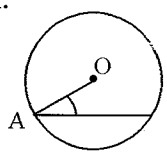
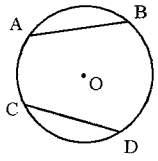
1.



[AB] is any chord of the circle with center O. Given $|AB| = \sqrt{2} \cdot |OA|$, what is the measure of angle OAB in degrees?

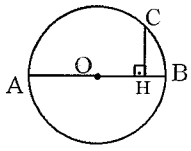
A) 30 B) 45 C) 50 D) 60 E) 65

2. In the given figure, the distances from the chords AB and CD to the center of the circle are 6 cm. If $|AB| = 2n + 4$ cm and $|CD| = 3n - 2$ cm, what is the radius of the circle?



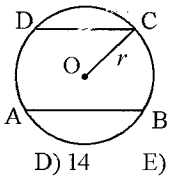
A) 5 B) 8 C) 10 D) 13 E) 15

3. If $|CH| = 4$ cm and $|HB| = 2$ cm, find the radius of the circle.



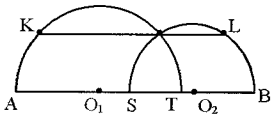
A) 5 B) 6 C) 8
D) 10 E) 16

4. In the figure $[AB] // [CD]$, $|AB| = 16$, $|CD| = 12$ and $r = 10$. Find the distance between the chords.



A) 10 B) 12 C) 13 D) 14 E) 15

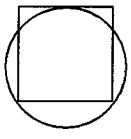
5.



Two semicircles with centers O_1 and O_2 are given. If $[KL] // [AB]$, $|KL| = 20$, $|ST| = 3$, then find $|AB|$.

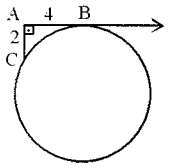
A) 21 B) 22 C) 23 D) 24 E) 25

6. In the figure, a square and a circle are given. One side of the square is tangent to the circle and the two vertices are on the circle. If side length of the square is 12 cm, what is the radius of the circle?



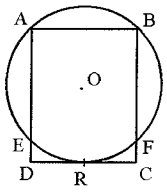
A) 6 B) 7 C) 7.5 D) 8 E) 8.5

7. In the given figure, $[AB$ is tangent to the circle and $AC \perp AB$. If $|AB| = 4$ cm and $|AC| = 2$ cm, what is the radius of the circle?



A) 3 B) 4 C) 5 D) 6 E) 8

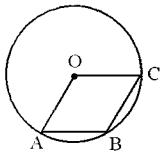
8.



If $|ED| = 2$ cm, $|EA| = 4$ cm and $ABCD$ is a rectangle, find the radius of the circle

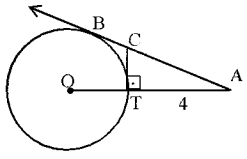
A) 2 B) 3 C) 4
D) 5 E) 6

9. In the given figure, the radius of the circle is 12 cm. What is the altitude of the rhombus?



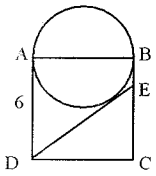
A) 6 B) $4\sqrt{3}$ C) $6\sqrt{3}$
D) 9 E) 10

10. In the given figure, [AB is tangent to the circle with center O and $[OA] \perp\!\!\!\perp [CT]$. If $|AB| = 8$ and $|AT| = 4$, then $|CT| = ?$



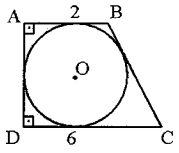
A) 3 B) $\frac{8}{3}$ C) $2\sqrt{2}$ D) 2.5 E) 2

11. In the given figure, $ABCD$ is a square and DE is tangent to the circle with diameter AB. If $|AD| = 6$ cm, what is the perimeter of the triangle CDE?



A) 12 B) 16 C) 18 D) 20 E) 21

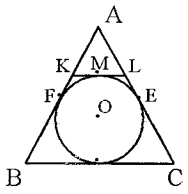
12.



The right trapezoid $ABCD$ is a circumscribed quadrilateral. If $|AB| = 2$ cm and $|DC| = 2$ cm, then find the radius of the circle.

