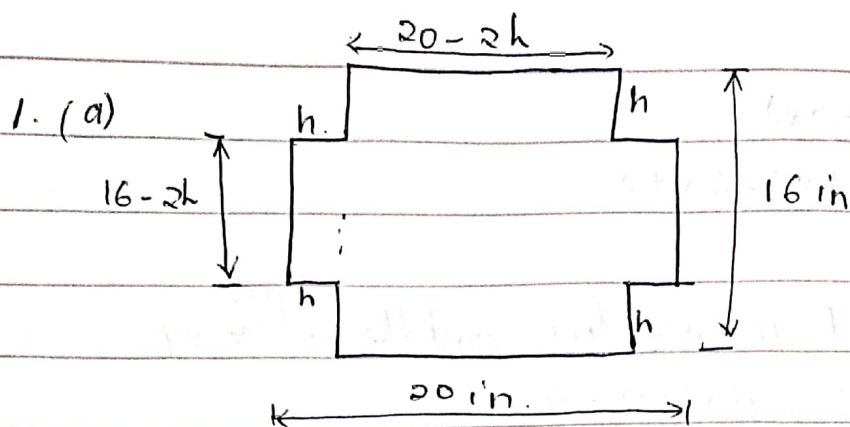




$$S.A = 2LW + 2LH + 2WH$$

$$= 2(20-2h)(16-2h) + 2(20-2h)(h) + 2(16-2h)(h)$$

$$= -4h^2 + 320$$

$$\text{So, } f(h) = -4h^2 + 320$$

$$(b) \quad -4h^2 + 320 = 0$$

$$-4h^2 = -320$$

$$h^2 = 80$$

$$h = \sqrt{80}$$

$$L = \pm\sqrt{5}, -\sqrt{5}$$

The measurement cannot be negative, therefore, $L = \sqrt{5} \approx 2.24$ in

$$(c) \quad 124 \leq -4h^2 + 320 \leq 256$$

$$124 \leq -4h^2 + 320 \quad \text{and} \quad -4h^2 + 320 \leq 256$$

$$-4h^2 \leq 196 \quad \text{and} \quad -4h^2 \leq -64$$

$$h^2 \leq 49 \quad \text{and} \quad h^2 \geq 16$$

$$[-7, 7] \quad \text{and} \quad h \leq -4 \text{ or } h \geq 4$$

Since we only need positive measurements:

