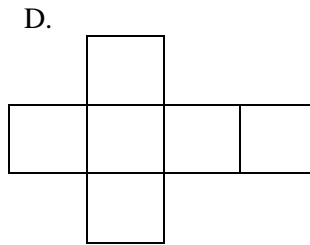
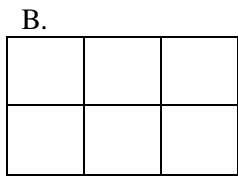
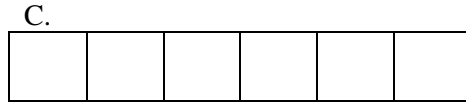
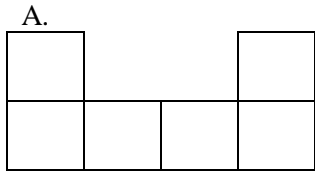
x	y
-4	0
0	2
2	2
6	5

D.

x	y
-4	0
2	3
4	4
6	-5

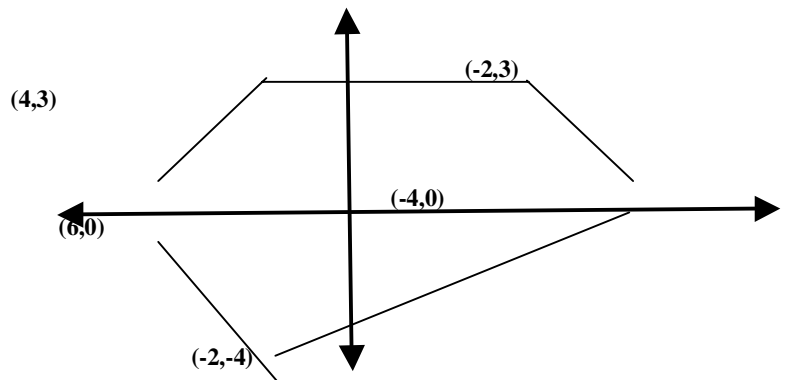


55. Select the model that could be folded to create a 3-dimensional “closed box”. (You must fold on the given lines).



56. Find the area of the given pentagon.

- A. 24 square units
- B. 36 square units
- C. 44 square units
- D. 52 square units

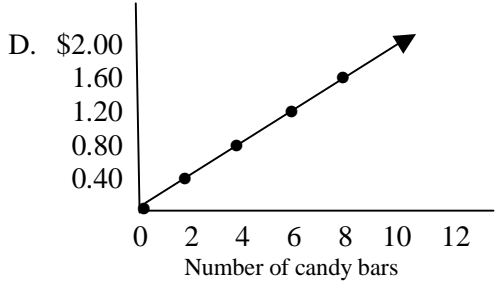
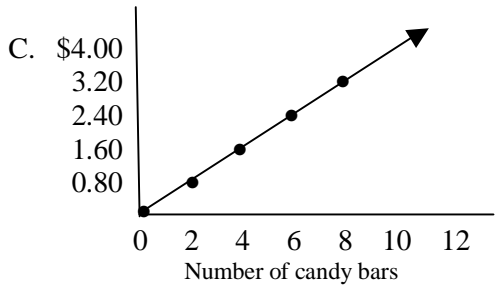
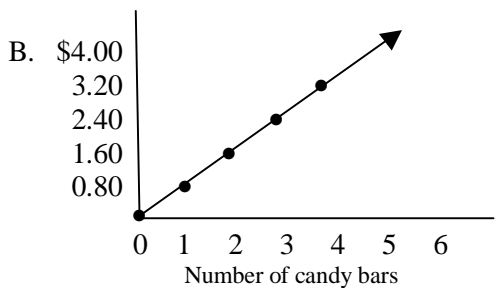
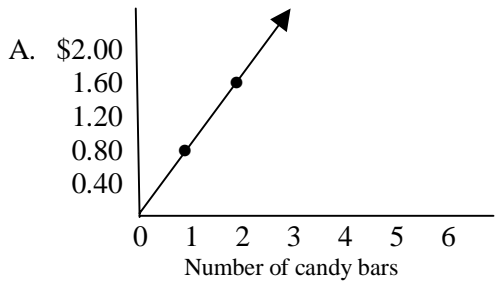


57. Determine the linear equation that would represent the line going through each of the coordinates in the table.

- A. $y = -3x + 2$
- B. $y = -2x + 5$
- C. $y = x + 2$
- D. $y = x - 14$

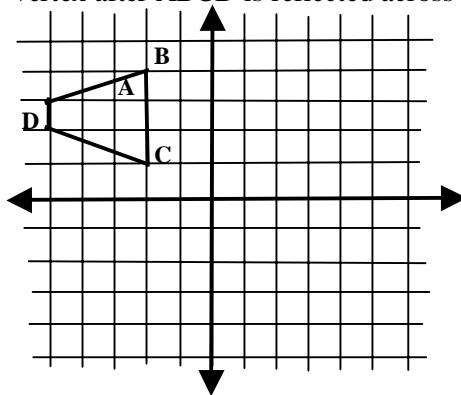
x	y
-3	11
-2	8
0	2
2	-4
4	-10

58. Gerry drew a line graph to visualize the cost of buying candy bars for all his buddies. If the candy bars sell for 40 cents each, which graph most accurately matches Gerry's cost?