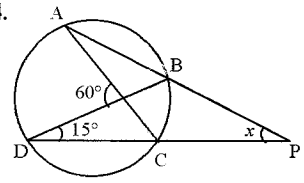
A) $\frac{3}{2}$ B) 4 C) $\frac{5}{2}$ D) 6 E) $\frac{7}{2}$

13. The perimeter of the triangle ABC is 26 cm and $|BC|=10$ cm. If $[KL]$ is tangent to circle at the point M, find the perimeter of the triangle AKL



A) 3 B) 4 C) 5 D) 6 E) 7

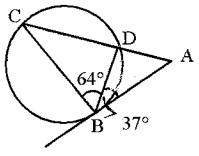
14.



Find x.

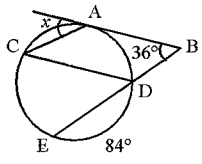
A) 10° B) 15° C) 20°
D) 25° E) 30°

15. In the figure, AB is tangent to the circle. If $m(C\hat{B}D)=64°$ and $m(A\hat{B}D)=37°$, find $m(A\hat{D}B)$.



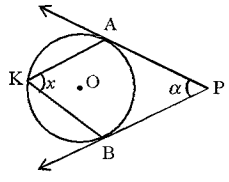
A) 37° B) 64° C) 79° D) 101° E) 143°

16. In the given figure, $AB//CD$ and AB is tangent to circle. If $m(\hat{B})=36°$ and $m(\widehat{ED})=84°$, find the value of x



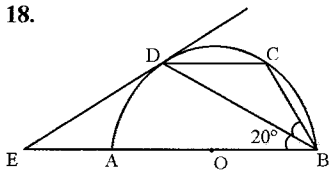
A) 36° B) 51° C) 54° D) 56° E) 60°

17. [PA and [PB are tangents of the circle. Find x, in terms of α



A) $180-2\alpha$
B) $90-2\alpha$
C) $90-\alpha$
D) $90-\frac{\alpha}{2}$ E) $90+\frac{\alpha}{2}$

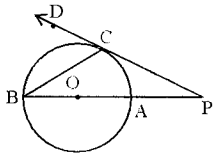
18.



If $|DC|=|CB|$ and $m(D\hat{B}A)=20°$, then find $m(D\hat{B}C)$.

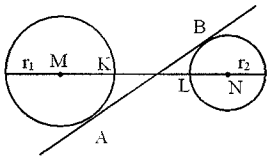
A) 25° B) 30° C) 35° D) 40° E) 45°

19. If [PC is tangent to circle and $|PC|=|CB|$, find $m(B\hat{C}D)$.



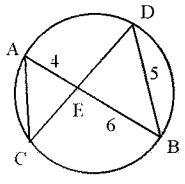
A) 30 B) 45 C) 50 D) 60 E) 75

20. In the given figure, AB is the common internal tangent of the circles. If $r_1=9$ cm, $r_2=6$ cm and $|AB|=8$ cm, find $|KL|$.



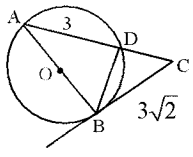
A) 1 B) $\frac{3}{2}$ C) 2 D) 3 E) 4

21. In the given figure, $|AE|=4$, $|BE|=6$, $|CD|=14$ and $|BD|=5$. Find $|AC|$.



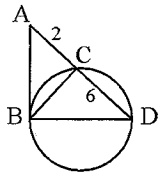
A) $\frac{5}{3}$ B) 8 C) 9 D) 10 E) 11

22. In the given figure, CB is tangent to the circle with center O, $|BC|=3\sqrt{2}$ and $|AD|=3$. Find $|BD|$.



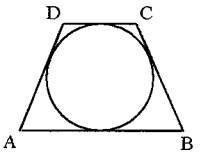
A) 3 B) $2\sqrt{3}$ C) 2 D) $\sqrt{3}$ E) $\sqrt{2}$

1. In the given figure, [AB] is tangent to the circle at the point B. If $|AC| = 2$ and $|CD| = 6$, then find the ratio $\frac{|DB|}{|BC|}$.



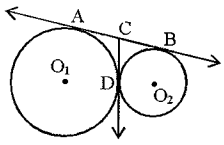
A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) 1 D) $\frac{3}{2}$ E) 2

2. ABCD is an isosceles trapezoid. If $|DC| = 4$ and $|AB| = 16$, find the radius of the inscribed circle



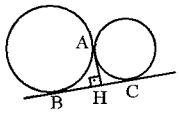
A) 4 B) 5 C) 6 D) 8 E) 10

3. The two circles are externally tangent to each other at the point D. AB and CD are common tangents. If $r_1 = 9$ and $r_2 = 4$, find $|CD|$



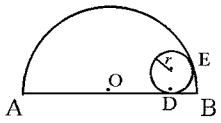
A) 5 B) 6 C) 8 D) 9 E) 12

4. In the given figure, the circles with radii R and r are externally tangent at the point A. $[BC]$ is common tangent and $[AH] \perp [BC]$ What is $|AH|$?