$$\text{Interval} = 4 \leq h \leq 7$$

$$[4, 7]$$

2. slant asymptote is obtained from: $\frac{P(x)}{q(x)}$

$$2x+1 = \frac{P(x)}{q(x)}$$

Vertical asymptote: $x = c$

$$q(x) = (x-c)^2$$

$$2x+1 = \frac{P(x)}{(x-c)^2}$$

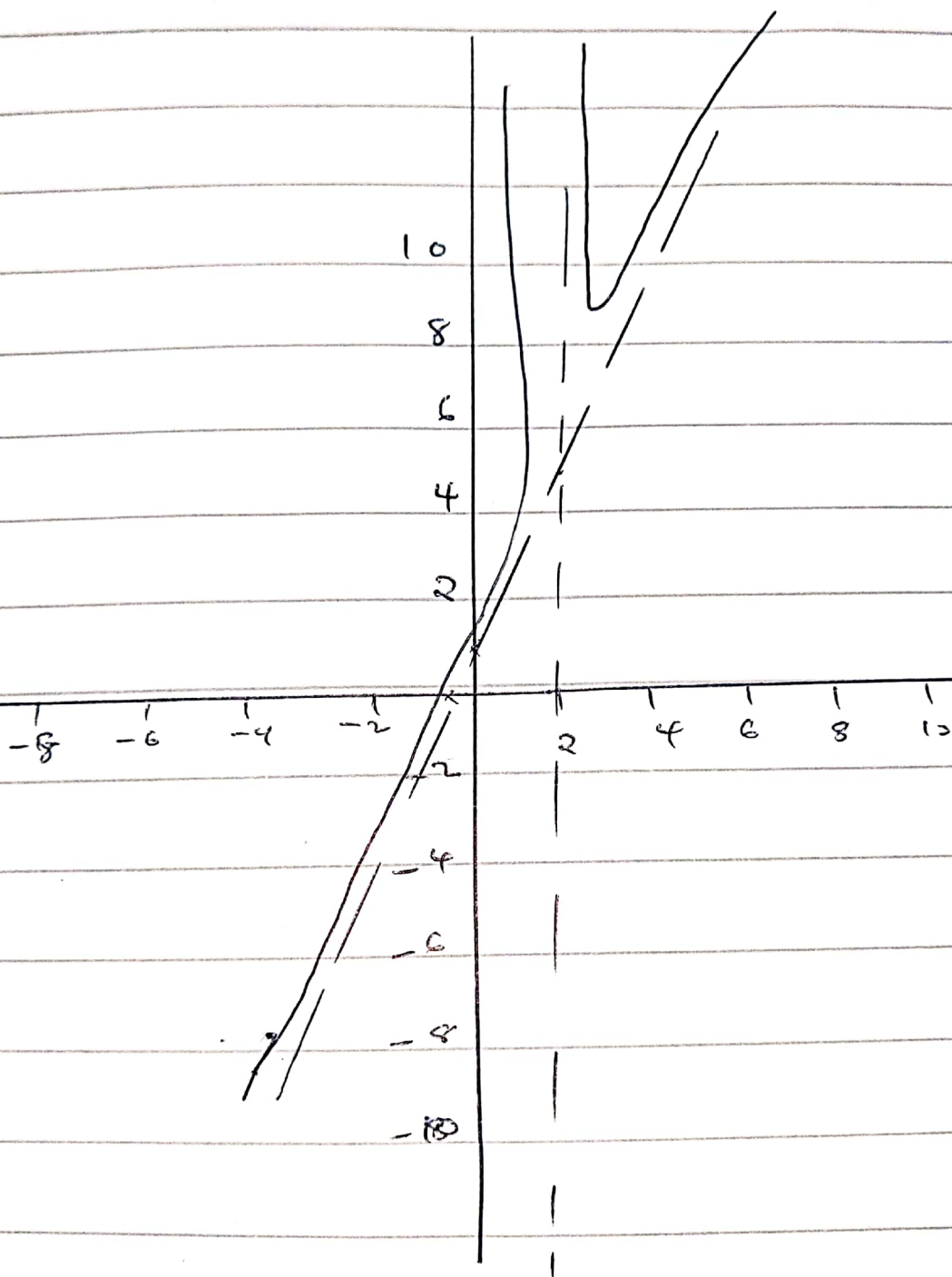
$$f(x) = \frac{(2x+1)(x-c)^2}{(x-c)^2} + \frac{1}{(x-c)^2}$$

$$x = 2$$

$$f(x) = \frac{(2x+1)(x-2)^2 + 1}{(x-2)^2}$$

$$= \frac{(2x+1)(x^2 - 4x + 4) + 1}{(x-2)^2}$$

$$f(x) = \frac{2x^3 - 7x^2 + 4x + 5}{(x-2)^2}$$



3.

$$p(x) = 2(x-1)^2(x+1)^2(1-2x)$$

$$= -4x^5 + 2x^4 + 8x^3 - 4x^2 - 4x + 2$$

(a) Since the leading coefficient is negative and the ~~order~~ ^{degree} of polynomial is odd; as $x \rightarrow \infty$, $f(x) \rightarrow -\infty$
 $x \rightarrow -\infty$, $f(x) \rightarrow \infty$

(b) The y-intercept is incorrect

$$p(0) = -4(0)^5 + 2(0)^4 + 8(0)^3 - 4(0)^2 - 4(0) + 2$$

$$p(0) = 2$$

$$y\text{-intercept} = (0, 2)$$

(c) The real zeroes of p and their multiplicities are:

