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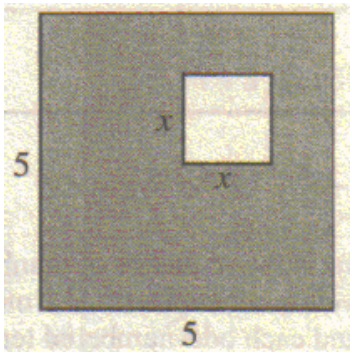
Online Homework

Focused Exercises for Math SAT

Skill Set 21: Shaded Regions

Many of the problems in this exercise set came from The College Board, writers of the SAT exam.

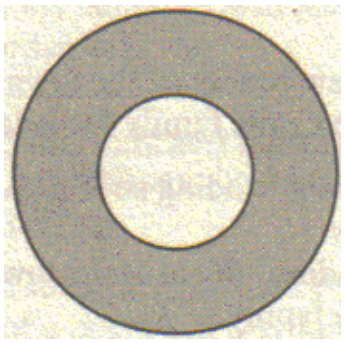
1.



In the figure above, a small square is inside a larger square. What is the area, in terms of x, of the shaded region?

(A) $2x - 10$
(B) $10 - 2x$
(C) $25 - 2x$
(D) $x^2 - 25$
(E) $25 - x^2$

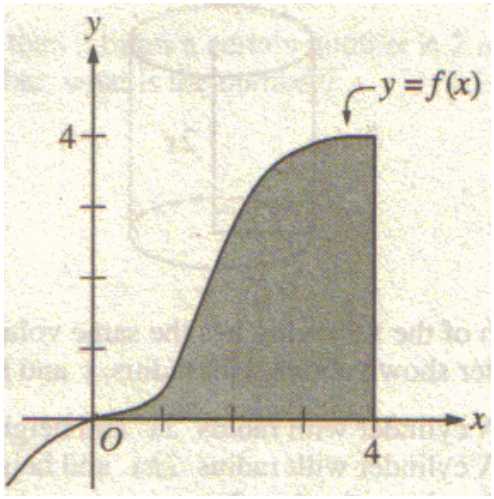
2.



Note: Figure not drawn to scale.

The figure above consists of two circles that have the same center. If the shaded area is 64π square inches and the smaller circle has a radius of 6 inches, what is the radius, in inches, of the larger circle?

3.

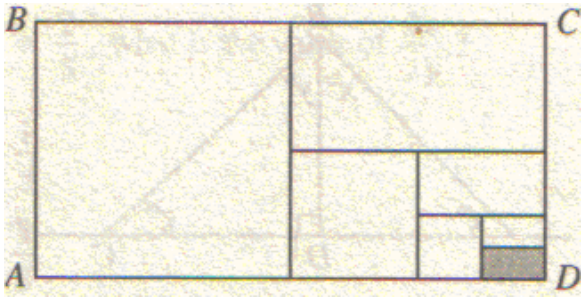


The shaded region in the figure above is bounded by the x-axis, the line $x = 4$, and the graph of $y = f(x)$. If the point (a, b) lies in the shaded region, which of the following must be true?

I. $a \leq 4$
II. $b \leq a$
III. $b \leq f(a)$

(A) I only
(B) III only
(C) I and II only
(D) I and III only
(E) I, II, and III

4.



In the figure above, rectangle *ABCD* is made up of seven non-overlapping rectangles. The two smallest rectangles have the same area. Each of the other rectangles has twice the area of the next smaller rectangle. The area of the shaded rectangle is what fraction of the area of rectangle *ABCD* ?

(A) $\frac{1}{128}$

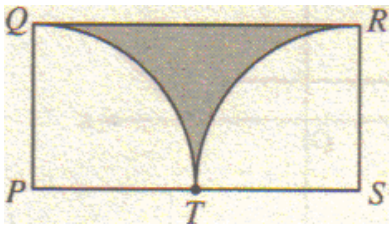
(B) $\frac{1}{64}$

(C) $\frac{1}{32}$

(D) $\frac{1}{16}$

(E) $\frac{1}{7}$

5.



