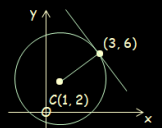
Outcome 1 – The gradient of the tangent to a circle

Bronze example

Examples...

Find the gradient of the tangent to the circle.



$m_{radius} = \frac{6-2}{3-1} = \frac{4}{2} = 2$

$m_{tangent} = -\frac{1}{2}$

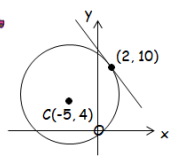
1. Calculate m_{radius}
2. Write $m_{tangent}$

Turn upside down and change the sign!

Bronze questions

Find the gradients of the tangents to the following circles...

1



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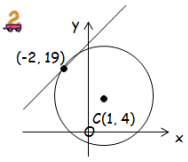

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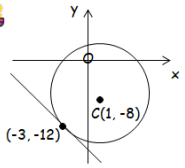

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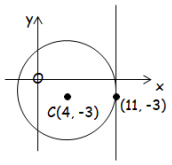


Outcome 2 – The equation of the tangent to a circle

Silver example

Examples...

Find the equation of the tangent at the point (-2, 4) on the circle $x^2 + y^2 - 10x + 6y - 9 = 0$.

(5, -3)

1. Get the centre
2. Calculate m_{rad}
3. Write m_{tan}
4. y - b...

$m_{rad} = \frac{4-(-3)}{-2-5}$

$= \frac{7}{-7} = -1$

$m_{tan} = 1$ m = 1 (-2, 4)

$y - 4 = 1(x + 2)$

$y - 4 = x + 2$

$y = x + 6$

Silver questions

1 Find the equation of the tangent at the point (-7, 5) on the circle $x^2 + y^2 - 2x - 18y - 4 = 0$

2 Find the equation of the tangent at the point (9, 1) on the circle $x^2 + y^2 - 12x + 4y - 6 = 0$

3 Find the equation of the tangent at the point (6, -3) on the circle $x^2 + y^2 + 4x + 2y + 3 = 0$

4 Find the equation of the tangent at the point (8, 10) on the circle $x^2 + y^2 - 20x + 12y - 12 = 0$

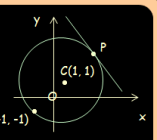
Outcome 3 – The equation when given the other point

Gold example

Examples...

PQ is a diameter of the circle.

Find the equation of the tangent to the circle with equation $x^2 + y^2 - 2x - 2y - 10 = 0$ at point P.



(1, 1)

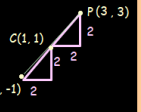
1. Get the centre
2. Calculate m_{rad}
3. Write m_{tan}
4. "Count along" to get P.

$m_{rad} = \frac{1-(-1)}{1-(-1)}$

$= \frac{2}{2} = 1$

$m_{tan} = -1$

m = -1 (3, 3)



$y - 3 = -1(x - 3)$

$y - 3 = -x + 3$

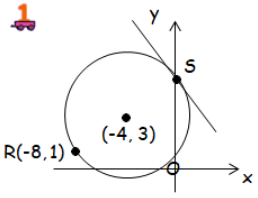
$y = -x + 6$

5. y - b...

Gold questions

Given that the two end points on each circle are diameters, find the equations of the tangents...

1



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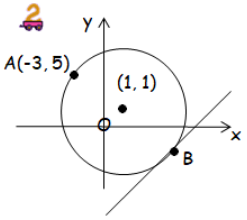

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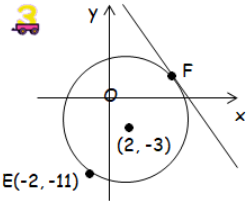

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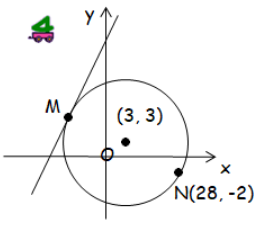

Bronze Answers

1. $m_{tan} = -\frac{7}{6}$ 2. $m_{tan} = \frac{1}{5}$

3. $m_{tan} = -1$ 4. $m_{tan} = \infty$

Silver Answers

1. $y = -2x - 9$ 2. $y = -x + 10$
3. $y = 4x - 21$ 4. $y = \frac{1}{8}x + 9$

Gold Answers

1. $y = -2x + 5$ 2. $y = x - 8$
3. $y = -\frac{1}{2}x + 8$ 4. $y = 5x + 118$