CALCULUS GRAPH NOTES

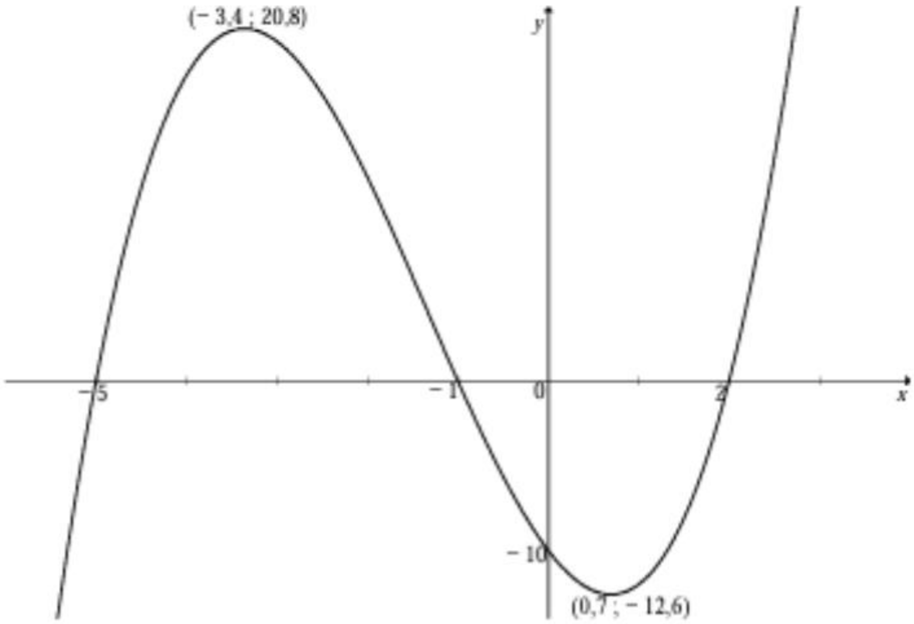
1. Given: $f(x) = x^3 + 4x^2 - 7x - 10$

1.1 Write down the y-intercept of f. (1)

1.2 Show that 2 is a root of the equation $f(x) = 0$. (2)

1.3 Hence, factorise $f(x)$ completely. (3)

1.4 If it is further given that the coordinates of the turning points are approximately at $(0{,}7\,;-12{,}6)$ and $(-3{,}4\,;20{,}8)$, draw a sketch graph of f and label all intercepts and turning points. (3)

8.1	$y = -10$
8.2	$f(x) = x^3 + 4x^2 - 7x - 10$ $f(2) = 2^3 + 4(2)^2 - 7(2) - 10 = 0$
8.3	$f(x) = (x-2)(x^2+6x+5)$ $f(x) = (x-2)(x+5)(x+1)$
8.4	

2. Given: *h(x)* = $f'(x) = 3x^2 + 8x - 7$

Sketch the above graph.