In rectangle *PQRS* above, arcs *QT* and *RT* are quarter circles with centers at *P* and *S*, respectively. If the radius of each quarter circle is 1, what is the area of the shaded region?

(A) $1 - \frac{\pi}{4}$

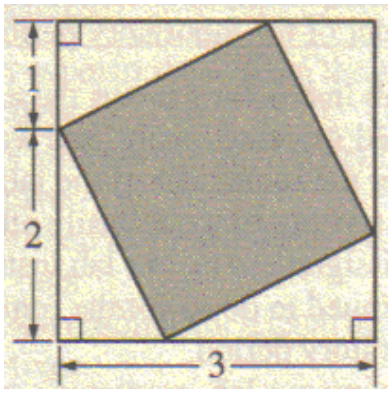
(B) $2 - \frac{\pi}{2}$

(C) $2 - \frac{\pi}{4}$

(D) $\frac{\pi}{4}$

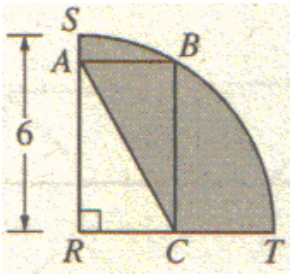
(E) $\frac{2}{3}$

6.



In the figure above, what is the area of the shaded square?

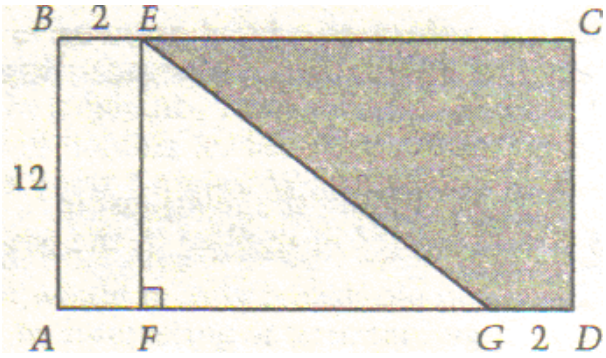
7.



In the figure above, arc *SBT* is one quarter of a circle with center *R* and radius 6. If the length plus the width of rectangle *ABCR* is 8, then the perimeter of the shaded region is

(A) $8 + 3\pi$
(B) $10 + 3\pi$
(C) $14 + 3\pi$
(D) $1 + 6\pi$
(E) $12 + 6\pi$

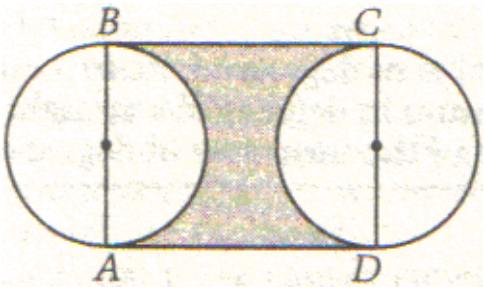
8.



Note: Figure not drawn to scale.

If the area of the shaded region in rectangle *ABCD* above is 90, what is the area of $\triangle EFG$?

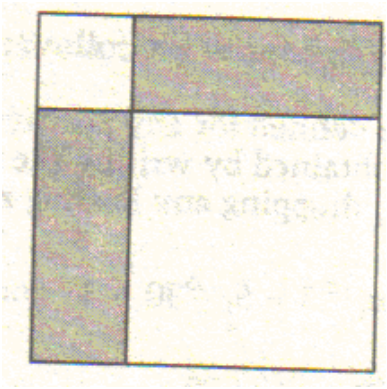
9.



In rectangle *ABCD* shown above, sides *AB* and *CD* pass through the centers of the two circles. If $AB = 12$ and $AD = 16$, what is the area of the shaded region ?

(A) 120
(B) 156
(C) 192
(D) $192 - 36\pi$
(E) $192 - 72\pi$

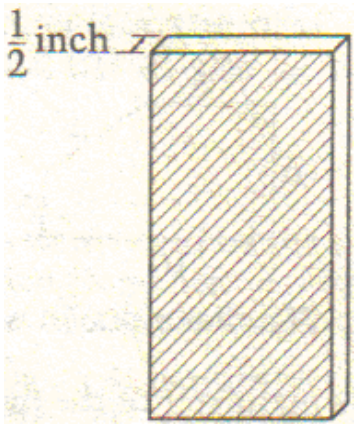
10.



