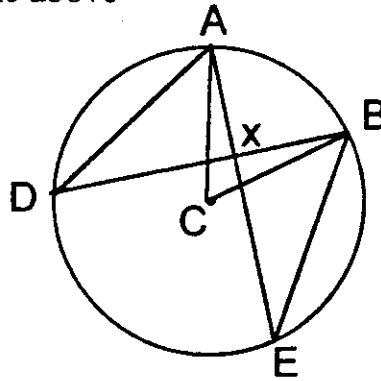
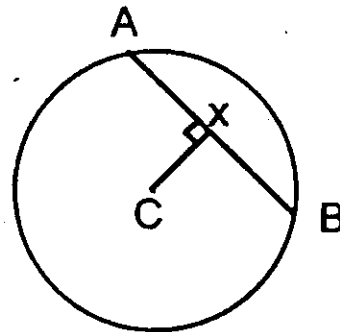


For this test, "NOTA" means "none of the above" answers is correct.



**FIGURE 1**

1. In Figure 1,  $m\angle ACB = 50^\circ$  and  $m\widehat{DE} = 110^\circ$ . C is the center of the circle. Find  $m\angle AXB$ .  
 (A) 25      (B) 55      (C) 80      (D) 100      (E) NOTA



**FIGURE 2**

2. In Figure 2,  $m\widehat{AB} = 120^\circ$ ,  $CX = 18$ , and  $\overline{CX} \perp \overline{AB}$ . Find the radius of  $\odot C$ .  
 (A) 9      (B)  $18\sqrt{2}$       (C) 36      (D)  $36\sqrt{2}$       (E) NOTA
3. The apothem of a square measures  $2\sqrt{2}$ . Find the area of the square.  
 (A)  $4\sqrt{2}$  units<sup>2</sup>      (B) 8 units<sup>2</sup>      (C)  $16\sqrt{2}$  units<sup>2</sup>      (D) 32 units<sup>2</sup>      (E) NOTA

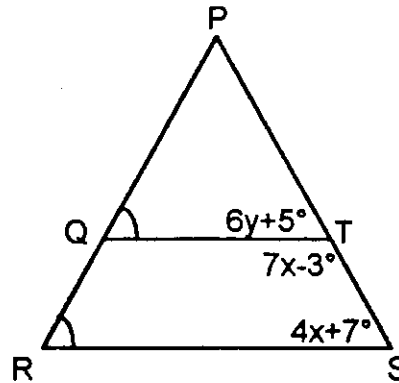


FIGURE 3

4. In Figure 3,  $\overline{QT} \parallel \overline{RS}$ ,  $m\angle PTQ = 6y + 5^\circ$ ,  $m\angle PSR = 4x + 7^\circ$ , and  $m\angle STQ = 7x - 3^\circ$ . Find  $x + y$ .
- (A) 16                      (B) 27                      (C) 36                      (D) 48                      (E) NOTA
5. What is the area of a regular hexagon inscribed in a circle with radius =  $6\pi$  cm?
- (A)  $36\pi^2 \text{ cm}^2$               (B)  $54\sqrt{3}\pi^2 \text{ cm}^2$               (C)  $108\pi^2 \text{ cm}^2$               (D)  $108\sqrt{3}\pi^2 \text{ cm}^2$               (E) NOTA
6. The long leg of a 30-60 right triangle measures 48 in. What is the length of the hypotenuse?
- (A) 8 in.              (B) 24 in.              (C)  $24\sqrt{3}$  in.              (D)  $32\sqrt{3}$  in.              (E) NOTA
7.  $\triangle ABC \cong \triangle ABX$ . B is on  $\overline{XC}$ .  $\overline{AB} \perp \overline{XC}$ .  $XC = 16$  m.  $AC = 32$  m. Find AB.
- (A)  $8\sqrt{3}$  m              (B)  $16\sqrt{3}$  m              (C)  $8\sqrt{17}$  m              (D) 1088 m              (E) NOTA

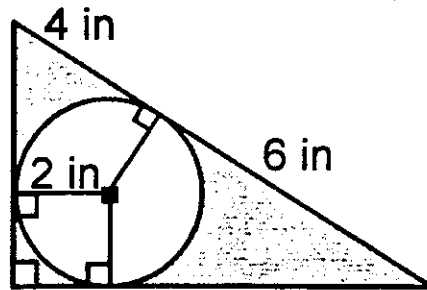


FIGURE 4

8. Find the area of the shaded region in Figure 4.

- (A)  $24 \text{ in}^2$       (B)  $(4\pi - 24) \text{ in}^2$       (C)  $(24 - 4\pi) \text{ in}^2$       (D)  $(48 - 4\pi) \text{ in}^2$       (E) NOTA

