Differentiation and Graphs GREEN

1) a)   $y=2x^{3}+3x^{2}+2$

Find $\frac{dy}{dx}$

 b) The point $P$ lies on the curve with equation $y=2x^{3}+3x^{2}+2$

The gradient of the curve at $P$ is $-\frac{3}{2}$

Find the coordinates of $P$.

2) $y=x^{3}+6x^{2}+5$

a) Find $\frac{dy}{dx}$

The curve with equation $y=x^{3}+6x^{2}+5$ has two turning points.

b)   Work out the coordinates of these two turning points. Show your working clearly.

3) $y=x^{3}-6x^{2}-15x$

a) Find $\frac{dy}{dx}$

The curve with equation$y=x^{3}-6x^{2}-15x$ has two stationary points.

b) Work out the coordinates of these two stationary points.

4) The curve with equation $y=10x^{2}+9x+5$ has a minimum at point $A$.

Find the coordinates of $A$. Show your working clearly.

5) a) Differentiate with respect to $x$

i) $8x^{2}$

ii) $\frac{2}{x}$

b) The curve with equation $y=8x^{2}+\frac{2}{x}$ has one turning point.

Find the coordinates of this turning point. Show your working clearly.

6) A curve has equation $y=x^{2}-4x+1$

 a) For this curve find

 i) $\frac{dy}{dx}$

 ii) the coordinates of the turning point

b) State, with a reason, whether the turning point is a minimum or a maximum.

Differentiation and Graphs AMBER

1) a)   $y=2x^{3}+3x^{2}+2$

Find $\frac{dy}{dx}$

 b) The point $P$ lies on the curve with equation $y=2x^{3}+3x^{2}+2$

$$\frac{dy}{dx}=-\frac{3}{2}$$

Solve for $x$.

Don’t forget to find $y$ too!

The gradient of the curve at $P$ is $-\frac{3}{2}$

Find the coordinates of $P$.

2) $y=x^{3}+6x^{2}+5$

a) Find $\frac{dy}{dx}$

The curve with equation $y=x^{3}+6x^{2}+5$ has two turning points.

$$\frac{dy}{dx}=0$$

Solve for $x$.

Don’t forget to find $y$ too!

b)   Work out the coordinates of these two turning points. Show your working clearly.

3) $y=x^{3}-6x^{2}-15x$

a) Find $\frac{dy}{dx}$

b) The curve with equation$y=x^{3}-6x^{2}-15x$ has two stationary points. Work out the coordinates of these two stationary points.

$$\frac{dy}{dx}=0$$

Solve for $x$.

Don’t forget to find $y$ too!

4) The curve with equation $y=10x^{2}+9x+5$ has a minimum at point $A$.

$$\frac{dy}{dx}=0$$

Solve for $x$.

Don’t forget to find $y$ too!

Find the coordinates of $A$. Show your working clearly.

5) a) Differentiate with respect to $x$

i) $8x^{2}$

Use laws of indices

ii) $\frac{2}{x}$

b) The curve with equation $y=8x^{2}+\frac{2}{x}$ has one turning point.

$$\frac{dy}{dx}=0$$

Solve for $x$.

Don’t forget to find $y$ too!

Find the coordinates of this turning point. Show your working clearly.

6) A curve has equation $y=x^{2}-4x+1$

 a) For this curve find

 i) $\frac{dy}{dx}$

 ii) the coordinates of the turning point

b) State, with a reason, whether the turning point is a minimum or a maximum.

What shape is the graph?

Differentiation and Graphs RED

1) a)   $y=2x^{3}+3x^{2}+2$

Multiply the coefficient of $x$ by the index, then reduce the index by 1.

Find $\frac{dy}{dx}$

 $\frac{dy}{dx}=6x^{2}+$

$$\frac{dy}{dx}=-\frac{3}{2}$$

Solve for $x$.

Don’t forget to find $y$ too!

 b) The point $P$ lies on the curve with equation $y=2x^{3}+3x^{2}+2$

The gradient of the curve at $P$ is $-\frac{3}{2}$

Find the coordinates of $P$.

2) $y=x^{3}+6x^{2}+5$

Multiply the coefficient of $x$ by the index, then reduce the index by 1.

a) Find $\frac{dy}{dx}$

 $\frac{dy}{dx}=3x^{2}+$

The curve with equation $y=x^{3}+6x^{2}+5$ has two turning points.

$$\frac{dy}{dx}=0$$

Solve for $x$.

Don’t forget to find $y$ too!

b)   Work out the coordinates of these two turning points. Show your working clearly.

3) $y=x^{3}-6x^{2}-15x$

a) Find $\frac{dy}{dx}$

b) The curve with equation$y=x^{3}-6x^{2}-15x$ has two stationary points. Work out the coordinates of these two stationary points.

$$\frac{dy}{dx}=0$$

Solve for $x$.

Don’t forget to find $y$ too!

4) The curve with equation $y=10x^{2}+9x+5$ has a minimum at point $A$.

$$\frac{dy}{dx}=0$$

Solve for $x$.

Don’t forget to find $y$ too!

Find the coordinates of $A$. Show your working clearly.

5) a) Differentiate with respect to $x$

i) $8x^{2}$

Use laws of indices

ii) $\frac{2}{x}$

b) The curve with equation $y=8x^{2}+\frac{2}{x}$ has one turning point.

$$\frac{dy}{dx}=0$$

Solve for $x$.

Don’t forget to find $y$ too!

Find the coordinates of this turning point. Show your working clearly.

6) A curve has equation $y=x^{2}-4x+1$

 a) For this curve find

 i) $\frac{dy}{dx}$

 ii) the coordinates of the turning point

b) State, with a reason, whether the turning point is a minimum or a maximum.

What shape is the graph?