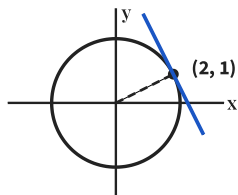


Equation of a Tangent to a Circle

ANSWERS

1

Find the equation of the tangent to $x^2 + y^2 = 5$ at the point (2, 1).

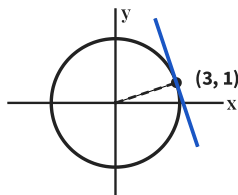


gradient of the radius $\frac{1}{2}$
gradient of the tangent -2
put the point into $y = mx + c$
 $c = 5$
 $y = -2x + 5$

Answer

2

Find the equation of the tangent to $x^2 + y^2 = 10$ at the point (3, 1).

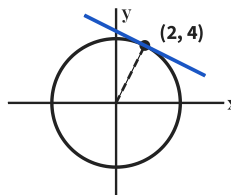


gradient of the radius $\frac{1}{3}$
gradient of the tangent -3
put the point into $y = mx + c$
 $c = 10$
 $y = -3x + 10$

Answer

3

Find the equation of the tangent to $x^2 + y^2 = 20$ at the point (2, 4).

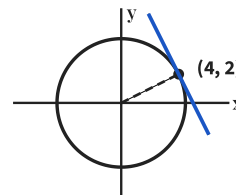


gradient of the radius 2
gradient of the tangent $-\frac{1}{2}$
put the point into $y = mx + c$
 $c = 5$
 $y = -\frac{1}{2}x + 5$

Answer

4

Find the equation of the tangent to $x^2 + y^2 = 20$ at the point (4, 2).

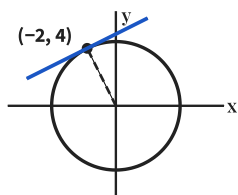


gradient of the radius $\frac{1}{2}$
gradient of the tangent -2
put the point into $y = mx + c$
 $c = 10$
 $y = -2x + 10$

Answer

5

Find the equation of the tangent to $x^2 + y^2 = 20$ at the point (-2, 4).

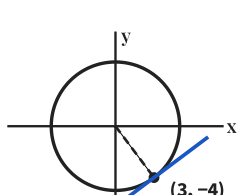


gradient of the radius -2
gradient of the tangent $\frac{1}{2}$
put the point into $y = mx + c$
 $c = 5$
 $y = \frac{1}{2}x + 5$

Answer

6

Find the equation of the tangent to $x^2 + y^2 = 25$ at the point (3, -4).

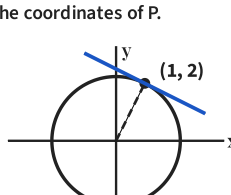


gradient of the radius $-\frac{4}{3}$
gradient of the tangent $\frac{3}{4}$
put the point into $y = mx + c$
 $c = -\frac{25}{4}$
 $y = \frac{3}{4}x - \frac{25}{4}$

Answer

7

The tangent to $x^2 + y^2 = 5$ at (1, 2) crosses the x axis at P. Find the coordinates of P.

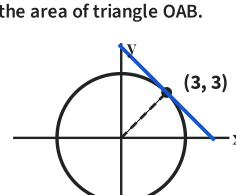


$y = -\frac{1}{2}x + \frac{5}{2}$, then $y = 0$
 $(5, 0)$

Answer

8

The tangent to $x^2 + y^2 = 18$ at (3, 3) meets the axes at A and B. Find the area of triangle OAB.



$y = -x + 6$ meets the axes at (6, 0) and (0, 6)
18 square units

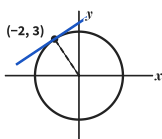
Answer

Equation of a Tangent to a Circle further practice

ANSWERS

9

Find the equation of the tangent to $x^2 + y^2 = 13$ at the point (-2, 3).

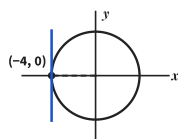


radius $-\frac{3}{2}$, tangent $\frac{2}{3}$, $c = \frac{13}{3}$

Answer $y = \frac{2}{3}x + \frac{13}{3}$

10

Find the equation of the tangent to $x^2 + y^2 = 16$ at the point (-4, 0).

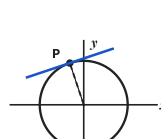


the radius is flat: the tangent is vertical

Answer $x = -4$

11

P is on the circle $x^2 + y^2 = 40$. Its x coordinate is -2 and it is above the x axis. Find the equation of the tangent at P.



$P(-2, 6)$, radius -3 , tangent $\frac{1}{3}$

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

12

Is $y = 2x + 5$ the tangent to $x^2 + y^2 = 5$ at (-2, 1)? Show how you know.

on the circle: $4 + 1 = 5$

radius $-\frac{1}{2}$, tangent 2 , $c = 1 + 4 = 5$

Answer Yes

13

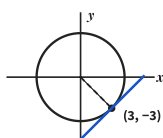
A toy train runs on the circular track $x^2 + y^2 = 100$, in metres. At (8, 6) it leaves the track and carries straight on along the tangent. Where does it cross the x axis?

$y = -\frac{4}{3}x + \frac{50}{3}$, then $y = 0$

Answer $(\frac{25}{2}, 0)$

14

The tangent to $x^2 + y^2 = 18$ at (3, -3) meets the axes at A and B. Find the perimeter of triangle OAB. Give your answer in surd form.

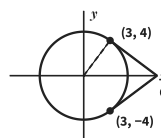


$y = x - 6$: $OA = OB = 6$, $AB = \sqrt{72}$

Answer $12 + 6\sqrt{2}$

15

A logo is the circle $x^2 + y^2 = 25$ with the tangents at (3, 4) and (3, -4). The tangents meet at Q. Find the coordinates of Q.



on the x axis: $0 = -\frac{3}{4}x + \frac{25}{4}$

Answer $(\frac{25}{3}, 0)$

16

Zara says the tangent to $x^2 + y^2 = 10$ at (1, 3) is $y = 3x$. Explain her mistake and find the right equation.

$y = 3x$ is the radius, not the tangent

the tangent's gradient is $-\frac{1}{3}$

Answer $y = -\frac{1}{3}x + \frac{10}{3}$