Junior High Math League

Sample Questions by Meet and Topic

Meet 1:

1.1 Common Factors and Multiples
1.2 Evaluating Expressions
1.3 Manipulating Fractions and Decimals
1.4 Understanding Ratios
1.5 Translating Verbal Statements
1.6 Area and Perimeter of 2-D Shapes
1.7 The Coordinate Plane
1.8 Measures of Central Tendency
1.9 Logic Problems

(All sample questions were taken from previous JH Math League meets. Please contact Bill Theisen at btheisen@isd2899.k12.mn.us with any questions regarding the sample questions and answers.)

1.1 Common Factors and Multiples - Questions

1) List all prime numbers between 160 and 170.

2) Which integers between 50 and 60 are prime?

3) What is the greatest common factor between 78 and 84?

4) How many factors does 180 have?

5) Factor 2100 into primes of the appropriate power.

6) If a number is divisible by 12, it must also be divisible by what other integers, other than 1 and itself?

7) Factor 456 into primes of the appropriate power.

1.1 Common Factors and Multiples - Answers

1) List all prime numbers between 160 and 170.

   163, 167

2) Which integers between 50 and 60 are prime?

   53, 59

3) What is the greatest common factor between 78 and 84?

   6

4) How many factors does 180 have?

   18

5) Factor 2100 into primes of the appropriate power.

   $2^2 * 3 * 5^2 * 7$

6) If a number is divisible by 12, it must also be divisible by what other integers, other than 1 and itself?

   2, 3, 4, 6

7) Factor 456 into primes of the appropriate power.

   $2^3 * 3 * 19$

1.2 Evaluating Expressions - Questions

1) How many integers are between 2012 and 3000, exclusive (not including 2012 or 3000)?

2) Simplify:

$$7 - 2(-5) + 4(3 + -2)$$

3) Simplify:

$$\frac{-9 + 5}{3 - 4 - -5}$$

4) Mary paid $200 to have a booth at the fair. She spent $46 on supplies and paid an assistant $50. She took in $550. What was her profit?

5) At the fair, Youa bought two drawings at $20 each, coffee for $2, lunch for $12, and a vase for $15. How much did she spend?

6) 4! = ?

7) Write 5040 as one factorial.

8) Solve for r if:

$$\frac{8!}{r!\,(8 - r)!} = 56$$

1.2 Evaluating Expressions - Answers

1) How many integers are between 2012 and 3000, exclusive (not including 2012 or 3000)?

   987

2) Simplify:

   $7 - 2(-5) + 4(3 + -2)$

   21

3) Simplify:

   $$\frac{-9 + 5}{3 - 4 - -5}$$

   -1

4) Mary paid $200 to have a booth at the fair. She spent $46 on supplies and paid an assistant $50. She took in $550. What was her profit?

   $254

5) At the fair, Youa bought two drawings at $20 each, coffee for $2, lunch for $12, and a vase for $15. How much did she spend?

   $69

6) 4! = ?

   24

7) Write 5040 as one factorial.

   7!

8) Solve for r if:

   $$\frac{8!}{r!\,(8 - r)!} = 56$$

   3 or 5

1.3 Manipulating Fractions and Decimals - Questions

1) Write as a decimal:

   $$\frac{2}{5} + \frac{3}{4} \div 10 = ?$$

2) Write 427.6789 to the nearest hundredth.

3) When divided, 1/23 has a repetend (the repeating part of the decimal) of 22 digits. What are the last two digits of the repetend?

4) On a fishing trip the husband caught 52 walleye, 20 northern, and 23 sauger. The wife caught 70 walleye, 15 northern, and 5 sauger. What fraction of the fish were sauger caught by the husband?

5) What fraction of a circle does the hour hand of a clock move through in one minute?

6) On a fishing trip to Canada, a couple caught 163 fish. They caught 110 walleye, 5 northern pike, 6 rock bass, and the rest were perch. They brought home 10 perch. What fraction of the perch caught were brought home (in a reduced fraction)?

7) Simplify:

   $$\frac{4 - -12 - 3}{-5 - 6 + -2}$$

1.3 Manipulating Fractions and Decimals - Answers

1) Write as a decimal:

   $$\frac{2}{5} + \frac{3}{4} \div 10 = ?$$

   0.475

2) Write 427.6789 to the nearest hundredth.

   427.68

3) When divided, 1/23 has a repetend (the repeating part of the decimal) of 22 digits. What are the last two digits of the repetend?

   13

4) On a fishing trip the husband caught 52 walleye, 20 northern, and 23 sauger. The wife caught 70 walleye, 15 northern, and 5 sauger. What fraction of the fish were sauger caught by the husband?

   23/185

5) What fraction of a circle does the hour hand of a clock move through in one minute?

