

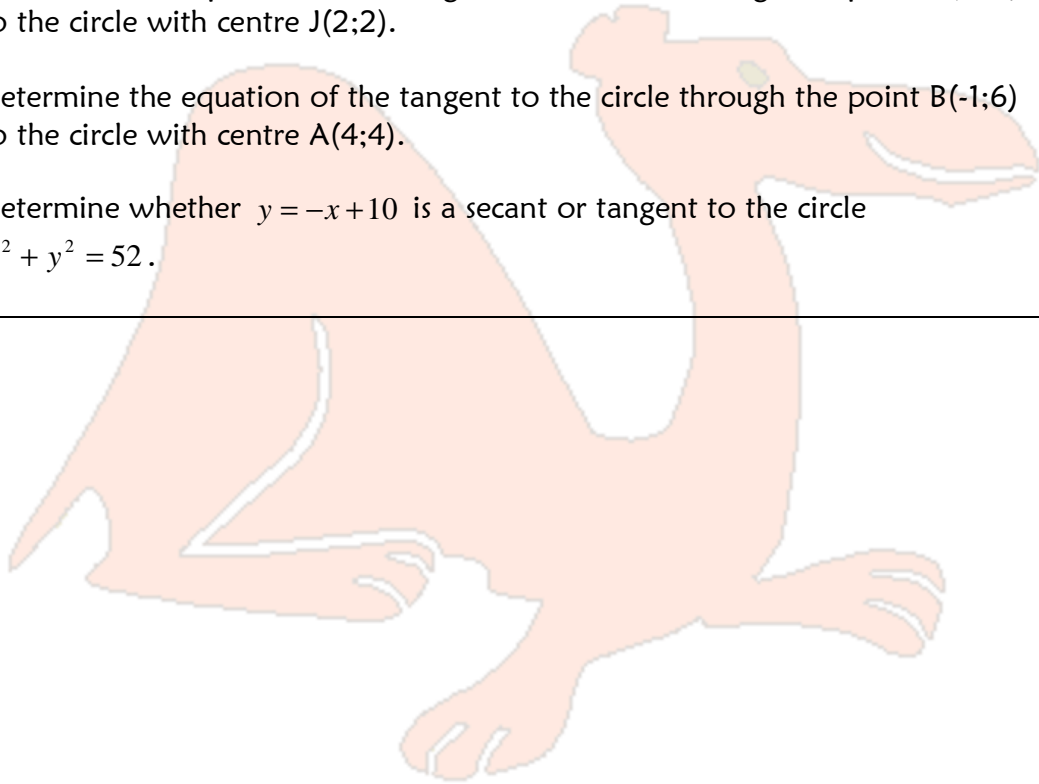


CAMI Mathematics: Grade 12

12.8 Analytical Geometry

12.8 Tangent to a circle

1. Determine the equation of the tangent to the circle, $x^2 + y^2 = 72$ through the point (6;-6).
2. Determine whether $y = 2x + 20$ is a secant or tangent to the circle $x^2 + y^2 = 80$.
3. Determine the equation of the tangent to the circle, $x^2 + y^2 = 40$ through the point (-2;6).
4. Determine the equation of the tangent to the circle through the point K(0;-1) to the circle with centre J(2;2).
5. Determine the equation of the tangent to the circle through the point B(-1;6) to the circle with centre A(4;4).
6. Determine whether $y = -x + 10$ is a secant or tangent to the circle $x^2 + y^2 = 52$.





MEMO

Tangent to circles [8.9.6.1; 8.9.6.2]

1. (0;0) and (6;-6)

$$m_{radius} = \frac{-6-0}{6-0} = -1$$

$$m_{tangent} = 1$$

Tangent :