In the figure above, the large square is divided into two smaller squares and two shaded rectangles. If the perimeters of the two smaller squares are 8 and 20, what is the sum of the perimeters of the two shaded rectangles?

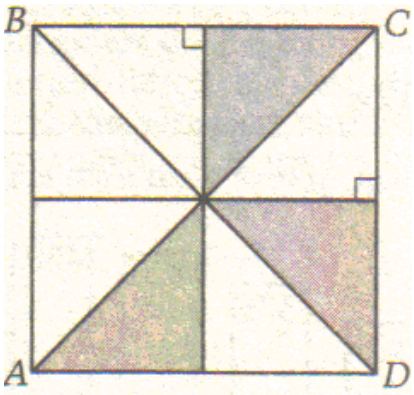
(A) 14
(B) 18
(C) 20
(D) 24
(E) 28

11.



If the volume of the rectangular solid shown above is 64 cubic inches and its depth is $\frac{1}{2}$ inch, what is the area, in square inches, of the shaded face?

12.



In the figure above, *ABCD* is a square. What percent of the square is shaded?

(A) 25%

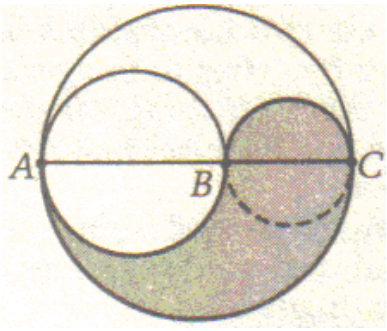
(B) $33\frac{1}{3}\%$

(C) $37\frac{1}{2}\%$

(D) 40%

(E) 50%

13.



Note: Figure not drawn to scale.

AB, *BC*, and *AC* are diameters of the three circles shown above. If *BC* = 2 and *AB* = 2*BC*, what is the area of the shaded region?

(A) 12π

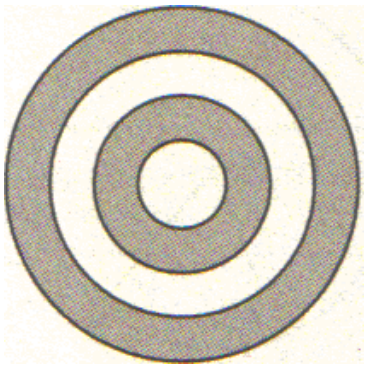
(B) 6π

(C) $\frac{9}{2}\pi$

(D) 3π

(E) 2π

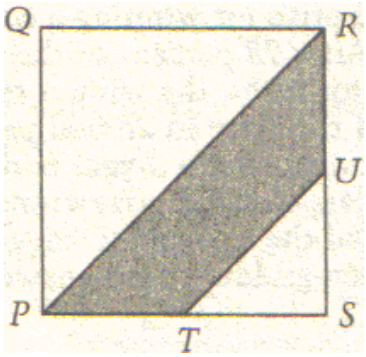
14.



In the figure above, the four circles have the same center and their radii are 1, 2, 3, and 4, respectively. What is the ratio of the area of the small shaded ring to the area of the large shaded ring?

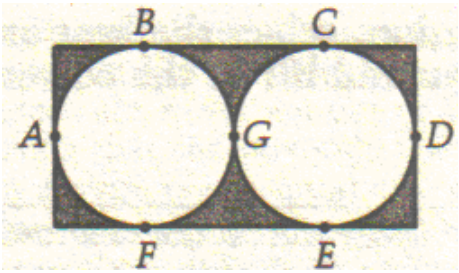
(A) 1:2
(B) 1:4
(C) 3:5
(D) 3:7
(E) 5:7

15.



In square *PQRS* above, *QR* = 1, *RU* = *US*, and *PT* = *TS*. What is the area of the shaded region?

16.



In the figure above, the circles touch each other and touch the sides of the rectangle at the lettered points shown. The radius of each circle is 1. Of the following, which is the best approximation of the area of the shaded region?

(A) 6
(B) 4
(C) 3
(D) 2
(E) 1