Name:

## GCSE Further Maths



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)

(2)

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)

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	$y = x^2 + 6x - 3$
4.	A curve has equation	y - x + 0x -

(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)

- A curve has equation  $y = x^3 + 4x^2 + x$ 5.
  - (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 $\frac{dy}{dx}$
	(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 $V = Tx = Tx = Tx$	10.	A curve has equation	$y = 4x^3 - 7$	$7x^2 +$	12
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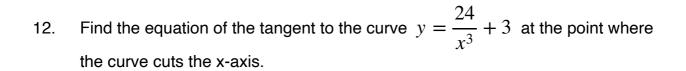
Work out the equation of the tangent to the curve at the point where x=2

(5)

## 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)



(5)

- 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

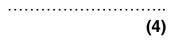
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14.	The equation of a curve is	y =	(x-2)(x+6)
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P is a point on the curve.

The tangent to the curve at P has gradient -2

Work out the coordinates of P



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

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.

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.

(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