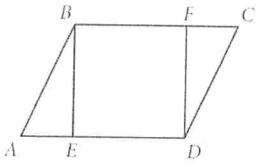
1

6



Note: Figure not drawn to scale.

In the figure shown, $ABCD$ is a parallelogram and $EBFD$ is a square. The area of $ABCD$ is 112 square meters (m^2), and the area of $EBFD$ is 64 m^2. What is the length, in meters, of line segment $\overline{AE}$?

A) 6
B) 8
C) 14
D) 23

2

7

The area of a square is 36 square inches. What is the length, in inches, of a side of the square?

A) 3
B) 6
C) 9
D) 18

3

11

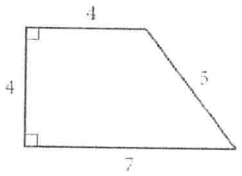
p	4	8	12	20	24
$f(p)$	1	4	9	25	36

For the function f, the table above shows several values of p and their corresponding values of $f(p)$, where $f(p)$ is the area, in square inches, of a square with perimeter p, in inches. Which of the following equations defines f?

A) $f(p) = 16p^2$
B) $f(p) = 4p^2$
C) $f(p) = \frac{p^2}{4}$
D) $f(p) = \frac{p^2}{16}$

4

11

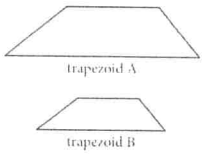


What is the area, in square units, of the figure shown?

A) 20
B) 22
C) 24
D) 28

5

13



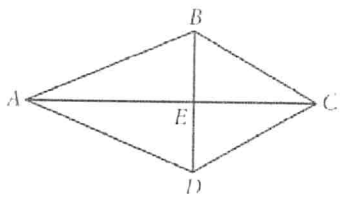
Note: Figures not drawn to scale.

Trapezoid A and trapezoid B shown are similar. The length of each side of trapezoid A is 8 times the length of the corresponding side of trapezoid B. The area of trapezoid A is how many times as large as the area of trapezoid B?

A) 8
B) 16
C) 32
D) 64

6

16

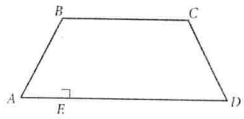


In the figure above, $AB = AD$, $BC = CD$, $BE = 2$, $BC = 4$, and $AC = 10$. What is the area of triangle ABD?

A) $40 - 8\sqrt{3}$
B) $30 - 6\sqrt{3}$
C) $20 - 4\sqrt{3}$
D) $10 - 2\sqrt{3}$

7

18



In quadrilateral $ABCD$ above, BC is parallel to AD, and $AB = CD$. If BC and AD were each doubled and BE was reduced by 50 percent, how would the area of $ABCD$ change?

A) The area of $ABCD$ would be decreased by 50 percent.

B) The area of $ABCD$ would be increased by 50 percent.

C) The area of $ABCD$ would not change.

D) The area of $ABCD$ would be multiplied by 2.

8

19

Kelly enlarged the area of a photograph to 250% of its original size. The original dimensions of the photograph were 5 inches by 7 inches. What is the area of the enlarged photograph, in square inches?

A) 71.25

B) 87.5

C) 218.75

D) 3,000

9

21

The lengths of the sides of a rectangle are a and b, where $a > b$. The sum of the lengths of the two shorter sides and one of the longer sides of the rectangle is 36. What value of a maximizes the area of the rectangle?

A) 9

B) 12

C) 18

D) 24

10

27

A square field measures 10 meters by 10 meters. Ten students each mark off a randomly selected region of the field; each region is square and has side lengths of 1 meter, and no two regions overlap. The students count the earthworms contained in the soil to a depth of 5 centimeters beneath the ground's surface in each region. The results are shown in the table below.

Region	Number of earthworms	Region	Number of earthworms
A	107	F	141
B	147	G	150
C	146	H	154
D	135	I	176
E	149	J	166

Which of the following is a reasonable approximation of the number of earthworms to a depth of 5 centimeters beneath the ground's surface in the entire field?

A) 150

B) 1,500

C) 15,000

D) 150,000

11

27

A rectangle was altered by increasing its length by 10 percent and decreasing its width by p percent. If these alterations decreased the area of the rectangle by 12 percent, what is the value of p ?

A) 12

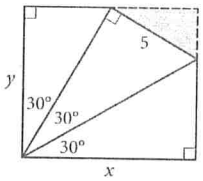
B) 15

C) 20

D) 22

12

28



The figure above shows that the shaded triangular region with a hypotenuse of 5 centimeters (cm) has been removed from a rectangular tile with dimensions x cm by y cm. Of the following, which best approximates the area, in square centimeters, of the tile before the piece was removed?

A) 15

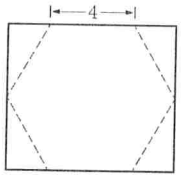
B) 43

C) 50

D) 65

13

29



A) $8\sqrt{3}$

B) $8\sqrt{2}$

C) $4\sqrt{2}$

D) 16

Thomas is making a sign in the shape of a regular hexagon with 4-inch sides, which he will cut out from a rectangular sheet of metal, as shown in the figure above. What is the sum of the areas of the four triangles that will be removed from the rectangle?

14

30

A poster has an area of 432 square inches. The length x, in inches, of the poster is 6 inches longer than the width of the poster. Which of the following equations can be solved to determine the length, in inches, of the poster?

A) $x^2 - 6 = 432$

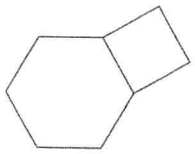
B) $x^2 - 6x = 432$

C) $x^2 + 6 = 432$

D) $x^2 + 6x = 432$

15

30



The figure above shows a regular hexagon with sides of length a and a square with sides of length a. If the area of the hexagon is $384\sqrt{3}$ square inches, what is the area, in square inches, of the square?

A) 256

B) 192

C) $64\sqrt{3}$

D) $16\sqrt{3}$

16

31

The side length of square $ABCD$ is twice the side length of square $EFGH$. If the area of square $EFGH$ is 9, what is the area of square $ABCD$?

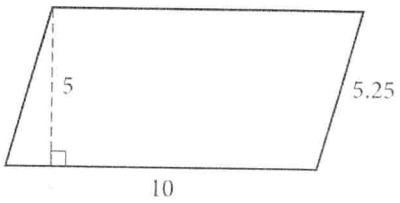
17

35

A landscaper is designing a rectangular garden. The length of the garden is to be 5 feet longer than the width. If the area of the garden will be 104 square feet, what will be the length, in feet, of the garden?

18

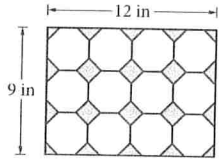
35



The length, in meters, of the sides and the height of a parallelogram are shown in the figure. What is the area, in square meters, of the parallelogram?

19

Carrie, a packaging engineer, is designing a container to hold 12 drinking glasses shaped as regular octagonal prisms. Her initial sketch of the top view of the base of the container is shown above.

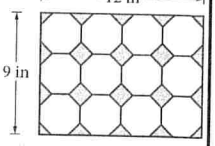


37

If the length and width of the container base in the initial sketch were doubled, at most how many more glasses could the new container hold?

20

Carrie, a packaging engineer, is designing a container to hold 12 drinking glasses shaped as regular octagonal prisms. Her initial sketch of the top view of the base of the container is shown above.

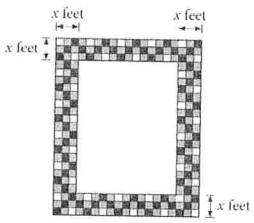


38

Carrie redesigned the container because the initial sketch did not account for cushioning material between the glasses. The area of the base of the newly designed container is 25% greater than the area of the base in the initial sketch. What is the area, in square inches, of the base of the newly designed container?

21

38



Note: Figure not drawn to scale.

The rectangular mirror shown above has width 3 feet and length 5 feet and is surrounded by a mosaic border with a width of x feet. If the area of the mirror with the border is 35 square feet, what is the width x, in feet, of the border?

1 A
2 B
3 D
4 B
5 D
6 C
7 C
8 B
9 C
10 C
11 C
12 D
13 A
14 B
15 A
16 36
17 13
18 50
19 36
20 135
21 1