1. Select the list below for which the values are listed in order from least to greatest.

   a. Additive identity, 50% of 1, two-thirds of 7/8, reciprocal of 7/8, the first prime number
   b. 50% of 1, two-thirds of 7/8, additive identity, reciprocal of 7/8, the first prime number
   c. Additive identity, 50% of 1, reciprocal of 7/8, two-thirds of 7/8, the first prime number
   d. Additive identity, 50% of 1, two-thirds of 7/8, the first prime number, reciprocal of 7/8
   e. None of the above are in order from smallest to largest.

2. Evaluate $\dfrac{-1.5 - 2.3}{\sqrt{5} - 2}$. Round to the nearest hundredth.

   a. -16.10
   b. -4.53
   c. $-.2.19$
   d. -11.24
   e. -3.7

3. Select the pair of numbers that are closest to each other on the number line.

   a. $\dfrac{1}{2}$ and $\dfrac{7}{8}$
   b. π and $\sqrt{2}$
   c. $^-2$ and $^-2\dfrac{1}{2}$
   d. $\dfrac{^-1}{2}$ and $\dfrac{1}{4}$
   e. $\dfrac{^-3}{4}$ and $\dfrac{1}{16}$

4. A blueprint has a scale of 2 inches representing 45 ft. How long is a side of a building represented by $2\dfrac{1}{2}$ inches?

   a. 60.25 feet
   b. 56.25 feet
   c. 9 feet
   d. 225 feet
   e. 112.5 feet

5. If the rectangle shown here represents $\frac{2}{3}$, which picture below best represents 3?

    a.

    b.

    c.

    d.

    e.

6. A 1-inch stack of $100 bills contains about 250 bills. In 1995 the federal debt was approximately 5 trillion dollars. If the entire debt were converted into a stack of $100 bills, how many feet high would it be? (Round to the nearest hundredth of a foot.)

    a. 104.17 feet
    b. 166,666.67 feet
    c. 16,666,666.67 feet
    d. 200,000,000 feet
    e. $1.67 \cdot 10^{16}$ feet

7. A square inch is what percentage of a square foot?

    a. $0.0069\overline{4}\%$
    b. $0.069\overline{4}\%$
    c. $0.69\overline{4}\%$
    d. $0.08\overline{3}\%$
    e. $.8\overline{3}\%$

8. The Carmack and Regal cinemas start movies at 7:15 p.m. The movie showing at the Carmack lasts 2 hours and the movie at the Regal lasts one hour and 45 minutes. If the movies run continuously, when will the movies start at the same time again?

    a. 6:45 a.m.
    b. 7:15 a.m.
   c. 7:45 a.m.
    d. 9:15 a.m.
    e. 9:45 a.m.

9. The price of an item increased by 120% after 5 years to $1000. What was the original price? Round to the nearest penny.

    a. $454.55
    b. $471.703
    c. $833.33
    d. $880.00
    e. $892.86

10. What is the 25th digit in the decimal representation of 1/13?

    a. 7
    b. 9
    c. 2
    d. 3
    e. 0

11. Suppose x and y are real numbers, x is positive and $y = {}^-x$. Which of the following statements is false?

    a. $x + y = 0$
    b. $x\,y < 0$
    c. $xy^2 > 0$
    d. $x^2y > 0$
    e. $x - y > 0$

12. How many integers are there between 6×10^{98} and 5×10^{100} (not counting 6×10^{98} and 5×10^{100})?

    a. $4.94 \times 10^{100} - 1$
    b. $4.94 \times 10^{99} - 1$
    c. $4.94 \times 10^{98} - 1$
    d. $4.4 \times 10^{100} - 1$
    e. $4.4 \times 10^{99} - 1$

13. A banquet hall has capacity of 400 persons--including both diners and servers. Each server can attend to at most 12 diners. (For example, 24 people would require two servers, but 25 people would need three servers.) What is the maximum number of diners that can be served in the banquet hall?

    a. 366
    b. 367
    c. 368
    d. 369
    e. 370

14. We have $36\frac{3}{4}$ yards of material available to make flags. Each flag requires 5/8 yard of material. When as many flags as possible have been made, how much material will be left over?

    a. $\frac{1}{5}$ yard

    b. $\frac{1}{2}$ yard

    c. $\frac{3}{8}$ yard

    d. $\frac{4}{5}$ yard

    e. $\frac{7}{8}$ yard

15. Mr. Dean averages 55 miles per hour for the first 10 miles of his trip and then gets on the interstate and averages 70 miles per hour for the next 30 miles. What was his average speed in miles per hour for the entire 40-mile trip (to the nearest tenth mph).