59. Determine the location of the “A” vertex after ABCD is reflected across the y-axis, then reflected across the x-axis.

- A. (2, -3)
- B. (2, -2)
- C. (5, -2)
- D. (5, -3)



60. Select the table that best matches the ordered pair to this linear equation: $y = \frac{3}{2}x + 2$

A.

x	y
-6	-11
-2	-5
2	5
6	11

B.

x	y
-6	-7
-2	-1
2	5
6	11

C.

x	y
-4	-10
-2	-4
2	8
6	20

D.

x	y
-7	-6
-1	-2
5	2
11	6

Paraprofessional Assessment Mathematics Study Guide Answer Key

- | | | | |
|-------|--------------------------|-------|--------------------------|
| 1. B | Calculations/Estimations | 31. A | Algebraic Relationships |
| 2. C | Statistics/Probability | 32. D | Algebraic Relationships |
| 3. B | Measurement | 33. A | Algebraic Relationships |
| 4. C | Statistics/Probability | 34. C | Statistics/Probability |
| 5. C | Calculations/Estimations | 35. B | Geometry |
| 6. D | Measurement | 36. B | Measurement |
| 7. B | Measurement | 37. B | Measurement |
| 8. B | Calculations/Estimations | 38. C | Statistics/Probability |
| 9. D | Calculations/Estimations | 39. A | Statistics/Probability |
| 10. B | Calculations/Estimations | 40. A | Calculations/Estimations |
| 11. B | Geometry | 41. A | Statistics/Probability |
| 12. D | Calculations/Estimations | 42. B | Statistics/Probability |
| 13. C | Algebraic Relationships | 43. B | Statistics/Probability |
| 14. D | Statistics/Probability | 44. D | Geometry |
| 15. C | Measurement | 45. C | Geometry |
| 16. B | Calculations/Estimations | 46. C | Measurement |
| 17. D | Statistics/Probability | 47. B | Algebraic Relationships |
| 18. C | Geometry | 48. D | Geometry |
| 19. D | Calculations/Estimations | 49. C | Statistics/Probability |
| 20. A | Algebraic Relationships | 50. A | Geometry |
| 21. D | Measurement | 51. D | Geometry |
| 22. B | Measurement | 52. D | Geometry |
| 23. C | Measurement | 53. A | Algebraic Relationships |
| 24. D | Statistics/Probability | 54. A | Algebraic Relationships |
| 25. B | Measurement | 55. D | Geometry |
| 26. A | Measurement | 56. C | Geometry |
| 27. A | Calculations/Estimations | 57. A | Algebraic Relationships |
| 28. B | Calculations/Estimations | 58. C | Algebraic Relationships |
| 29. D | Algebraic Relationships | 59. D | Geometry |
| 30. D | Calculations/Estimations | 60. B | Algebraic Relationships |

Math Resources on the Web

Vocabulary Definitions:

Math Vocabulary/SK Online

<http://skonline.salkeiz.k12.or.us/mathonline/mathvocab.htm>

Oregon Department of Education (Mathematics Glossary)

<http://www.ode.state.or.us/cifs/mathematics/glossary.doc>

Harcourt Animated Math Glossary

http://www.harcourtschool.com/glossary/math2/index_temp.html

General Resources:

Oregon Department of Education

<http://www.ode.state.or.us/>

The Oregon Public Education Network (O.P.E.N.)

<http://www.open.k12.or.us/>

The Oregon Council of Teachers of Mathematics (OCTM)

Cool Math Links:

<http://www.octm.org/mathlinks.html>

Fun Help Sites:

Cool Math

<http://www.coolmath4kids.com/>

Hotmath.com, help on homework

<http://www.hotmath.org/>

The Math Forum - Ask Dr. Math

<http://mathforum.org/dr.math/dr-math.html>

Tutorial:

Math Tutorial for all levels in all strands

<http://www.math.com>

Internet Resources for Algebra

<http://www.purplemath.com/internet.htm>

Curriculum Office has math books available for checkout. Contact Sue Hunt, 503-399-3075 or books will be available to check out at the math study sessions.

A Glossary of Mathematical Terms Common to School Curriculum

Absolute value: The distance a number is from zero on a number line. The absolute value of -4 is 4 ; the absolute value of 4 is 4 .

Arithmetic sequence: A sequence of terms having a common difference, i.e. $\{2,5,8,11,14, \dots\}$.

Bisector: A segment, ray, or line that divides a segment or angle into two congruent halves.

