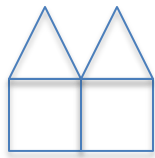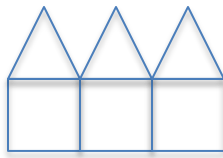1. Find all real solutions to $x^3=27$
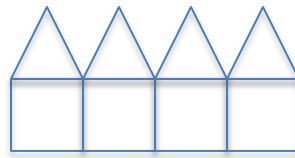
    A. -3
    B. 9
    C. 3
    D. 3 and -3
    E. 5.2

Picture 1   Picture 2   Picture 3

2. Above are 3 pictures in a sequence of pictures. Picture 1 uses 11 toothpicks. I wish to continue to build the pictures in the sequence using toothpicks. What is the first picture that will use at least 1000 toothpicks?

    A. Picture 197
    B. Picture 198
    C. Picture 199
    D. Picture 200
    E. Picture 201

3. When $\dfrac{1}{17}$ is written in decimal form, the decimal

    A. Terminates after 10 decimal places
    B. Terminates after 17 decimal places
    C. Is infinite, but repeats a sequence of digits
    D. Is infinite, and does not repeat a sequence of digits
    E. None of the above

4. Three boards are measured accurately to the nearest millimeter. The measurements are 45 mm, 36 mm, and 51 mm. What is the smallest the sum of the three boards could possibly be?

A. 129 mm
B. 129.5 mm
C. 130 mm
D. 130.5 mm
E. 132 mm

5. A teacher gave a two-page test. The first page was short answer and the last page was multiple choice. The students' names were written on the first page but not on the second. The teacher unstapled the papers to copy them before returning them, but she dropped the stack of papers before she could staple them back. She was able to correctly and confidently put the first and second pages back together on all but four of the papers using clues such as handwriting, choice of writing instrument, grade. On the four remaining papers it is impossible for her to determine which second sheet goes with each first sheet. So she just guesses. What is the probability that she gets all four of the papers matched correctly?

A. $\dfrac{1}{256}$

B. $\dfrac{1}{64}$

C. $\dfrac{1}{24}$

D. $\dfrac{1}{6}$

E. $\dfrac{1}{4}$

6. If $a^{\frac{2}{3}} = b$, and a≠0 and b≠0, then $a^{\frac{-4}{3}} =$

   A. b^{-2}

   B. b^2

   C. $b^{\frac{3}{2}}$

   D. $b^{\frac{-2}{3}}$

   E. $b^{\frac{-1}{2}}$

7. When three die are rolled, what is the probability that the sum is prime?

   A. $\frac{65}{216}$

   B. $\frac{73}{216}$

   C. 0

   D. 37.5%

   E. 25%

8. Larry and Moe walk to school at a constant rate. It takes Larry 20 minutes to get to school and it takes Moe 25 minutes. Moe gets a 2 minute head start on Larry. Which of the following statements is true?

   A. Larry will not catch Moe.
   B. Larry will catch Moe 10 minutes after Moe starts.
   C. Larry will catch Moe 10 minutes after Larry starts.
   D. Larry will catch Moe 12 minutes after Moe starts.
   E. Larry will catch Moe 14 minutes after Moe starts.

9. A car got 33 miles per gallon using gasoline that cost $2.95 per gallon. Approximately what was the cost, in dollars, of the gasoline used in driving the car 350 miles?

   A. $10
   B. $20
   C. $30
   D. $40
   E. $50

10. A certain jar contains 60 jelly beans — 22 white, 18 green, 11 yellow, 5 red and 4 purple. If a jelly bean is to be chosen at random, what is the probability that the jelly bean will be neither red nor purple?

A. 0.09
B. 0.15
C. 0.54
D. 0.85
E. 0.91

11. Which of the following numbers is farthest from the number 1 on the number line?

A. -59/10
B. -5
C. -49/11
D. 5
E. 60/8

**ANNUAL PERCENT CHANGE IN DOLLAR AMOUNT OF SALES
AT FIVE RETAIL STORES FROM 2010 TO 2012**

Store	Percent Change from 2010 to 2011	Percent Change from 2011 to 2012
P	10	-10

12. If the dollar amount of sales at Store P was $800,000 for 2010, what was the dollar amount of sales at that store for 2012?

A. $727,200
B. $792,000
C. $800,000
D. $880,000
E. $968,000

13. If 25 students in one class had an average of 93% and 20 students from another class had an average of 98%, approximately what is the average in percent of all 45 students?

A. 94
B. 97
C. 95.5
D. 95.2
E. 93

14. A water treatment plant is built with two cylindrical tanks to contain water for a town. Each tank has a radius of 10 feet and a depth of 20 feet. If there are about 7.5 gallons in a cubic foot of water, approximately how many gallons of water can be treated at the plant at any one time?

