Name:

GCSE Further Maths

Equation of a Tangent

Corbettmaths

Ensure you have: Pencil, Pen, Calculator

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/gcse-further-maths

1. A curve has equation $y = 4x^2 - 9x + 1$

Find the gradient of the tangent to the curve at the point $(2, -1)$

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(2)

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2. A curve has equation $y = 11x^3 - 9x^2 + x$

Find the gradient of the tangent to the curve at the point where x = –1

.....

(2)

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3. A curve has equation $y = \frac{3}{4}x^2 + 3 - \frac{8}{x}$

Find the gradient of the tangent to the curve at the point where x = 2

.....

(2)

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

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

.....

(2)

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

.....

(2)

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

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

(2)

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

.....

(2)

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

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

.....

(1)

(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*

.....

(3)

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

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

(2)

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

.....

(3)

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

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

.....

(2)

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

.....

(3)

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

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

.....

(4)

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

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

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(5)

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11. A curve has equation $y = 3x^3 - x^2 - 8x + 6$

Work out the equation of the tangent to the curve at the point where the curve cuts the y-axis.

.....

(5)

12. Find the equation of the tangent to the curve $y = \frac{24}{x^3} + 3$ at the point where the curve cuts the x-axis.

.....

(5)

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

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

.....

(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)

14. 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

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(4)

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15. 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

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(4)

16. The gradient function of a curve is $\frac{dy}{dx} = \frac{2x^3 - 9}{10}$

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)

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

(5)

18. 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)

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

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

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

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(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

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(5)