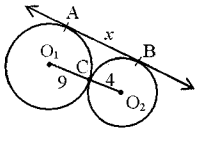
A) $\frac{R+r}{2}$ B) $\frac{Rr}{2}$ C) $\frac{Rr}{R+r}$ D) $\frac{2Rr}{R+r}$ E) $\frac{4Rr}{R+r}$

5. In the figure, the circle with radius r is tangent to semicircle with center O at the point E and tangent to diameter AB at the point D. If $|OD| = 3|DB|$ and $|DA| = 14$, find r.



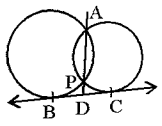
A) 2 B) 3 C) $\frac{7}{2}$ D) $\frac{7}{4}$ E) $\frac{7}{3}$

6. The circles with centers O_1 and O_2 are tangent to each other at the point C. If $|O_1C| = 9$ cm and $|CO_2| = 4$ cm, then find $|AB|$.



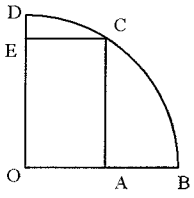
A) 5 B) 10 C) 12 D) 13 E) 17

7. If $|DC| = 6$ cm and $|PD| = 4$ cm, then find $|BD|$.



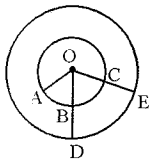
A) 2 B) 4 C) 6 D) 8 E) 10

8. In the given figure, the arc is the part of a circle with center O, $OACE$ is a rectangle and $|OA| = |AB|$. Find $\frac{|\widehat{DC}|}{|\widehat{CB}|}$.



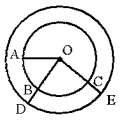
A) 2 B) $\frac{7}{4}$ C) $\frac{3}{2}$ D) 1 E) $\frac{1}{2}$

9. In the given figure, O is the center of the circles.If $|OC| = 2$ cm, $|OD| = 6$ cm and $|\widehat{AC}| = |\widehat{DE}| = 12$ cm, find $|\widehat{AB}|$.



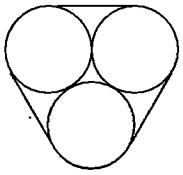
A) 3 cm B) 4 cm C) 6 cm D) 8 cm E) 9 cm

10. In the figure, two circles with centers O are given. The radii of the circles are 100 m and 101 m. The lengths of the arcs AC and DE are equal to 404 m. Find the length of the arc AB.



A) 4 B) 6 C) 8 D) 12 E) 14

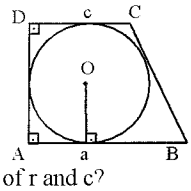
11.



In the given figure, the three circles with radii 1 cm are externally tangent to each other. Find the perimeter of the given figure

A) $2\pi + 6$ B) $2\pi - 3$ C) $\pi + 8$
D) $8 - \pi$ E) $6 - \pi$

12. In the given figure, ABCD is a right trapezoid with four sides tangent to the circle. $|AB| = a$, $|DC| = c$ and the radius of the circle is r.



What is the value of a in terms of r and c?

A) $\frac{c \cdot r}{c+r}$ B) $\frac{c \cdot r}{c-r}$ C) $\frac{c+r}{2}$ D) $\frac{c \cdot r}{2}$ E) $\sqrt{c \cdot r}$

1. Find the intersection point of the asymptotes of the function $y = \dfrac{2x-3}{x+3}$.

A) (–2,3) B) (2,1) C) (2,–3)
D) (–3,2) E) (2,8)

2. Find the asymptotes of the curve $f(x) = \dfrac{2x^2 - x + 2}{x-2}$.

A) $x = 2, y = x - 2$ B) $x = 3, y = x + 3$
C) $x = 2, y = 2x + 3$ D) $x = 3, y = 2x + 3$
E) $x = 2, y = 2x + 8$

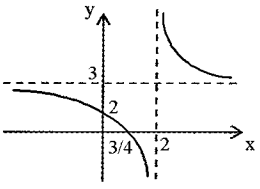
3. If the vertical and horizontal asymptotes of the curve $y = \dfrac{mx-4}{x-2}$ intersect on the line $y = 2x - 3$, find m.