$$x = 1, \quad \text{multiplicity } 2$$

$$x = -1, \quad \text{multiplicity } 2$$

$$x = \frac{1}{2}, \quad \text{multiplicity } 1$$

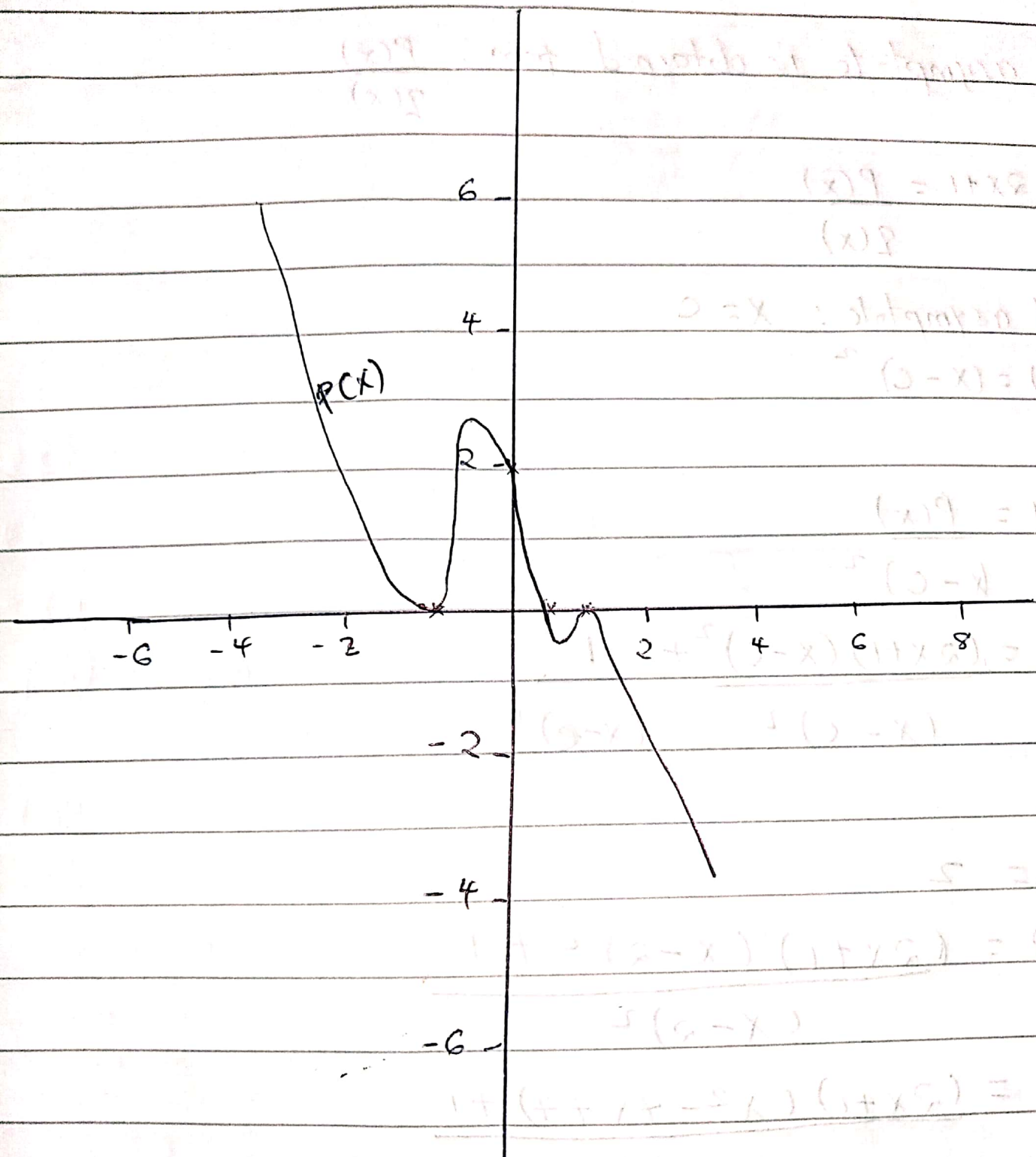
(d) The graph will touch the x-axis at $x=1$, $x=-1$. It will cross the x-axis at $x=\frac{1}{2}$

(e) Testing for symmetry

$$p(-x) = 4x^5 + 2x^4 + 8x^3 - 4x^2 + 4x + 2$$

$$= p(x) = 4x^5 - 2x^4 - 8x^3 + 4x^2 + 4x - 2$$

$p(x)$ is neither odd nor even



$$2 + x^4 + 5x^5 - 8x^6 = (x+1) \cdot 5(x-2)$$