$$y = x + c$$

$$-6 = 6 + c$$

$$c = -12$$

$$\therefore y = x - 12$$

2. $y = 2x + 20$ and $x^2 + y^2 = 80$

$$x^2 + (2x + 20)^2 = 80$$

$$x^2 + 4x^2 + 80x + 400 = 80$$

$$5x^2 + 80x + 320 = 0$$

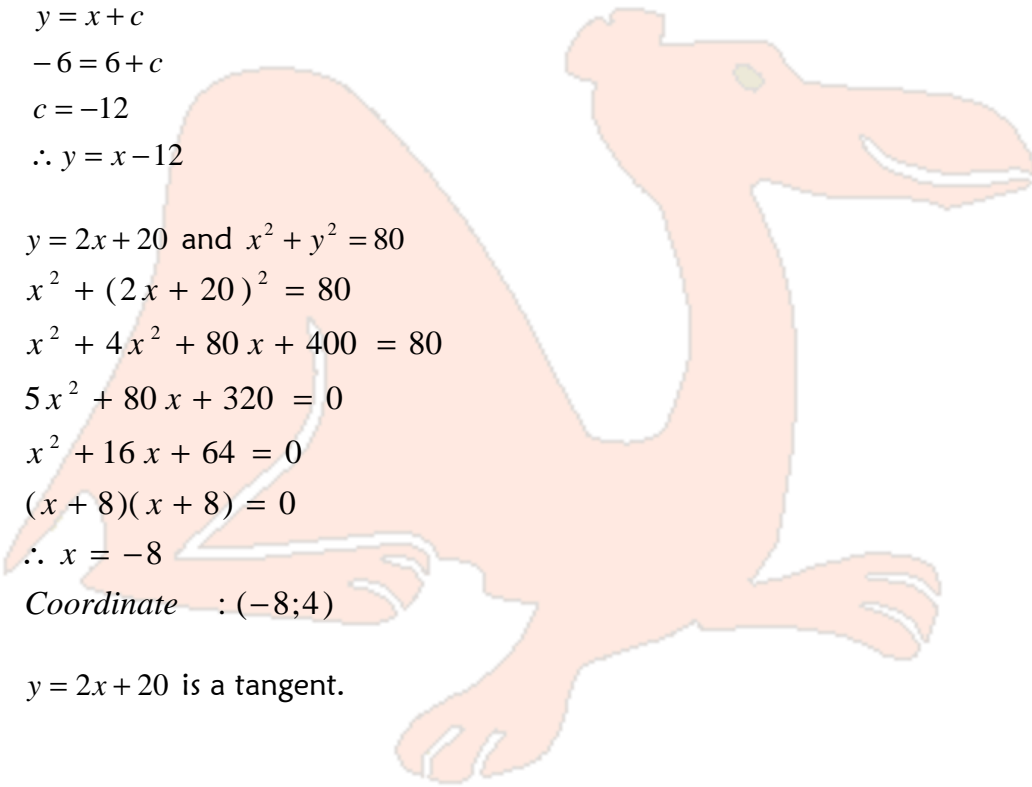
$$x^2 + 16x + 64 = 0$$

$$(x + 8)(x + 8) = 0$$

$$\therefore x = -8$$

$$\text{Coordinate} : (-8;4)$$

$y = 2x + 20$ is a tangent.





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3. (0;0) and (-2;6)

$$m_{radius} = \frac{6-0}{-2-0} = -3$$

$$m_{tangent} = \frac{1}{3}$$

Tangent :

$$y = \frac{1}{3}x + c$$

$$6 = \frac{1}{3}(-2) + c$$

$$c = \frac{20}{3}$$

$$\therefore y = \frac{1}{3}x + \frac{20}{3}$$

4. (0;-1) and (2;2)

$$m_{radius} = \frac{2-(-1)}{2-0} = \frac{3}{2}$$

$$m_{tangent} = -\frac{2}{3}$$

Tangent :

$$y = -\frac{2}{3}x + c$$

$$-1 = -\frac{2}{3}(0) + c$$

$$c = -1$$

$$\therefore y = -\frac{2}{3}x - 1$$



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5. (-1;6) and (4;4)

$$m_{\text{radius}} = \frac{4-6}{4-(-1)} = -\frac{2}{5}$$

$$m_{\text{tangent}} = \frac{5}{2}$$

Tangent :

$$y = \frac{5}{2}x + c$$

$$6 = \frac{5}{2}(-1) + c$$

$$c = \frac{17}{2}$$

$$\therefore y = \frac{5}{2}x + \frac{17}{2}$$

6. $x^2 + y^2 = 52$ and $y = -x + 10$

$$x^2 + (-x + 10)^2 = 52$$

$$x^2 + x^2 - 20x + 100 = 52$$

$$2x^2 - 20x + 48 = 0$$

$$x^2 - 10x + 24 = 0$$

$$(x - 6)(x - 4) = 0$$

Coordinates : (6;4) and (4;6)

$y = -x + 10$ a secant