    A. 6280
    B. 12560
    C. 94200
    D. 2000
    E. 47100

15. What is the area of a circle that is inscribed in a square whose area is 81 square inches?

    A. 81π *square inches*
    B. 18π *square inches*
    C. 9π *square inches*
    D. 20.25π *square inches*
    E. 40.5π *square inches*

16. Being a conscientious driver, Suzy stayed at or below the speed limit while traveling down the interstate. Overall, she went an average rate of 65 mph and it took her 10 hours to complete her journey. If she traveled for 6 of her 10 hours at 70 mph, what constant speed did she go for the remaining 4 hours to obtain the overall 65 mph average?

    A. 65 mph
    B. 60 mph
    C. 57.5 mph
    D. 59.5 mph
    E. 62.5 mph

17. Victor is half as old as Maria. The sum of their ages is 54. How old are they?

    A. Victor is 30 and Maria is 24
    B. Victor is 24 and Maria is 54.
    C. Victor is 9 and Maria is 27.
    D. Victor is 36 and Maria is 18.
    E. Victor is 18 and Maria is 36.

18.

B (0, 12)

C (4, 4)

A (0, 0)
D (3, 0)   E (6, 0)
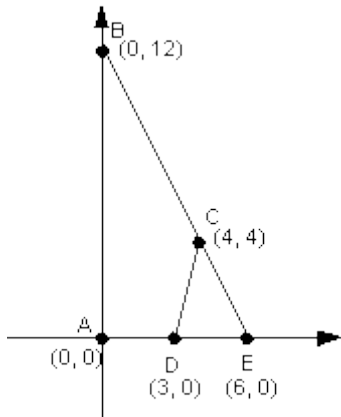
Find the area of the graph above enclosed by figure ABCD.

A. 36 u^2
B. 30 u^2
C. 42 u^2
D. 72 u^2
E. 84 u^2

19. If account codes for a certain company are assigned as follows: two letters and then three one digit numbers, how many different account codes can be made? Assume that letters and digits cannot be repeated.

A. 1,757,600
B. 676,000
C. 260
D. 468,000
E. 18,720

20. The volume of a certain cone is 524 dm^3. What is the volume of a cylinder that has a congruent base and height to the cone?

A. 1572 dm^3
B. 1048 dm^3
C. 524 dm^3
D. 175 dm^3
E. 699 dm^3

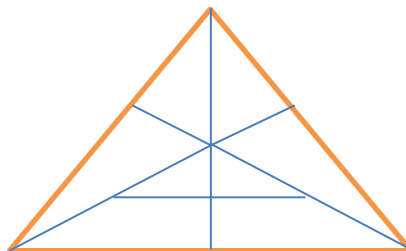21. Find the perimeter of the pentagon shown here. The figure is not necessarily to scale.

3.6cm

5.2 cm

3.4cm

6.48cm
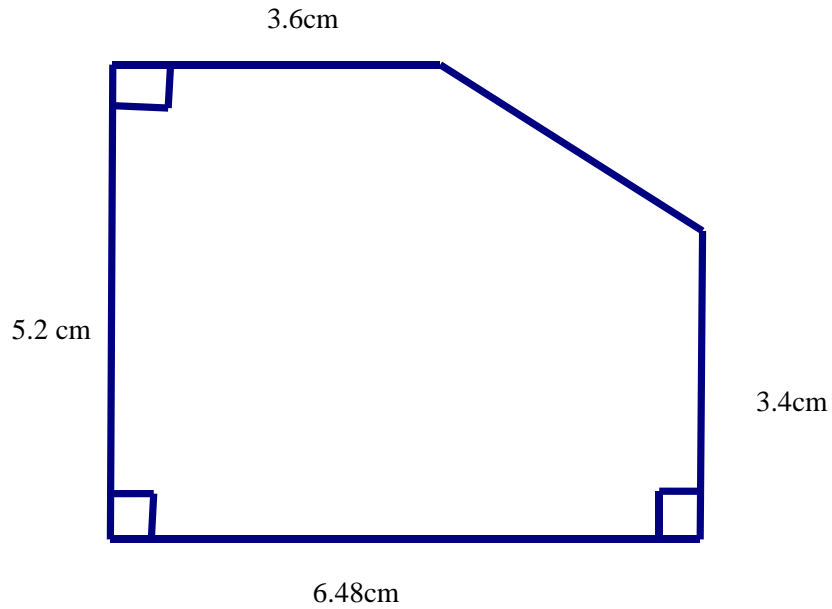
A. 18.68 cm
B. 32.77 cm^2
C. 3.4 cm
D. 23.4 cm
E. 22.1 cm

22. Suppose 4a=5b=7c, where a, b, and c are all positive integers. What is the smallest possible sum of a, b, and c?

A. 16
B. 12
C. 83
D. 3
E. 166

23. How many triangles of any size are shown in the figure below?

A. 8
B. 13
C. 25
D. 19
E. 18

24. Pierre and Marie are two snails that are 9 inches from each other. Pierre approaches Marie at a rate of $1\frac{1}{4}$ inches per minute while Marie inches towards Pierre at a rate of $\frac{5}{8}$ of an inch per minute. How long until they reach one another?