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

4. The graph of a function intersects y-axis at the point (0,-1) and the asymptotes of this function are $y = 3$ and $x = -1$ This function is ....

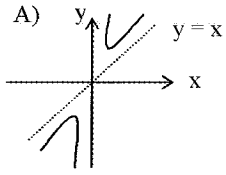
A) $y = \dfrac{3x+1}{x+1}$ B) $y = \dfrac{3x+1}{x-1}$
C) $y = \dfrac{-3x+1}{x+1}$ D) $y = \dfrac{3x+2}{x+1}$
E) $y = \dfrac{3x-1}{x+1}$

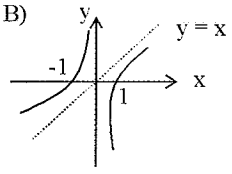
5. Which of the followings is the function of the graph given in the figure?

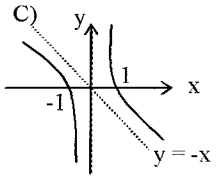


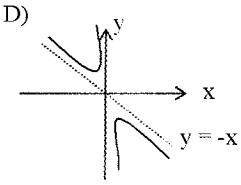
A) $y = \dfrac{3x-2}{x-2}$ B) $y = \dfrac{3x-4}{x+2}$
C) $y = \dfrac{3x+4}{6x-4}$ D) $y = \dfrac{x-4}{3x+2}$
E) $y = \dfrac{3x-4}{x-2}$

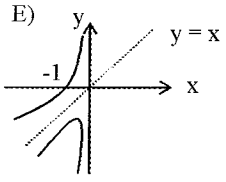
6. Which one of the followings is the graph of $f(x) = x - \dfrac{1}{x}$?

A)


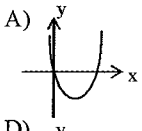
B)


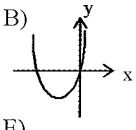
C)


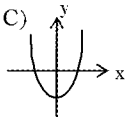
D)


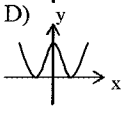
E)


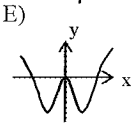
7. Which one of the followings may be the graph of the function $y = x^4 - 2x^2$?

A)


B)


C)


D)


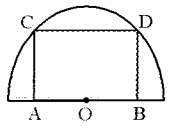
E)


8. The product of two real numbers is 150. Find the minimum value of the sum of these two numbers.

A) $6\sqrt{5}$ B) $8\sqrt{5}$ C) $10\sqrt{5}$
D) $5\sqrt{6}$ E) $10\sqrt{6}$

9. The number 30 is divided into two parts such that the product of the square of one number by the other is a maximum. Find this product.

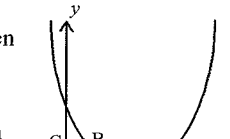
A) 2900 B) 3000 C) 3300 D) 3600 E) 4000

10. 

Find the maximum value of the perimeter of the rectangle ABCD that can be inscribed in the semicircle whose radius is 1.

A) $\sqrt{5}$ B) $2\sqrt{5}$ C) $3\sqrt{5}$ D) $4\sqrt{5}$ E) $5\sqrt{5}$

11. The point B is taken on the parabola $y = x^2 - 4x + 4$. Find the maximum area of the rectangle OABC.



A) $\frac{1}{2}$ B) 1 C) $\frac{32}{27}$ D) 2 E) $\frac{5}{2}$

12. Find the largest possible area of the right triangle whose length of hypotenuse is t cm (in terms of t).

A) t^2 B) $2t$ C) $\frac{t}{2}$ D) $\frac{t^2}{2}$ E) $\frac{t^2}{4}$

13. The function $f(x) = 2x^2 - 8x - 4$ is given. Find x-value (abscissa) of the point that satisfies the mean value theorem in the interval (2,6).

A) $\sqrt{2}$ B) $2\sqrt{2}$ C) 3
D) 4 E) $3\sqrt{2}$

14. $\lim_{x \to \pi} \frac{\sin\frac{x}{3} + \cos\frac{5x}{6}}{x - \pi} = ?$

A) $-\frac{1}{4}$ B) $-\frac{5}{12}$ C) $\frac{5}{12}$ D) $\frac{7}{12}$ E) 1

15. $\lim_{x \to 0} \frac{x^2 \cos x - \sin x^2}{x^2} = ?$

A) no limit B) 2 C) 1
D) 0 E) –1