***X*-intercept put *y* = 0**

$3x^2 + 8x - 7 = 0$

$$x = \frac{-8 \pm \sqrt{(8)^2 - 4(3)(-7)}}{2(3)}$$

$$= \frac{-8 \pm \sqrt{64 + 84}}{6}$$

$$= \frac{-8 \pm \sqrt{148}}{6}$$

$x = -3.36 \quad or \quad x = 0.69$

$x = -3.34 \quad or \quad x = 0.7$

***Y* intercept put *x* = 0**

y = −7

Axis of symmetry

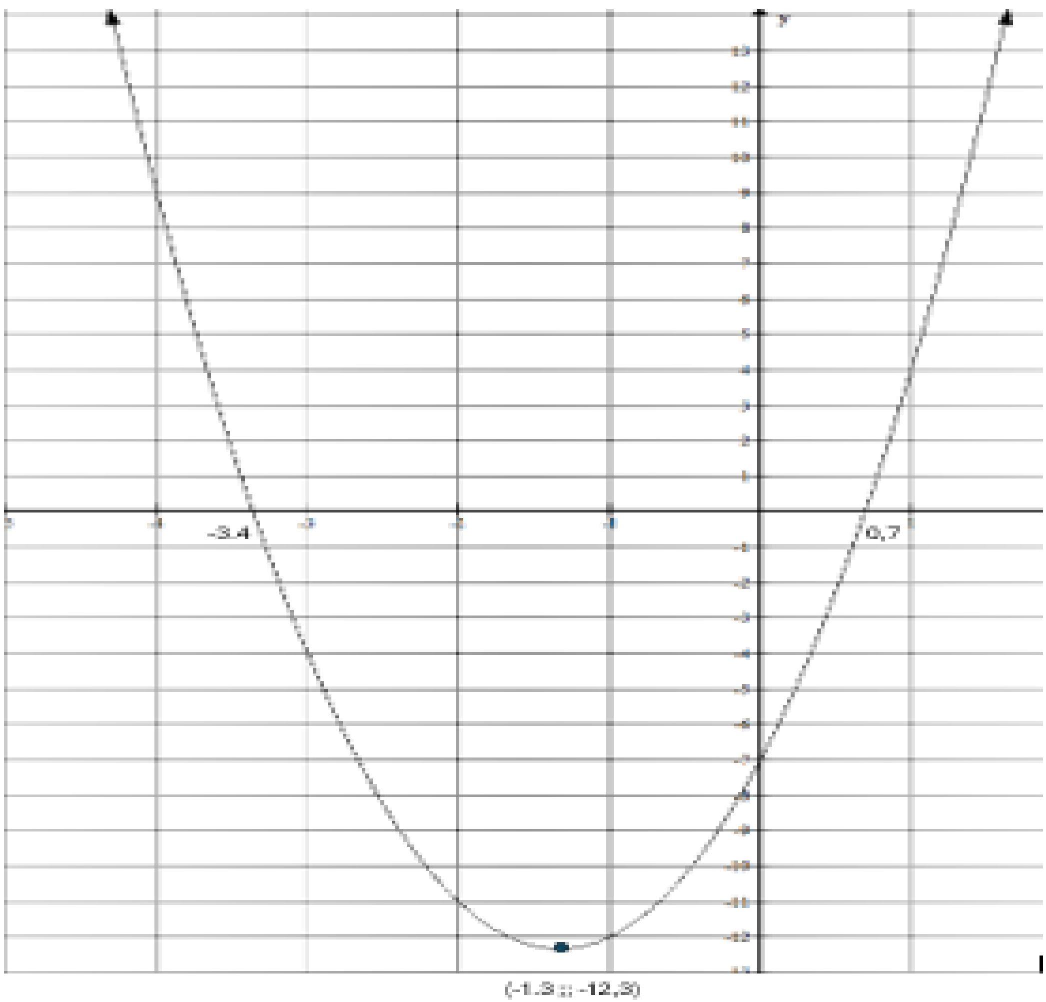
$$x = \frac{-b}{2a}$$

$$= \frac{-8}{2(3)}$$

$$= \frac{-4}{3}$$

Turning point

$$h\left(\frac{-4}{3}\right) = -12.3$$



$h(x) = f''(x) = 6x + 8$

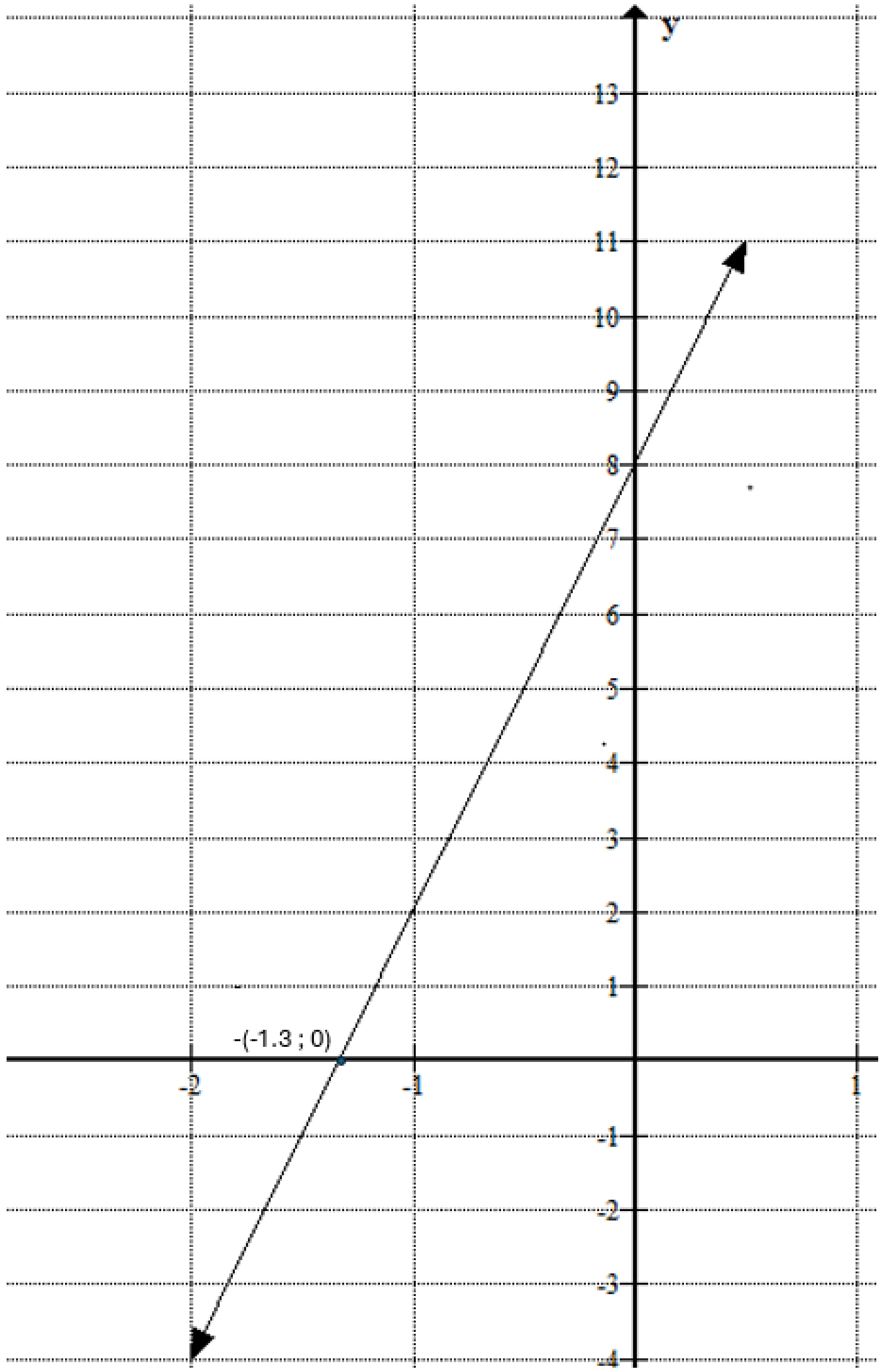
<u>X-intercept put y = 0</u>

$6x + 8 = 0$

$x = \frac{-4}{3}$

<u>*Y* - intercept put *x*=0</u>

Y = 8



y
13
12
11
10
9
8
7
6
5
4
3
2
1
-(-1.3 ; 0)
-2
-1
1
-1
-2
-3
-4

THE DERIVATIVE OF A CUBIC FUNCTION

The derivative of a **cubic function** is a **quadratic function**: