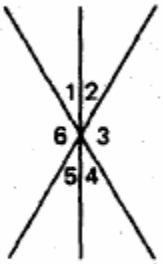
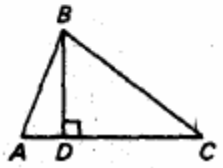
1. The perimeter of a square is $p$ inches. The area of this square is
(A) $p^2$ (B) $16p^2$ (C) $4p$ (D) $\frac{p^2}{16}$ (E) $4p^2$

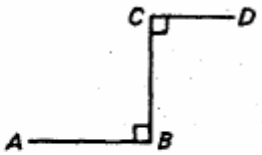
2. $\angle 1 = \angle 5 \stackrel{\circ}{=} 30$
$\angle 3 \stackrel{\circ}{=} ?$
(A) 90 (B) 120
(C) 135 (D) 150
(E) 160




3. In $\triangle ABC$, $BD \perp AC$.
$AB = 13$, $BC = 20$,
$AD = 5$, $DC = ?$
(A) 16 (B) 17 (C) 18
(D) 19 (E) 20

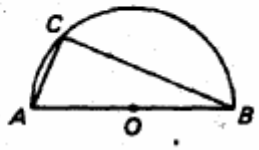



4. $AB \perp BC$, $BC \perp CD$.
$AB = 8$, $BC = 5$, $CD = 4$
What is the shortest distance from $A$ to $D$?
(A) 12 (B) 13 (C) 15
(D) 16 (E) 17

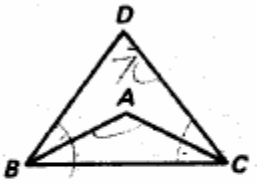



5. One end of a ladder 13 feet long is placed 5 feet from the outer wall of a building that stands on level ground. How far up the building, to the nearest foot, will the ladder reach?
(A) 5 feet (B) 9 feet (C) 12 feet (D) 13 feet
(E) 18 feet

6. $AB$ is a diameter of circle $O$.
$AC = 10$, $CB = 24$. What is the area of circle $O$?
(A) 120 (B) $84.5\pi$
(C) $169\pi$ (D) 240
(E) $100\pi - 240$




7. $AB = AC$, $DB = DC$,
$\angle ABC \stackrel{\circ}{=} \frac{1}{2} \angle DBC$,
$\angle D \stackrel{\circ}{=} 70$. What is the measure of $\angle A$?
(A) 55° (B) 70°
(C) 105° (D) 110°
(E) 125°




8. The diameter of a hoop is 7. How many revolutions will it make if it is rolled a distance of $182\pi$?
(A) 26 (B) $13\pi$ (C) $26\pi$ (D) $30\pi$
(E) $52\pi$

9. A cord 200 inches long can go around a square block 10 times. The area of one side of this square is
(A) 20 square inches (B) 25 square inches
(C) 100 square inches (D) 400 square inches
(E) 500 square inches

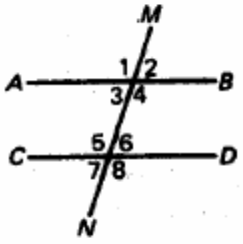
10. In trapezoid $ABCD$, $A$ and $B$ are right angles and $BC$ is longer than $AD$. If $AD = 15$ and the diagonals of the trapezoid are 25 and 17, the length of $AB$ is
(A) 8 (B) 12 (C) 15 (D) 17 (E) 20

11. Find the area of a triangle with coordinates $(-16, 0)$, $(-6, 0)$, $(0, 8)$
(A) 32 (B) 40 (C) 48 (D) 64 (E) 80

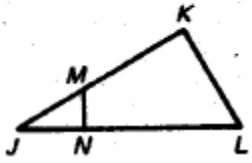
12. A 15-foot seesaw is balanced at its center on a base which is 3 feet high. How many feet above the ground can an end reach?
(A) 5 (B) 6 (C) 9 (D) 10 (E) 15