   1/720

6) On a fishing trip to Canada, a couple caught 163 fish. They caught 110 walleye, 5 northern pike, 6 rock bass, and the rest were perch. They brought home 10 perch. What fraction of the perch caught were brought home (in a reduced fraction)?

   10/42 = 5/21

7) Simplify:

   $$\frac{4--12-3}{-5-6+-2}$$

   -1

1.4 Understanding Ratios - Questions

1) A recipe for orange aide calls for 3 cups of orange liquid concentrate to 5 cups of water. What is the ratio of cups of orange liquid concentrate to the total number of cups?

2) Write 140% as a ratio of two relatively prime numbers (simplified improper fraction).

3) There are 45 apple trees and 18 cherry trees in an orchard. Write the ratio of apple trees to cherry trees in lowest terms.

1.4 Understanding Ratios - Answers

1) A recipe for orange aide calls for 3 cups of orange liquid concentrate to 5 cups of water. What is the ratio of cups of orange liquid concentrate to the total number of cups?

   3:8; 3 to 8; 3/8

2) Write 140% as a ratio of two relatively prime numbers (simplified improper fraction).

   7/5

3) There are 45 apple trees and 18 cherry trees in an orchard. Write the ratio of apple trees to cherry trees in lowest terms.

   5:2 (or 5 to 2 or 5/2)

1.5 Translating Verbal Statements - Questions

1) Write the equation for two less than a number, n, is ten.

2) There are p pencils to be put into b school boxes equally. Write an equation for n, the number of pencils in each box.

3) Write the equation for: The product of a number and one more than the number is the number increased by seven hundred seven. Let the number be n.

4) A classroom has d desks. There are half as many tables in the classroom as there are desks. Each desk has 1 chair. Each table has 4 chairs. Write an equation in terms of d to find the number of chairs, c, in the classroom.

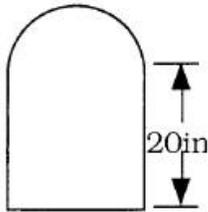5) Translate the verbal statement into an algebraic expression: eight less than three times the sum of n and 12.

1.5 Translating Verbal Statements - Answers

1) Write the equation for two less than a number, *n*, is ten.

   $n - 2 = 10$

2) There are *p* pencils to be put into *b* school boxes equally. Write an equation for *n*, the number of pencils in each box.

   $n = p / b$

3) Write the equation for: The product of a number and one more than the number is the number increased by seven hundred seven. Let the number be *n*.

   $n(n + 1) = n + 707$

4) A classroom has *d* desks. There are half as many tables in the classroom as there are desks. Each desk has 1 chair. Each table has 4 chairs. Write an equation in terms of *d* to find the number of chairs, *c*, in the classroom.

   $c = 3d$

5) Translate the verbal statement into an algebraic expression: eight less than three times the sum of *n* and 12.

   $3(n + 12) - 8$

1.6 Area and Perimeter of 2-D Shapes - Questions

1) What is the perimeter of a rectangle twice as long as it is wide if the long side is 100 inches?

2) If an eight inch pie is cut into eight equal pieces, what is the perimeter of one piece? Answer in terms of π.

3) If the radius of a circle is exactly $\frac{5}{\pi}$ cm, what is the circumference?

4) A 16 in. by 20 in. rectangular window has a semicircle on one of the shorter ends. What is the perimeter in terms of π?

5) What time is it, to the nearest minute, if the angle between the hands on a clock is 35°, the hour hand is between 4 and 5, and the minute hand is between 5 and 6?

6) Lang bakes a sheet cake. He slices the sheet cake into equal-sized isosceles triangular pieces as shown. Lang will store the slices in a 10 inch x 12 inch rectangular container. What is the maximum number of slices Lang can fit into one container without cutting or stacking any slices?

1.6 Area and Perimeter of 2-D Shapes - Answers

1) What is the perimeter of a rectangle twice as long as it is wide if the long side is 100 inches?
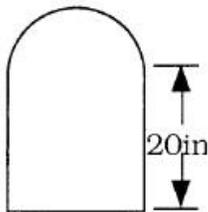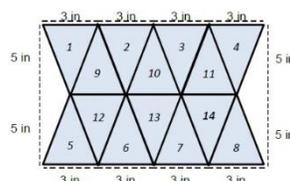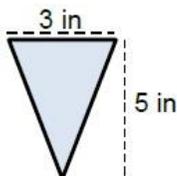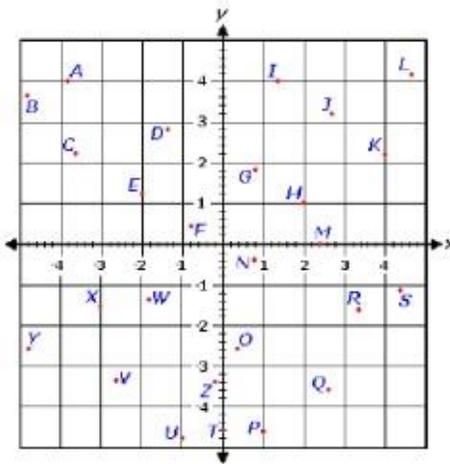
   300 in

2) If an eight inch pie is cut into eight equal pieces, what is the perimeter of one piece? Answer in terms of π.

