Level 2 Further Maths

Equation of a Tangent

Corbettmaths

Ensure you have: Pencil or pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Revision for this topic

www.corbettmaths.com/more/further-maths/

1. A curve has equation $y = x^2 + 6x - 3$

   (a) Find the value of $\dfrac{dy}{dx}$ when $x = 1$

   ....

   (2)

   (b) Work out the equation of the tangent to the curve $y = x^2 + 6x - 3$ at the point $(1, 4)$

   ....

   (4)

2. A curve has equation $y = x^3 + 4x^2 + x$

(a) When $x = -1$, show that the value of $\dfrac{dy}{dx}$ is -4

(2)

(b) Work out the equation of the tangent to the curve $y = x^3 + 4x^2 + x$ at the point $(-1, 2)$

....

(4)

3.   A curve has equation $y = 2x^2 - 3x + 1$

(a) Work out $\dfrac{dy}{dx}$

....

(2)

(b) Line *L* is the tangent to the curve $y = 2x^2 - 3x + 1$ at the point $(3, 10)$
Work out the equation of *L*

....

(4)

4. A curve has equation $y = (x - 7)(x - 3)$

(a) When $x = -2$, show that the value of $\dfrac{dy}{dx}$ is -14

(2)

(b) Work out the equation of the tangent to the curve $y = (x - 7)(x - 3)$
at the point where $x = -2$

....

(4)

5. A curve has equation $y = x^4 - 3x^3 + x$

(a) Work out $\dfrac{dy}{dx}$

....
(2)

(b) Work out the equation of the tangent to the curve at the point where $x = -1$

....
(4)

6. A curve has equation $y = x^2(3 - x)$

Work out the equation of the tangent to the curve at the point $(3, 0)$

....

(5)

7. A curve has equation $y = 4x^3 - 7x^2 + 12$

   Work out the equation of the tangent to the curve at the point where $x = 2$

   ....

   (6)

8.   The equation of a curve is $y = x^2 - 3x - 8$

(a) Work out $\dfrac{dy}{dx}$

....
(2)

P is a point on the curve.
The tangent to the curve at P has gradient 5

(b) Work out the coordinates of P

....
(2)

_____

9.   The equation of a curve is $y = (x - 2)(x + 6)$

P is a point on the curve.
The tangent to the curve at P has gradient –2

Work out the coordinates of P

....
(4)

10. A curve has equation $y = 3x^2 - x + 7$

At the point P on the curve, the tangent is parallel to the line $y = 2x - 8$

Work out the coordinates of P

....

(4)

11. A curve has a gradient function $\dfrac{2x^3 - 9}{10}$

The point P is a point on the curve.

The tangent to the curve at the point P is perpendicular to the line $2x - 5y + 3 = 0$

Work out the x-coordinate of P

....

(5)

12. Show that the tangents to the curve $y = x^3 - 4x^2 - 4x + 4$ at $x = -\dfrac{1}{3}$ and $x = 3$ are parallel.

(5)

13. The curve C has equation $y = \frac{1}{2}x^4 - 3x^2$

The point P on the curve C has x-coordinate 2.

The tangent at P meets the x-axis at the point $(k,\ 0)$

Find the value of k

....

(6)

14. The curve C has equation $y = \dfrac{1}{3}x^3 - 2x^2 - 10x + 4$

The point P has coordinates $(-3, 7)$

(a) Find the equation of the tangent to C at P.

....

(5)

Another point Q also lies on C.
The tangent to C at Q is parallel to the tangent to C at P.

(b) Find the x-coordinate of Q

....

(5)

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