9. What is the slope of a line parallel to a line passing through the points  $(0, -4)$  and  $(8, -4)$ ?

- (A) 0      (B) 1      (C)  $\frac{1}{2}$       (D) undefined      (E) NOTA

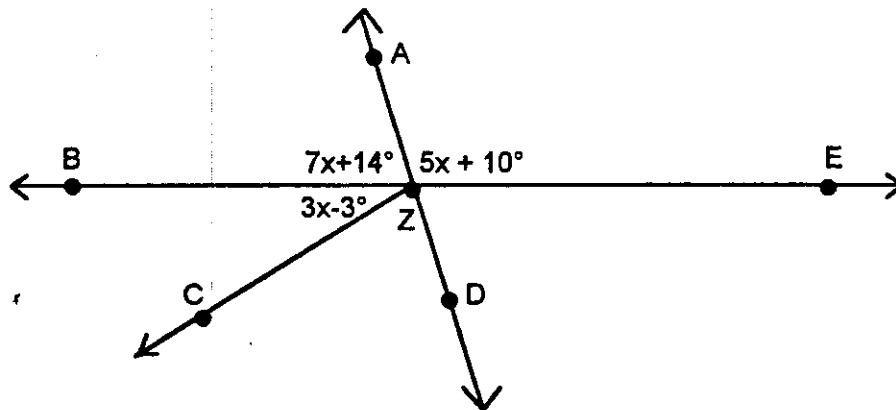


FIGURE 5

10. Find  $m\angle BZC$  in Figure 5..

- (A)  $13^\circ$       (B)  $36^\circ$       (C)  $75^\circ$       (D)  $105^\circ$       (E) NOTA

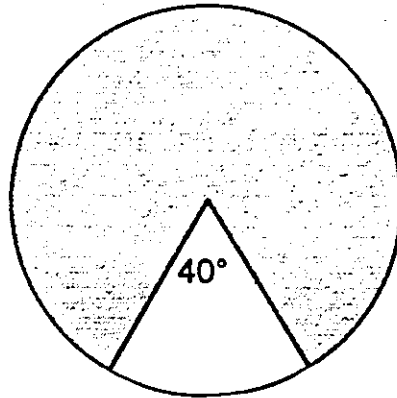


FIGURE 6

11. The circumference of the circle in Figure 6 is  $36\pi$  cm. Find the area of the shaded region.
- (A)  $24\pi$  cm<sup>2</sup>      (B)  $36\pi$  cm<sup>2</sup>      (C)  $288\pi$  cm<sup>2</sup>      (D)  $360\pi$  cm<sup>2</sup>      (E) NOTA
12. The measure of an angle of a parallelogram is  $30^\circ$  more than twice the measure of the next consecutive angle. Find the measure of the smaller angle.
- (A) 30      (B) 50      (C) 70      (D) 110      (E) NOTA
13. Stan Musial took off from Pecos Gulch International Airport at 3:15 am, flying due north. His airspeed was 220 km/h. At 5:20 am, Willie Mays took off from Pecos Gulch and flew due west at 195 km/h. At 7:00 am, how far apart were they, to the nearest kilometer?
- (A) 500 km      (B) 518 km      (C) 887 km      (D) 1150 km      (E) NOTA
14. One side of an equilateral triangle is 8 cm. What is the length of an altitude of the triangle?
- (A) 4 cm      (B)  $4\sqrt{3}$  cm      (C) 16 cm      (D)  $\frac{16\sqrt{3}}{3}$  cm      (E) NOTA
15. In  $\triangle LMN$ ,  $LM = x - 4$ ,  $LN = x + 4$ , and  $MN = 2x - 1$ , and the perimeter of the triangle is 27. List the angles of the triangle in order from largest to smallest.
- (A) L, N, M      (B) N, M, L      (C) M, N, L      (D) N, L, M      (E) NOTA

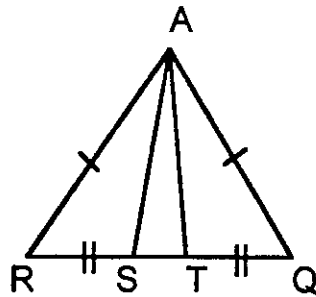


FIGURE 7

16. In Figure 7 above,  $m\angle SAT = 18^\circ$ . Find  $m\angle AST$ .

- (A)  $18^\circ$                       (B)  $36^\circ$                       (C)  $81^\circ$                       (D)  $162^\circ$                       (E) NOTA

17.  $A(2,5)$ ,  $B(12,-1)$ , and  $C(-6,8)$  are the vertices of  $\triangle ABC$ . What is the slope of the perpendicular bisector of  $AC$ ?

- (A)  $\frac{8}{3}$                       (B)  $\frac{3}{8}$                       (C)  $\frac{3}{5}$                       (D)  $-2$                       (E) NOTA

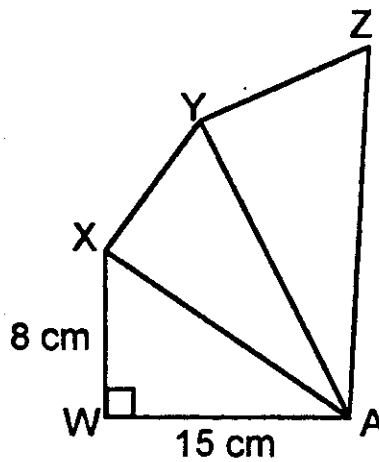


FIGURE 8

18. In the figure above, all the triangles are similar. Find the perimeter of pentagon  $AWXYZ$  to the nearest centimeter.