13. A rectangular lot 50 feet by 100 feet is surrounded on all sides by a concrete walk 5 feet wide. Find the number of square feet in the surface of the walk.
(A) 775 (B) 1500 (C) 1600 (D) 5000
(E) 6600

14. Straight line $MN$ intersects straight lines $AB$ and $CD$ as shown in figure. If $\angle 2 \stackrel{\circ}{=} \angle 6$, and $\angle 4 \stackrel{\circ}{=} 130$, then the measure of $\angle 7 =$
(A) 40° (B) 50°
(C) 60° (D) 90°
(E) 130°

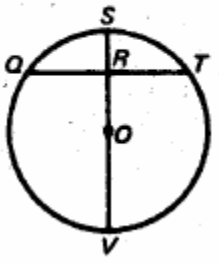



15. $JK$ is perpendicular to $KL$ and $MN$ is perpendicular to $JL$. If $JM$ is 6, $JN$ is 4, and $JL$ is 18, what is $JK$?
(A) $\frac{3}{4}$ (B) 12 (C) 18
(D) 27 (E) none of these




Nicely Phrased

16. Straight line $SROV$ is a diameter of circle $O$. $QRT$ is a 12-inch chord perpendicular to $SROV$, and $RS$ is 3 inches. How many inches is a radius of circle $O$?
(A) 4.5 (B) 6 (C) 7.5
(D) 9 (E) 12



**17.** If the length of a rectangle is $3u + 2v$ and its perimeter is $10u + 6v$, the width is

(A) $2u + v$ (B) $7u + 4v$ (C) $4u + 2v$
(D) $3.5u + 2v$ (E) $2v + u$

**18.** In $\triangle ABC$, $AB \perp BC$, $\angle A \stackrel{\circ}{=} 45$, and $AB = 10$. $(AC)^2$ equals

(A) 10 (B) 20 (C) 100 (D) $2\sqrt{10}$ (E) 200

**19.** The base of an isosceles triangle is 16 and each of the equal sides is 10. Find the area of the triangle.

(A) 24 (B) 36 (C) 48 (D) 80 (E) 96

**20.** A rectangular field 100 feet long is twice as long as it is wide. The number of feet of fencing needed is

(A) 150 (B) 300 (C) 400 (D) 500 (E) 600

**21.** Given right triangles, I, II, III, IV, and V. The following are the lengths of the legs of each triangle: (I) 7 and 4; (II) 12 and 2; (III) 8 and 3; (IV) 6 and 4; (V) 24 and 1. Which of these have the same area?

(A) all of them (B) none of them
(C) only I, II, III, and IV
(D) only II, III, IV, and V
(E) only I, III, IV, and V

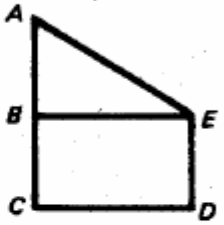
**22.** Four circles each have a radius of $\frac{2}{\pi}$. The sum of the four circumferences is

(A) 4 (B) 8 (C) 16 (D) 24 (E) 32

**23.** What is the average measure of the angles of $\triangle ABC$?

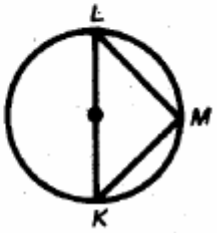
(A) 30° (B) 60° (C) 90° (D) 180°
(E) cannot be determined from the information furnished

**24.** Right $\triangle ABE$ shares side $BE$ with rectangle $BCDE$. $AB = BC = 5$ and $CD = 6$. The area of $\triangle ABE$ is