   8 + π in

3) If the radius of a circle is exactly $\frac{5}{\pi}$ cm, what is the circumference?

   10 cm

4) A 16 in. by 20 in. rectangular window has a semicircle on one of the shorter ends. What is the perimeter in terms of π?

   20in

   56 + 8π in

5) What time is it, to the nearest minute, if the angle between the hands on a clock is 35°, the hour hand is between 4 and 5, and the minute hand is between 5 and 6?

   4:28

6) Lang bakes a sheet cake. He slices the sheet cake into equal-sized isosceles triangular pieces as shown. Lang will store the slices in a 10 inch x 12 inch rectangular container. What is the maximum number of slices Lang can fit into one container without cutting or stacking any slices?
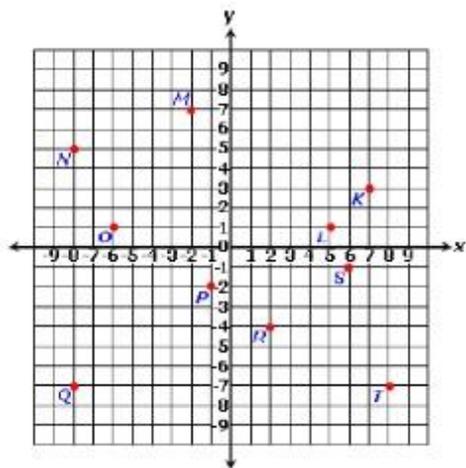

   3 in

   5 in

   14

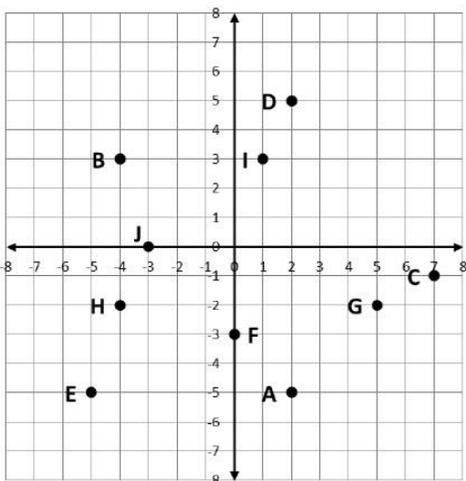# 1.7 Coordinate Plane - Questions

1) What are the coordinates of point *B*?
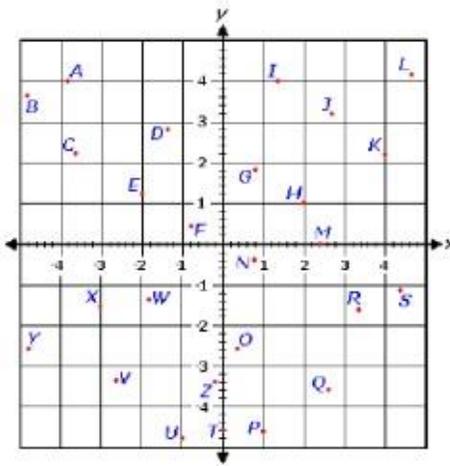

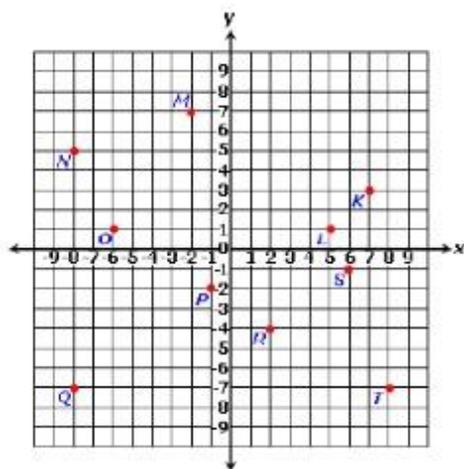2) Which point is at (-8,-7)?

3) What is the area of trapezoid EBIA?