- (A) 56 cm                      (B) 64 cm                      (C) 120 cm                      (D) 289 cm                      (E) NOTA

19. The area of an isosceles right triangle is  $12.5 \text{ in}^2$ . Find the perimeter of the triangle.
- (A) 5 in            (B) 10 in            (C)  $10 + 5\sqrt{2}$  in            (D)  $15\sqrt{2}$  in            (E) NOTA
20. In  $\triangle ABC$ , an altitude to side  $\overline{AC}$  is drawn. If  $AB = 13$ ,  $BC = 15$ , and the altitude drawn to  $\overline{AC}$  is 12, find  $AC$ .
- (A) 14            (B) 16            (C) 17            (D) 20            (E) NOTA
21. In a 30 - 60 - 90 triangle, the  $60^\circ$  angle is bisected. What is the ratio of the segments into which the angle bisector divides the opposite leg?
- (A) 2:3            (B) 3:4            (C) 1:2            (D) 3:5            (E) NOTA
22. Classify a triangle with sides 65, 172, and 156.
- (A) Isosceles            (B) Right            (C) Acute            (D) Obtuse            (E) NOTA
23. The sum of the measures of the exterior angles of a regular 121-gon is
- (A)  $121^\circ$             (B)  $360^\circ$             (C)  $10710^\circ$             (D)  $21420^\circ$             (E) NOTA
24. "If two angles and the non-included side of one triangle are congruent to two angles and the non-included side of another triangle then the two triangles are congruent." This is also known as which of the following triangle congruency tests?
- (A) SSS            (B) SSA            (C) SAS            (D) ASA            (E) NOTA
25. The measure of an interior angle of a regular dodecagon is
- (A)  $75^\circ$             (B)  $144^\circ$             (C)  $150^\circ$             (D)  $180^\circ$             (E) NOTA

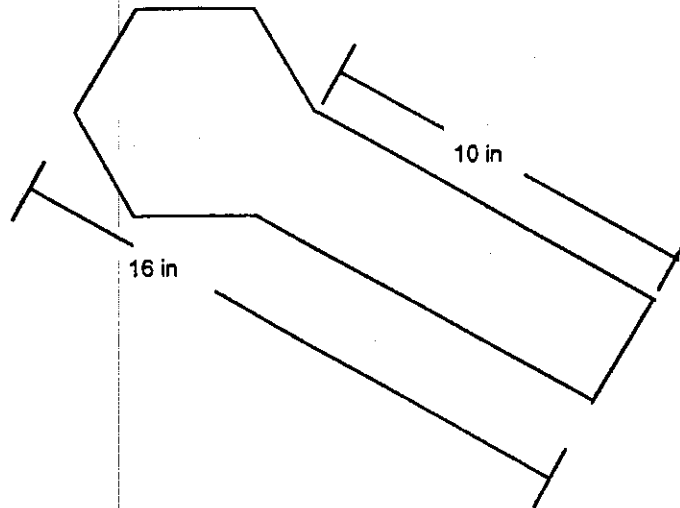


Figure 10

26. In Figure 10, the hexagonal region is regular, and the other region is rectangular. Find the area of the figure.

- (A)  $18\sqrt{3} \text{ cm}^2$       (B)  $20\sqrt{3} \text{ cm}^2$       (C)  $38\sqrt{3} \text{ cm}^2$       (D)  $92\sqrt{3} \text{ cm}^2$       (E) NOTA

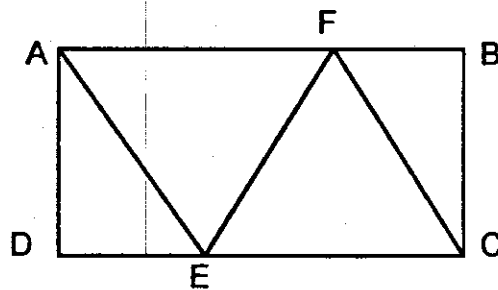
27. If the angles of a triangle are  $x$ ,  $y$ , and  $z$  and the angles of a second triangle are  $2x$ ,  $2y$  and  $a$ , then  $z - a$  equals

- (A)  $\frac{x+y}{2}$       (B)  $x+y$       (C)  $\frac{x-y}{2}$       (D)  $180 - x - y$       (E) NOTA

28. ABCD is a rectangle.  $AE = EF = FC$ .  $AD = 12$ ,  $AB = 15$ .

Find  $AE + EF + FC$ .

- (A) 45      (B) 39      (C) 36      (D) 30      (E) NOTA



29. What is the measure of the supplement of the complement of an angle with measure  $(n-2)^\circ$ ?
- (A)  $182 - n^\circ$       (B)  $178 - n^\circ$       (C)  $92 - n^\circ$       (D)  $88 - n^\circ$       (E) NOTA
30. The altitude to the hypotenuse of an isosceles right triangle has length 8 microns. What is the length of the hypotenuse of the original triangle?
- (A)  $8\sqrt{3} \mu$       (B)  $16 \mu$       (C)  $16\sqrt{2} \mu$       (D)  $16\sqrt{3} \mu$       (E) NOTA