    a. 61.5 mph
    b. 62.5 mph
    c. 63.5 mph
    d. 64.5 mph
    e. 65.5 mph

16. What is the sum of all solutions of $|2x - 4| = 17$?

    a. 10.5
    b. 0
    c. 21
    d. 17
    e. 4

17. The mean of a list of twelve numbers is exactly 4.9. If two new numbers are added to the list, the mean is 5.8. What is the mean of the two new numbers?

    a. 0.8
    b. 5.7
    c. 6.6
    d. 0.4
    e. 11.2

18. Electrical resistance in a wire is directly proportional to its length and inversely proportional to the square of its diameter. If a 10 cm long wire with diameter 2 cm has a resistance 600 ohms, a 15 cm long wire with diameter 5 cm has resistance

    a. 144 ohms
    b. 2500 ohms
    c. 1200 ohms
    d. 1000 ohms
    e. 360 ohms

19. Sue has 40 dimes, nickels, and quarters worth $5.90. If the quarters were dimes, the dimes nickels, and the nickels quarters, the coins would be worth $5.45. How many nickels does Sue have?

    a. 9
    b. 10
    c. 11
    d. 13
    e. 15

20. It is recommended that all people above the age of six should drink six cups of water a day. If there are 5.4 million people in Tennessee and 90% of them are above the age of six, how many gallons of water should be drunk daily by Tennesseans above the age of six?

    a. 4,860,000 gallons
    b. 1,822,500 gallons
    c. 1,350,000 gallons
    d. 925,000 gallons
    e. 486,000 gallons

21. Jan wanted to make a cylinder 8 centimeters tall whose bases were 10 centimeters in diameter. She decided to cut out 2 circles for the bases and a rectangle to make the lateral surface of the cylinder. There would be no gaps or overlaps and she would use tape to connect all the edges. What should be the dimensions (to the nearest millimeter) of the rectangle?

    a. 8 mm by 20 mm
    b. 80 mm by 200 mm
    c. 80 mm by 3142 mm
   d. 80 mm by 314 mm
    e. 80 mm by 31 mm

22. Jake and Trevor ate some brownies from a large pan. Each brownie was the same size. Jake ate one fourth of all the brownies. Shane ate one fifth of all the brownies. Together they ate 18 brownies. How many brownies were in the pan to begin with?

    a. 20 brownies
    b. 28 brownies
    c. 40 brownies
    d. 60 brownies
    e. 80 brownies

23. Stephanie used a 25% off coupon at JC Penny. Her discounted purchase was $72 (not including sales tax). How much would the purchase have cost (excluding tax) if she had not used the coupon?

    a. $90
    b. $92
    c. $94
    d. $96
    e. $98

24. Reserved seating tickets for a ball game costs $9. General admission tickets cost $5. The ratio of general admission tickets sold to reserved seating tickets sold was 3:1. If the value of all the tickets sold was $2,160, how many tickets were sold altogether?

    a. 154
    b. 300
    c. 360
    d. 400
    e. 420

25. Which statement is true concerning the rectangle and the right triangle whose side lengths are as shown here?
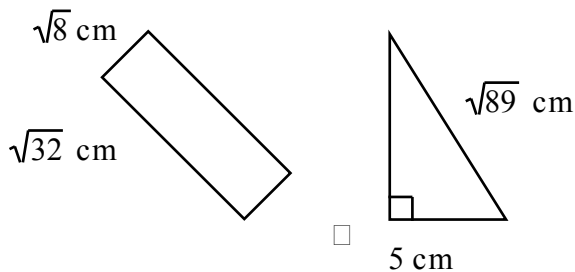
$\sqrt{8}$ cm

$\sqrt{89}$ cm

$\sqrt{32}$ cm

5 cm

    a. The perimeter of the rectangle is greater than the perimeter of the triangle.
    b. It is impossible to determine whether the perimeter of the rectangle is greater than the perimeter of the triangle.
    c. The area of the triangle is greater than the area of the rectangle.
    d. The area of the rectangle is equal to the area of the triangle.
    e. The area of at least one of the figures is irrational.

26. The rectangle shown below is made of various other polygons. Figure D is a rectangle. Figure E is an equilateral triangle. Figure G is an isosceles triangle. The segment that runs from the upper left corner to the bottom right corner of the outer rectangle is a diagonal of that rectangle. What is the measure of the greatest acute angle in Figure A?
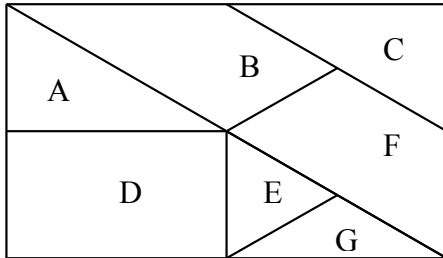
   a. 30°
   b. 60°
   c. 45°
   d. 120°
   e. There is not enough information given to determine the measure of the greatest acute angle in Figure A.

