



MATHS

BOOKS - VIKRAM PUBLICATION (ANDHRA PUBLICATION)

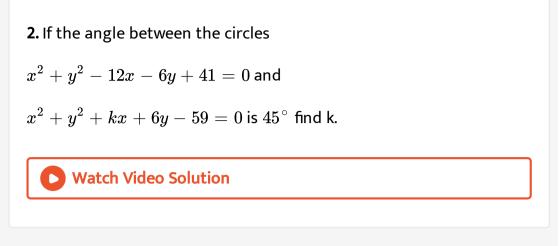
SYSTEM OF CIRCLE

Solved Probems

1. Find the angle between the circles

 $x^2+y^2+4x-14y+28=0$ and

 $x^2 + y^2 + 4x - 5 = 0$



3. Find the question of the circle which passes through (1, 1) and cuts orthogonally each of the circles.

$$x^2 + y^2 - 8x - 2y + 16 = 0 \, ext{ and } (1)$$

 $x^2 + y^2 - 4x - 1 = 0.$ (2)

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4. Find the equation of the circle which is orthogonal to each of the following three circles.

$$x^2 + y^2 + 2x + 17y + 4 = 0$$
___(1)

$$x^2 + y^2 + 7x + 6y + 11 = 0(__)(2)$$

and
$$x^2 + y^2 - x + 22y + 3 = 0$$
___(3)

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5. If the straight line represented by Itbgt $x\coslpha+y\sinlpha=p$ ____ (1)

inersects the circle

 $x^2 + y^2 = a^2$ ___(2)

at the points A and B, then show that the equation of the circle with AB as diameter is $(x^2+y^2-a^2)-2p(x\coslpha+y\sinlpha-p)=0.$

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6. Find the equation of the circle passing therough the points of intersection of the circles.

$$x^2+y^2-8x-6y+21=0_(1)$$

$$x^2 + y^2 - 2x - 15 = 0$$
(2)

and (1, 2).



7. Let us find the equation the radical axis of the circles S $\equiv x^2 + y^2 - 5x + 6y + 12 = 0$ and $S^1 \equiv x^2 + y^2 + 6x - 4y - 14 = 0$ Watch Video Solution

8. Let us find the equation of the radical axis of the circles

$$2x^2 + 2y^2 + 3x + 6y - 5 = 0$$
 (1)

and
$$3x^2 + 3y^2 - 7x + 8y - 11 = 0$$
___(2)

9. Let find the radical and centre of the circles $x^2 + y^2 - 2x + 6y = 0$ ____(1) $x^2 + y^2 - 4x - 2y + 6 = 0$ ____(2) and $x^2 + y^2 - 12x + 2y + 3 = 0$ ___(3)

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10. Find the equation and length of the common chord of the two circles $S\equiv x^2+y^2+3x+5y+4=0$ and $S^1\equiv x^2+y^2+5x+3y+4=0$



11. Show that the circles

$$S \equiv x^2 + y^2 - 2x - 4y - 20 = 0$$
 ____(1)

and $S^1 \equiv x^2 + y^2 + 6x + 2y - 90 = 0$ ____(2)

touch each other internally. Find their point of contact and the equation of common tnagent.



12. Find the equation fo the circle whose diameter is the common chord of the circles

$$S \equiv x^2 + y^2 + 2x + 3y + 1 = 0$$
 ____(1)

and
$$S^1 \equiv x^2 + y^2 + 4x + 3y + 2 = 0$$
 (2)

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13. Let us find the equation of a circle which cuts each of the following circles orthogonally

$$S' \equiv x^2 + y^2 + 3x + 2y + 1 = 0$$
 __(1)
 $S'' \equiv x^2 + y^2 - x + 6y + 5 = 0$ __(2)
and $S''' \equiv x^2 + y^2 + 5x - 8y + 15 = 0$ __(3)