Box-and-whisker plot: A method for displaying the median, quartiles, and extremes of a set of data, using a number line.

Constructing a box-and-whisker plot:

The data: Math test scores 80, 75, 90, 95, 65, 65, 80, 85, 70, 100

<p>Write the data in numerical order and find the first quartile, the median, the third quartile, the smallest value and the largest value.</p> <p>median = 80 first quartile = 70 third quartile = 90 smallest value = 65 largest value = 100</p>	<p>median of all data, second quartile</p> <p>65, 65, 70, 75, 80, 80, 85, 90, 95, 100</p> <p>median of lower part, first quartile median of upper part, third quartile</p>
<p>Place a circle beneath each of these values on a number line.</p>	
<p>Draw a box with ends through the points for the first and third quartiles. Then draw a vertical line through the box at the median point. Now, draw the whiskers (or lines) from each end of the box to the smallest and largest values.</p>	

Circumference: The distance around a circle.

Combinations: Arrangements or listings where order is not important.

Complementary angles: Two angles with measures whose sum is 90 degrees.

Composite number: An integer that is divisible by more than two integers, 1 and itself.

Coordinate plane (graph): A graph with two perpendicular number lines that intersect at their zero points forming a coordinate system.

Dependent event: Two or more events in which the outcome of one event does affect the outcome of the other event(s).

Diagonals: A line segment that connects two non-adjacent vertices in a polygon.

Distributive property: The sum or difference of two terms multiplied by a number is the sum or difference of the product of each term and the number.

$$a(b+c) = ab + ac \quad \text{or} \quad a(b-c) = ab - ac$$

Equilateral triangle: A triangle that has three congruent sides and angles.

Expanded notation: A way of representing a number that shows the sum of each digit multiplied by the positive power of ten and the digit, e.g. $3452 = 3(1000) + 4(100) + 5(10) + 2(1)$.

Experimental probability: Expressed as a ratio, the result of an experiment that shows the number of times an expected outcome occurred compared to the number of times the experiment was performed.

Geometric sequence: An ordered list of numbers that have a common ratio between each number, e.g. $\{2, 6, 18, 54, 162, \dots\}$.

Independent event: Two or more events in which the outcome of one event does NOT affect the outcome of the other event(s).

Integer: A number that is either a whole number or the opposite of a whole number, i.e. $\{\dots -3, -2, -1, 0, 1, 2, 3, \dots\}$.

Isosceles triangle: A triangle with two congruent sides and angles.

Line graph: A set of data points on a coordinate graph with consecutive points connected by line segments.

Line of symmetry: A fold line on a figure that shows symmetry. Some figures can be folded in more than one way, others not at all.

Line plot: A number line with dots or other marks above it to show the number of times an event occurs.

Ordered pairs: A pair of numbers where order is important (x, y). The first number (x) represents the horizontal placement, the second number (y) represents the vertical placement.

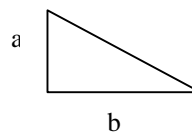
Permutations: An arrangement or listing of objects in which order is important.

Perpendicular lines/segments: Two lines or segments that intersect to form right angles (90 degrees).

Proportion: An equation that states that two ratios are equivalent, e.g. $4/8 = 10/20$.

Pythagorean theorem: In a right triangle, the square of the hypotenuse (longest side) is equal to the sum of the squares of the legs (the two sides that form the right angle.)

$$a^2 + b^2 = c^2$$



Reflections: A mirror image of a figure across a line of symmetry.

Rotations: A type of transformation that turns a figure about a fixed point, called the center of rotation.

Rotational symmetry: A figure has rotational symmetry if it is identical after being rotated on an axis up to 180 degrees.

Scalene triangle: A triangle with no congruent sides.

Scatter plot: Two sets of data plotted as ordered pairs on a coordinate graph.

Scientific notation: A way of expressing numbers as the product of a number that is at least 1, but less than 10, and a power of 10. In scientific notation $4,500,000 = 4.5 \times 10^6$

Slope of line: The ratio of the rise (vertical movement) to the run (horizontal movement) of any two distinct points on the line. Lines moving up have positive slope. Lines moving downward (left to right) have negative slope.

Stem-and-leaf plot: A table utilizing digits of a number where the greatest place value is the stem, the next greatest place value is the leaf. For example, this group of data is placed in a table form: 23, 31, 31, 33, 34, 35, 44, 44, 45, 47, 48, 50

2	3
3	1 1 3 4
4	4 4 5 7 8
5	0

Supplementary angles: Two angles with measures whose sum is 180 degrees.

Symmetry: A correspondence in size, form and arrangement of parts on opposite sides of a plane, line, or point.

Transformation: Movements of geometric figures. Reflections, rotations, translations, and dilations are particular examples of transformations.

Translation: A type of transformation that moves the figure in one direction (it slides.)

Vertex / vertices: The point(s) where lines, rays, or line segments, originate and form an angle.