1.7 Coordinate Plane - Answers
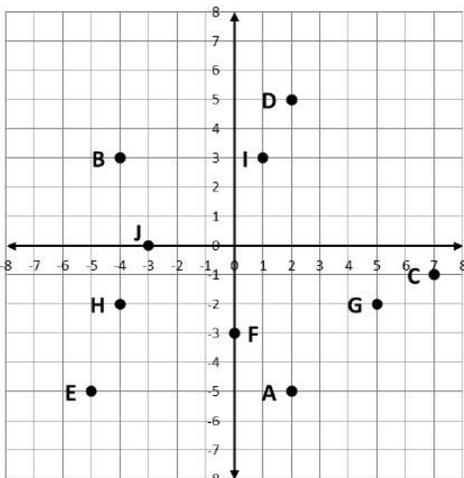
1) What are the coordinates of point *B*?

(-4.8,3.6)

2) Which point is at (-8,-7)?

Q

3) What is the area of trapezoid EBIA?

48 sq. units

1.8 Measures of Central Tendency - Questions

1) If scores of 60, a, 75, a, a, 90 average to 80, what is a?

2) Given: 40, 35, 7, 40, 21, 18, 27.

      a. What is the mode?

      b. What is the median?

3) If the mean, median, mode, and range of a set of data are 45, 45, 41, and 9, respectively, and you add 75 to the data list, which will change the most: mean, median, or mode?

4) Sarah earned scores of 80, 90, and 95 on her first three tests. What does she need to score on her fourth test to average 90?

1.8 Measures of Central Tendency - Answers

1) If scores of 60, a, 75, a, a, 90 average to 80, what is a?

   85

2) Given: 40, 35, 7, 40, 21, 18, 27.

   a. What is the mode?

      40

   b. What is the median?

      27

3) If the mean, median, mode, and range of a set of data are 45, 45, 41, and 9, respectively, and you add 75 to the data list, which will change the most: mean, median, or mode?
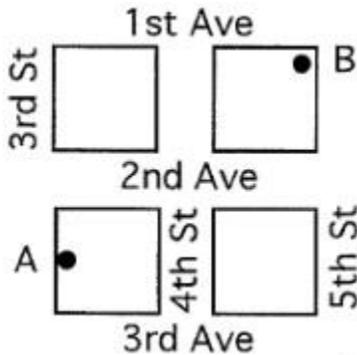
   mean

4) Sarah earned scores of 80, 90, and 95 on her first three tests. What does she need to score on her fourth test to average 90?

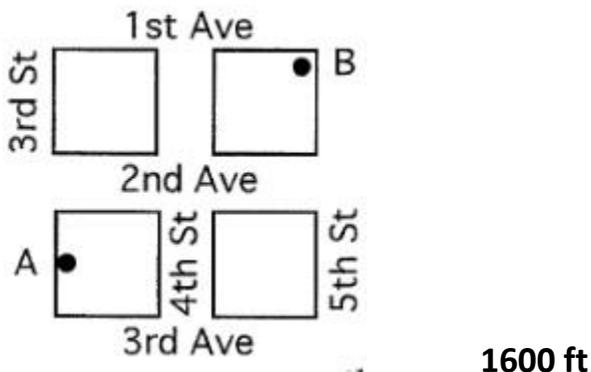   **95**

1.9 Logic Problems - Questions

1) Alice lived on 3rd St., in the middle of the block, on the west side between 2nd Ave. and 3rd Ave. Beth lived at the southwest corner of the intersection of 5th St. and 1st Ave. How far must Alice walk to get to Beth's house? Alice stays on the road and uses the crosswalks and goes the shortest distance. The blocks are 400 feet long, and the streets are 100 feet wide.

2) Jenni needed 144 squares 7 ½ inches on a side to make a quilt. Half were plain fabric, half were flowered fabric. If each roll of fabric is 43 inches wide, what length of plain fabric does she need, to the nearest 1/8 of a yard?

3) Peter walked on a treadmill for 40 minutes. The treadmill was set at a pace equivalent to 3 miles per hour. How many miles Peter walk?

4) Benjamin's robot travels at a pace of 45 meters per minute. How far does his robot travel in 20 seconds?

1.9 Logic Problems - Answers

1) Alice lived on 3rd St., in the middle of the block, on the west side between 2nd Ave. and 3rd Ave. Beth lived at the southwest corner of the intersection of 5th St. and 1st Ave. How far must Alice walk to get to Beth's house? Alice stays on the road and uses the crosswalks and goes the shortest distance. The blocks are 400 feet long, and the streets are 100 feet wide.

1600 ft

2) Jenni needed 144 squares 7 ½ inches on a side to make a quilt. Half were plain fabric, half were flowered fabric. If each roll of fabric is 43 inches wide, what length of plain fabric does she need, to the nearest 1/8 of a yard?

   3 1/8 yards

3) Peter walked on a treadmill for 40 minutes. The treadmill was set at a pace equivalent to 3 miles per hour. How many miles Peter walk?

   2 miles

4) Benjamin's robot travels at a pace of 45 meters per minute. How far does his robot travel in 20 seconds?

   15 meters