Exerxcise 2 A

1. Find k if the following pairs of circles are orthogonal.

$$x^2 + y^2 + 2by - k = 0, x^2 + y^2 + 2ax + 8 = 0.$$

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2. Find k if the following pairs of circles are orthogonal.

$$x^2 + y^2 - 6x - 8y + 12 = 0,$$

$$x^2 + y^2 - 4x + 6y + k = 0$$

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3. Find k if the following pairs of circles are orthogonal.

$$x^2 + y^2 - 5x - 14y - 34 = 0.$$

$$x^2 + y^2 + 2x + 4y + k = 0$$



4. Find k if the following pairs of circles are orthogonal.

$$x^2 + y^2 + 4x + 8 = 0, x^2 + y^2 - 16y + k = 0$$



5. Find the angle between the circles given by the equations.

$$x^2 + y^2 - 12x - 6y + 41 = 0,$$

$$x^2 + y^2 + 4x + 6y - 59 = 0.$$

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6. Find the angle between the circles given by the equations.

$$x^2 + y^2 + 6x - 10y - 135 = 0,$$

$$x^2 + y^2 - 4x - 116 = 0$$



7. Show that the angle between the circles

$$x^2+y^2=a^2, x^2+y^2=ax+ay$$
 is $rac{3\pi}{4}.$

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8. Show that the circles given by the following equation intersect each other orthogonally.

$$x^2 + y^2 - 2x - 2y - 7 = 0,$$

 $3x^2 + 3y^2 - 8x + 29y = 0.$

9. Show that the circles given by the following equation intersect each other orthogonally.

 $x^2 + y^2 + 4x - 2y - 11 = 0,$

 $x^2 + y^2 - 4x - 8y + 11 = 0.$

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10. Show that the circles given by the following equation intersect each other orthogonally. $x^2 + y^2 - 2x + 4y + 4 = 0$.

$$x^2 + y^2 + 3x + 4y + 1 = 0.$$



11. Show that the circles given by the following equation intersect each other orthogonally.

$$x^2 + y^2 - 2lx + g = 0,$$

$$x^2 + y^2 - 2my - g = 0.$$

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12. Find the equation of the circle which passes through the origin and intersects the circles below, orthogonally.

$$x^2 + y^2 - 4x + 6y + 10 = 0$$

$$x^2 + y^2 + 12y + 6 = 0.$$

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13. Find the equation of the circle which passes through the origin and intersects the circles below, orthogonally.

$$x^2 + y^2 - 4x - 6y - 3 = 0.$$

$$x^2 + y^2 - 8y + 12 = 0.$$

14. Find the equation of the circle which passes through the point (0,-3) and intersects the circles given by the equation $x^2 + y^2 - 6x + 3y + 5 = 0$ and $x^2 + y^2 - x - 7y = 0$ orthogonally.

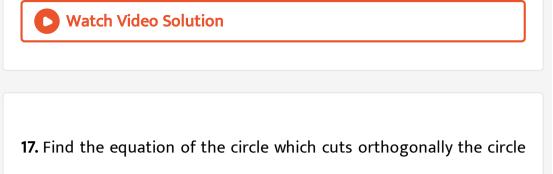
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15. Find the equation of the circle passing through the origin, having its centre on the line x + y = 4 and intersecting the circle $x^2 + y^2 - 4x + 2y + 4 = 0$ orthogonlly.

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16. Find the equation of the circle which passes through the point (2,0), (0,2) and orthogonally to the circle

 $2x^2 + 2y^2 + 5x - 6y + 4 = 0.$



 $x^2+y^2-4x+2y-7=0$ and having a center at (2,3).

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18. Find the equation of the circle which intersects the circle

 $x^2+y^2-6x+4y-3=0$ orthogonally and passes through the

point (3,0) and touches Y-axis.