   A. 4 minutes and 8 seconds
   B. 14 minutes and 24 seconds
   C. 7 minutes and 12 seconds
   D. 4 minutes and 48 seconds
   E. 3 minutes and 30 seconds

25. Each year the money in a savings account is 3% more than it was the previous year. The amount in Lillie's account is 1,256.89. What was the balance of her account a year ago?

   A. $1220.28
   B. $1294.60
   C. $41,896.33
   D. $1234.63
   E. $1253.89

26. Ms. Agusto bought 3 hotdogs and 4 sodas for $11. Her friend, Mr. Gupton bought 3 sodas and 5 hot dogs from the same stand for $13.75. How much money would you need if you wanted to buy 1 hotdog and 1 soda from this stand?

   A. $3.50
   B. $4
   C. $2.75
   D. $1.50
   E. $3.25

27. Which transformation could have produced A'B'C' below?
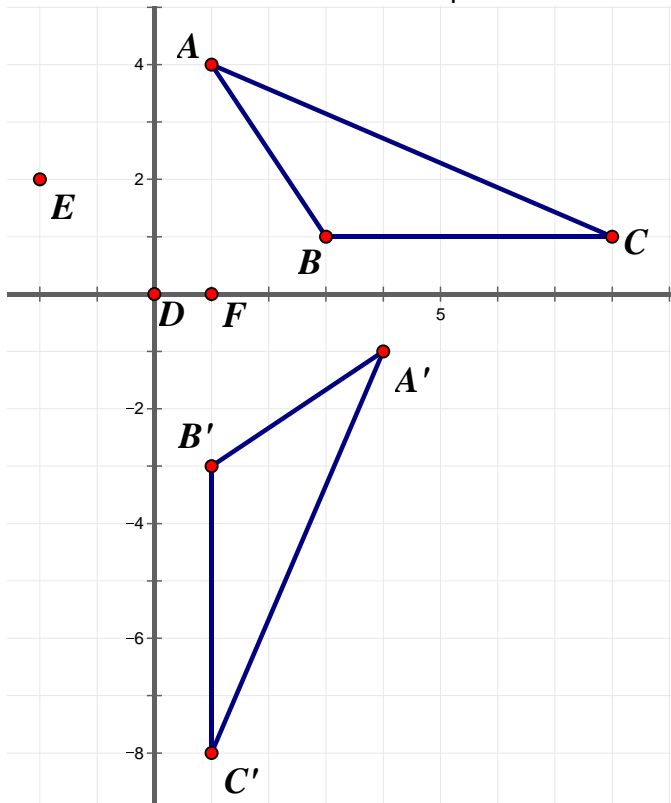

A. A reflection over the x-axis
B. A 90 ° clockwise rotation about point D
C. A 90 ° clockwise rotation about point E
D. A 90 ° clockwise rotation about point F
E. A reflection over the x-axis and then a reflection over the line x=5

28. Lines j and k are parallel below. Find the measure of angle ACB given that the measure of angle ABC is 41 ° and the measure of angle DCA is 56°.
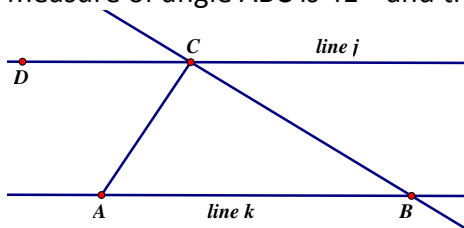
A. 41°
B. 97°
C. 83°
D. 79°
E. There is not enough information to tell.

29. Find the distance between point G and point H on the coordinate plane below.
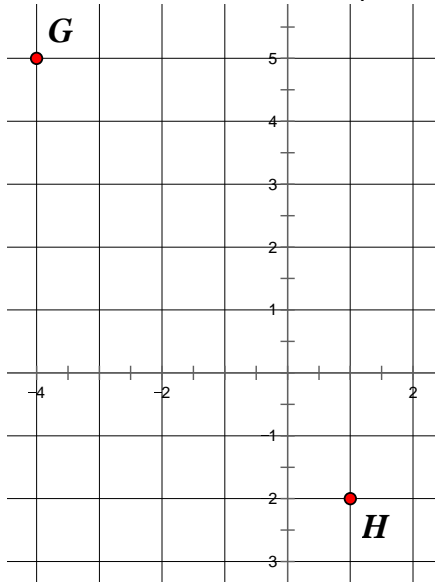
A. 37 units
B. 12 units
C. $\sqrt{12}$ units
D. 74 units
E. $\sqrt{74}$ units

30. Farmer Johnson has a farm with only ducks and pigs. There are 96 animals and those animals have a total of 302 legs. How many ducks are on his farm?

A. 220
B. 82
C. 41
D. 55
E. 62