27. Suppose a new triangle $A'B'C'$ is created by adding 2 to each of the x-components of the coordinates of A, B, and C and then subtracting 3 from each of the y-components of A, B, and C. (For example, the coordinates of A' would be (-1, -4).) Which statement would be true about triangle $A'B'C'$?
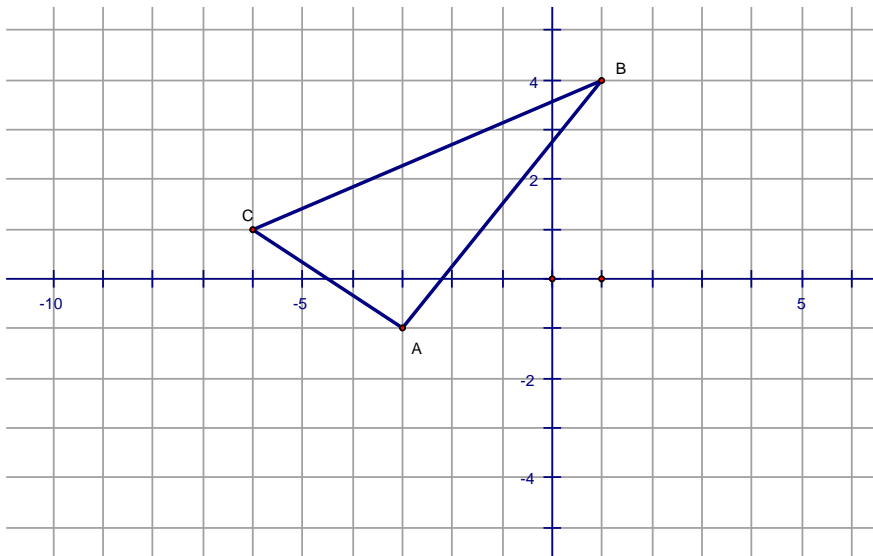
   a. Triangle $A'B'C'$ is a rotation of triangle ABC about the point (2, -3).
   b. Triangle $A'B'C'$ is a reflection of triangle ABC across the line $y = 2x - 3$.
   c. Triangle $A'B'C'$ is a translation of triangle ABC of up 2 units and left 3 units.
   d. Triangle $A'B'C'$ is a glide reflection of triangle ABC.
   e. Triangle $A'B'C'$ is a translation of triangle ABC of right 2 units and down 3 units.

28. Which statement could be false?

    a. A rectangle whose side lengths are 4 cm and 5 cm is similar to a rectangle whose side lengths are 1 cm and 1.25 cm.
    b. A parallelogram whose side lengths are 6 cm and 12 cm is similar to a parallelogram whose side lengths are 18 cm and 36 cm.
    c. All squares are similar to each other.
    d. A triangle whose sides are 3 cm, 4 cm, and 5 cm is similar to a triangle whose sides are 15 cm, 20 cm, and 25 cm.
    e. All triangles with angles of 35˚ and 44˚ are similar.

29. These are the rules for the Difference Game:
    Two people play. Roll two fair dice whose faces are numbered 1-6. Person A wins if the absolute value of the difference between the two numbers rolled is 0, 1, or 2. Person B wins if the absolute value of the difference between the two numbers rolled is 3, 4, or 5.
    Jan and Lynn played the game 10 times. Jan won 8 times and Lynn won twice. Lynn said, "This game is not fair." Which statement is false?

    a. Because Lynn lost 8 out of 10 games, the game must be unfair.
    b. Lynn should not make a decision about the fairness based on only ten repetitions of the game.
    c. It is possible to determine whether the game is fair without playing the game.
    d. It is possible that in the next ten games Lynn could win 8 times and Jan could win twice.
    e. If they played the game 500 times and Jan won two-thirds of the games, the game is probably unfair.

30. CD's FOR ALL and HAPPY MUSIC are two clubs that sells cd's. CD's FOR ALL charges a one-time $10 membership fee and $8 per cd. HAPPY MUSIC does not charge a membership fee but cd's are $11 each. If the information for each club is graphed with the number of cd's bought on the x-axis and total cost on the y-axis, which statement would be true?

    a. The slope of HAPPY MUSIC would be greater than the slope of CD's FOR ALL.
    b. The y-intercept for CD's FOR ALL would be the origin.
    c. The y-intercept for HAPPY MUSIC would be (0, 11).
    d. The slope for CD's FOR ALL would be 10.
    e. The y-intercept for CD's FOR ALL for be (0, 8).