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19. Find the equation of the circle which cuts the circle $x^2+y^2+4x-6y+11=0$ and $x^2+y^2-10x-4y+21=0$

rthogonally and has the diameter along the staight line 2x + 3y = 7



20. If P, Q are conjugate points with respect to a circles $S \equiv x^2 + y^2 + 2gx + 2fy + c = 0$ then prove that the circle PQ as diameter cuts the circles S = 0 orthogonally.

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21. If the equation fo two circles whose radii are a, a ' are S = 0 and S' = 0, then show that circles $\frac{S}{a} + \frac{S'}{a'} = 0$ and $\frac{S}{a} - \frac{S'}{a'} = 0$ intersect orthogonally.

22. Find the equation of the circle which intersects each of the following circles orthogonly

i) $x^2 + y^2 + 2x + 4y + 1 = 0.$ $x^2 + y^2 - 2x + 6y - 3 = 0.$ $2(x^2 + y^2) + 6x + 8y - 3 = 0.$

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23. Find the equation of the circle which intersects each of the following circles orthogonly

$$egin{array}{ll} x^2+y^2+4x+2y+1=0.\ 2(x^2+y^2)+8x+6y-3=0, \end{array}$$

$$x^2 + y^2 + 6x - 2y - 3 = 0.$$

24. If the straight line 2x + 3y = 1 intersects the circle $x^2 + y^2 = 4$ at the points A and B, then find the equation of the circle having AB as diameter.

25. If x + y = 3 is the equation of the chord AB of circle $x^2 + y^2 - 2x + 4y - 8 = 0$, find the equation of the circle having \overline{AB} as diameter.

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26. Find the equation of the circle passing through the intersection of the circles $x^2 + y^2 = 2ax$ and $x^2 + y^2 = by$ and having its center on the line $\frac{x}{a} - \frac{y}{b} = 2$. 1. Find the equation of the radical axis of the following circles.

$$x^2 + y^2 - 3x - 4y + 5 = 0.$$

$$3ig(x^2+y^2ig) - 7x + 8y - 11 = 0$$

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2. Find the equation of the radical axis of the following circles.

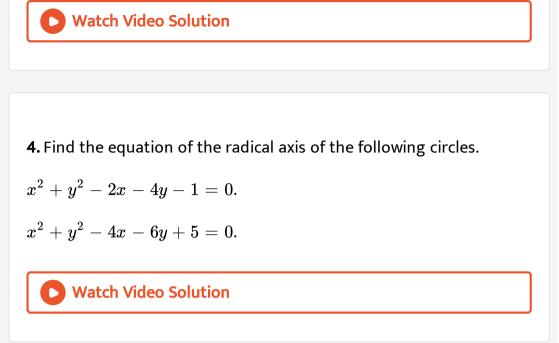
$$x^2 + y^2 + 2x + 4y + 1 = 0.$$

$$x^2 + y^2 + 4x + y = 0$$

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3. Find the equation of the radical axis of the following circles.

$$egin{aligned} &x^2+y^2+4x+6y-7=0.\ &4ig(x^2+y^2ig)+8x+12y-9=0. \end{aligned}$$



5. Find the equation of the common chord of the following pair of circles.

$$x^2+y^2-4y+3=0,$$
 $x^2+y^2-5x-6y+4=0.$

6. Find the equation of the common chord of the following pair of

circles.

 $x^2+y^2+3y+1=0,$ $x^2+y^2+4x+3y+2=0.$

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7. Find the equation of the common chord of the following pair of circles.

$$egin{aligned} &(x-a)^2+(y-b)^2=c^2,\ &(x-b)^2+(y-a)^2=c^2(a
eq b) \end{aligned}$$



8. find the equation of the common tangent of the following circles at their point of contact.

$$x^2 + y^2 + 10x - 2y + 22 = 0,$$

$$x^2 + y^2 + 2x - 8y + 8 = 0.$$

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9. find the equation of the common tangent of the following circles at their point of contact.

$$x^2+y^2-8y-4=0, x^2+y^2-2x-4y=0.$$

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10. Show that the circles

 $x^2+y^2-2y-8x+8=0$ and $x^2+y^2-2x+6y+6=0$ touch each other and find the point of contact.