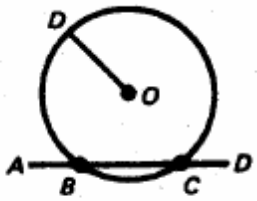

(A) 10 (B) 12.5 (C) 15
(D) 30 (E) 45

**25.** $KL$ is the diameter of a circle whose circumference is $10\pi$. If $KM = ML$, then the area of $KLM$ is



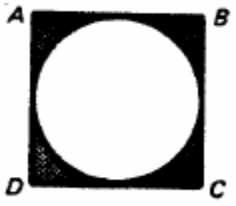

(A) 5 (B) $5\sqrt{2}$
(C) $2\sqrt{5}$ (D) 25
(E) 50

**26.** Straight line $AD$ intersects circle $O$ at $B$ and $C$. $BC$ equals radius $OD$. The measure of the angle formed by drawing radii $OB$ and $OC$ is



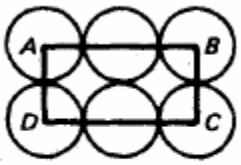

(A) 30° (B) 45°
(C) 60° (D) 90°
(E) 180°

**27.** Side $AB$ of square $ABCD$ is 10 units. The area of the shaded portion is



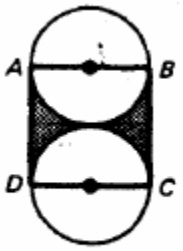

(A) $100 - 25\pi$
(B) $25\pi - 100$
(C) $100 - 100\pi$
(D) $\pi$
(E) $100 - 10\pi$

**28.** Rectangle $ABCD$ is formed by joining the centers of 6 equal circles, each having an area of $4\pi$. The perimeter of $ABCD$ is



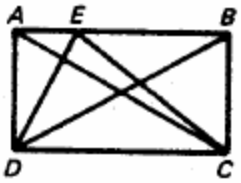

(A) 12 (B) 16 (C) 20
(D) 24 (E) 28

**29.** Diameter $AB$ = diameter $DC = 10$. $AB = AD$ and $DC = BC$. The area of the shaded portion is




(A) $100 - 25\pi$
(B) $25\pi - 100$
(C) $100 - 100\pi$
(D) $\pi$
(E) $25\pi - 100$

**30.** In rectangle $ABCD$ several triangles are drawn. All of the following triangles have identical areas EXCEPT




(A) $ADC$ (B) $EDC$
(C) $ACB$ (D) $AED$
(E) $BCD$

**31.** The distance between a point with coordinates (5, 9) and another point with coordinates (2, 5) is

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

**32.** The area of a circle whose center is at (0, 0) is $25\pi$. This circle passes through all of the following points EXCEPT

(A) $(-5, 0)$ (B) (5, 5) (C) (0, 5) (D) (5, 0)
(E) $(0, -5)$

**33.** The center of square $ABCD$ is located at point $(3, 3)$ and its sides are along the $x$ and $y$ axes. The area of $ABCD$ is

(A) 6 (B) 9 (C) 24 (D) 36 (E) 81

**34.** For right $\triangle ABC$ the coordinates of $A$ are $(3, 5)$ and of $C(-2, -2)$; then the coordinates of $B$ are

(A) $(-2, 3)$ (B) $(3, -2)$ (C) $(-2, -5)$
(D) $(-2, 8)$ (E) $(5, -2)$

**35.** The vertices of rectangle $ABCD$ are the points $A$ $(0, 0)$, $B$ $(8, 0)$, $C$ $(8, k)$ and $D$ $(0, 5)$; $k$ equals

(A) 2 (B) 3 (C) 4 (D) 5 (E) 6

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *1.* D | *5.* C | *9.* B | *13.* C | *17.* A | *21.* D | *24.* C | *27.* A | *30.* D | *33.* D |
| *2.* B | *6.* C | *10.* A | *14.* B | *18.* E | *22.* C | *25.* D | *28.* D | *31.* A | *34.* B |
| *3.* A | *7.* E | *11.* B | *15.* B | *19.* C | *23.* B | *26.* C | *29.* A | *32.* B | *35.* D |
| *4.* B | *8.* A | *12.* B | *16.* C | *20.* B | | | | | |