**April 2015**

6. The lengths of the legs of a right triangle are 4 miles and 5 miles, respectively. Which of the following lengths, in miles, is closest to that of the hypotenuse of the right triangle?

1. 3.0
2. 4.5
3. 6.4
4. 8.0
5. 8.7

18. In the figure below, (line)AE and (line)BD intersect at C, and (line)AB || (line)DE. Which of the following angles *must* have the same measure as (angle)BAC?

\*\*picture\*\*

1. (angle)ACB
2. (angle)ACD
3. (angle)BCE
4. (angle)CDE
5. (angle)CED

38. Shown in the standard (x,y) coordinate plane below is equilateral triangle (triangle)AOC with coordinates A(a,b), C(4*c*,0), and O(0,0). In terms of *c*, what is *a*? [PICTURE]

F. *c*

G. 2*c*

H. 3*c*

J. 4*c*

K. 6*c*

43. The circle below has a diameter of 8 centimeters. Which of the following is closest to the area, in square centimeters, of the square inscribed in the circle?

\*\*picture\*\*

1. 25
2. 32
3. 50
4. 64
5. 201

**June 2015**

4. In the figure below, (triangle)QRS is equilateral, side (line)QR is bisected by T, and side (line)QS is bisected by U. What is the degree measure of (angle)TUS?

\*\*picture\*\*

1. 60°
2. 90°
3. 120°
4. 135°
5. 150°

16. In the figure below, vertices D and F of (triangle)DEF lie on (line)CG, the measure of (angle)CDE is 148°, and the measure of (angle)EFG is 140°. What is the measure of (angle)DEF?

\*\*picture\*\*

1. 72°
2. 98°
3. 100°
4. 108°
5. 116°

22. In the figure shown below (line)AE || (line)DC, (line)AC, and (line)DE intersect at B, and the given length are in feet. What is the length, in feet, of (line)BC?

\*\*picture\*\*

1. 6
2. 8
3. 9
4. 10
5. 11

**December 2015**

32. In isosceles triangle (triangle)PQR shown below, (line)PQ ≅ (line)QR and the measure of (angle)P is 54°. If it can be determined, what is the measure of (angle)Q?

\*\*picture\*\*

1. 36°
2. 54°
3. 72°
4. 81°
5. Cannot be determined from the given information

37. The midpoint of the sides of rectangle WXYZ are the vertices of rhombus ABCD.. The dimensions of the rectangle WXYZ are 6cm by 8cm. What is the perimeter, in centimeters, of rhombus ABCD?

\*\*picture\*\*

1. 20
2. 25
3. 28
4. 40
5. 48

58. As shown below, (line)BE divides rectangle ACDF into 2 congruent trapezoids. The measure of (angle)BED is 45°. The lengths of (line)BC, (line)CD, and (line)EF are given in feet. What is the area, in the square feet, of rectangle ACDF?

\*\*picture\*\*

1. 10
2. 14
3. 60
4. 72
5. 84

**June 2016**

6. In the figure below, C lies on both (line) and (line)BD, (line) AB and (line)DE are parallel and congruent, and 2 angle measures are given. What is the measure of (angle)ACB?

\*\*\*picture\*\*\*

1. 55°
2. 57.5°
3. 65°
4. 67.5°
5. 70°

30) The dimensions of equilateral triangle (*triangle)ABC* are given in centimeters in the figure below. What is the value of *y*?

1. 2
2. 5
3. 8
4. 13
5. 16

46. Lindsay is designing a 5-foot-by-8-foot rectangular poster for her art class. She will cover both diagonals of the poster with straight lengths of yellow rope. Which of the following values is closest to the total length, in feet, of the 2 yellow ropes Lindsay will need for the poster?

1. 19
2. 20
3. 23
4. 26
5. 40

**April 2016**

10. The figure below shown lines (arrows <->)AB and (arrows <->)DC, line segments (line)AC and (line)BC, and 2 angle measures. What is the measure of (angle)ACB?

\*\*\*picture\*\*\*

1. 38 1/2°
2. 42°
3. 48°
4. 55°
5. 77°

54. Which of the following lists of numbers could be the side lengths, in inches, of a triangle?

1. 1, 2, 3
2. 2, 5, 7
3. 3, 7, 11
4. 4, 9, 16
5. 5, 8, 10

**December 2016**

2. The statement (triangle)ABC ≅ (triangle) DEF is true. Which of the following statements *must* be true?

1. (line)AB ≅ (line)DF
2. (line)AC ≅ (line)EF
3. (line)BC ≅ (line) DF
4. (angle)A ≅ (angle)F
5. (angle)C ≅ (angle) F

3. In the figure below, C lies on (line)AD, the measure of (angle)BAC is 65°, the measure of (angle)BCD is 100°, and the measure of (angle)ABC is x°.

\*\*\*picture\*\*\*

What is the value of x?

1. 15
2. 25
3. 35
4. 65
5. 80

16. In (triangle)ABC shown below, the measure of (angle)A is 48°, and (line)AB ≅ (line)AC. What is the measure of (angle)C?

\*\*picture\*\*

1. 42°
2. 48°
3. 52°
4. 66°
5. 72°

33. When it was constructed 4,500 years ago, the Great Pyramid in Egypt had a height of 147 meters and contained roughly 2.3 million stone blocks. It is estimated that 5.5 million tons of limestone, 8,000 tons of granite, and 500,000 tons of mortar were used in its construction. In the side view shown below, an ancient observer found the angle of elevation at D to the top of the pyramid to be 39°. The diagonals of the pyramid’s square base, shown below, intersect at C.

\*\*\*picture\*\*\*

The perimeter of the pyramid’s base was 920 meters when construction was completed. At that time, which of the following values is closest to the length, in meters, of each diagonal of the base?

1. 30
2. 40
3. 230
4. 320
5. 650

35. In (triangle)ABC, AB = 6cm, AC = 12cm, m(angle)A = 60°, and (line)AC is the longest side. Which of the following statements about the measures of the angles in (triangle)ABC *must* be true? (Note: m(angle)X denotes the measure of angle X).

1. m(angle)A = m(angle)B = m(angle)C
2. m(angle)B > m(angle)A > m(angle)C
3. m(angle)B = m(angle)C > m(angle)A
4. m(angle)B > m(angle)C = m(angle)A
5. m(angle)C > m(angle)A > m(angle)B

**June 2017**

28. Jamie claims, “If a triangle is in Set A, then it is not isosceles.” Later, Jamie discovers that (triangle)MNP is a counterexample proving this claim false. Which of the following statements *must* be true about (triangle)MNP?

F. It is isosceles and in Set A.

G. It is scalene and in Set A.

H. It is obtuse and not in Set A.

J. It is scalene and not in Set A.

K. It is isosceles and not in Set A.

48. The side lengths of a certain triangle are 4, 5, and 7 centimeters. Which of the following descriptions best classifies this triangle?

1. Scalene acute
2. Scalene right
3. Scalene obtuse
4. Isosceles obtuse
5. Isosceles right

**April 2017**

20. In (triangle)DEF, the length of (line)DE is (rad)30 inches, and the length of (line)EF is 3 inches. If it can be determined, what is the length, in inches, of (line)DF?

F. 3

G. (rad)30

H. (rad)33

J. (rad)39

K. Cannot be determined from the given information