11. if the two circles

$$x^2+y^2+2gx+2fy=0$$
 and $x^2+y^2+2g'x+2f'y=0$ touch each other then show that f'g = fg'

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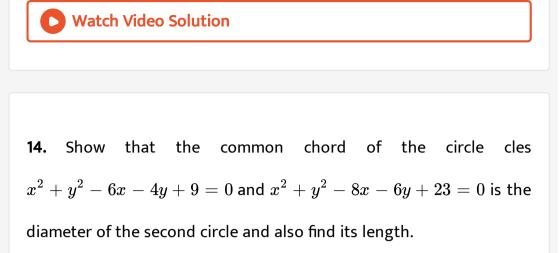
12. Find the radical centre of the following circles.

$$egin{aligned} &x^2+y^2-4x-6y+5=0 & _(i)\ &x^2+y^2-2x-4y-1=0 & _(ii)\ &x^2+y^2-6x-2y=0 & _(iii) \end{aligned}$$

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13. Find the radical centre of the following circles.

 $x^{2} + y^{2} + 4x - 7 = 0, 2x^{2} + 2y^{2} + 3x + 5y - 9 = 0, x^{2} + y^{2} + y = 0$



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15. Find the equation and length of the common chord of the following circles.

$$x^2 + y^2 + 2x + 2y + 1 = 0,$$

 $x^2 + y^2 + 4x + 3y + 2 = 0.$

16. Find the equation and length of the common chord of the following circles.

 $x^2 + y^2 - 5x - 6y + 4 = 0,$

 $x^2 + y^2 - 2x - 2 = 0$

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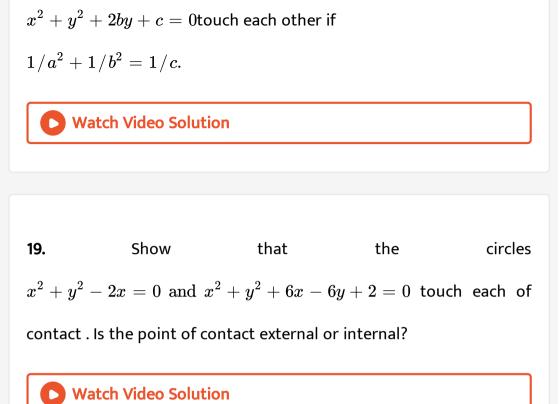
17. Prove that the radical axis of the circles

 $x^2 + y^2 + 2gx + 2fy + c = 0$ and $x^2 + y^2 + 2g'x + 2f'y + c' = 0$ is the diameter of the latter circle (or the former bisects the circumference fo the latter) if 2g'(g-g') + 2f'(f-f') = c-c'.



18. Show that the circles

 $x^2+y^2+2ax+c=0$ and



20. Find the equation of the circle which cuts the following circles orthogonally.

$$egin{aligned} &x^2+y^2+4x-7=0.\ &2x^2+2y^2+3x+5y-9=0,\ &x^2+y^2+y=0. \end{aligned}$$

21. Find the equation of the circle which cuts the following circles orthogonally.

 $egin{aligned} x^2+y^2+2x+4y+1&=0,\ 2x^2+2y^2+6x+8y-3&=0,\ x^2+y^2-2x+6y-3&=0. \end{aligned}$

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22. Find the equation of the circle which cuts the following circles orthogonally.

 $egin{aligned} x^2+y^2+2x+17y+4&=0,\ x^2+y^2+7x+6y+11&=0,\ x^2+y^2-x+22y+3&=0. \end{aligned}$

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23. Find the equation of the circle which intersects each of the following circles orthogonly

 $egin{aligned} &x^2+y^2+4x+2y+1=0.\ &2ig(x^2+y^2ig)+8x+6y-3=0,\ &x^2+y^2+6x-2y-3=0. \end{aligned}$