

EXTENDED RESPONSE, Ch 9 REVIEW

Q2. (a) The function  $f(x+2)$  represents the function  $f(x)$  shifted 2 units to the left.

The derivative function will also be shifted two units to the left.

(i) For  $f(x+2)$ :

$$\frac{dy}{dx} = 0 \text{ at } x = 1-2, \text{ or } x = 5-2$$

$$\therefore \frac{dy}{dx} = 0 \text{ at } x = -1, 3$$

(ii)  $\frac{dy}{dx} > 0$  for  $x > 5-2$  or  $x < 1-2$

$$\therefore \frac{dy}{dx} > 0 \text{ for } x > 3 \cup x < -1$$

(b)  $f(x-2)$  is shifted 2 units to right

(i)  $\frac{dy}{dx} = 0$  at  $x = 1+2, 5+2$

$$\therefore \frac{dy}{dx} = 0 \text{ at } x = 3, 7$$

(ii)  $f(3) = 6$  and  $f(7) = 1$

$\therefore$  Co-ordinates of points where  $\frac{dy}{dx} = 0$  are:  $(3, 6)$  and  $(7, 1)$ .

(c)  $f(2x)$  represents a dilation of factor  $\frac{1}{2}$  from y-axis.

(i)  $\frac{dy}{dx} = 0$  at  $x = \frac{1}{2}, \frac{5}{2}$

(ii)  $(\frac{1}{2}, 6)$  and  $(\frac{5}{2}, 1)$

(d)  $f(\frac{x}{2})$  represents a dilation of factor 2 from y-axis

(i)  $\frac{dy}{dx} = 0$  at  $x = 2, 10$ .

(ii)  $(2, 6)$  and  $(10, 1)$

(e)  $3f\left(\frac{x}{2}\right)$  represents a dilation of factor 2 from y-axis and a dilation of factor 3 from x-axis

(i)  $\frac{dy}{dx} = 0$  at  $x = 2, 10$

(ii)  $(2, 18)$  and  $(10, 3)$