

p. 298 # 27

$$f(x) = x^2 - 2x - 3$$

$$\left[\frac{1}{2}(-2)\right]^2 = 1$$

$$= (x^2 - 2x + 1) - 3 - 1$$

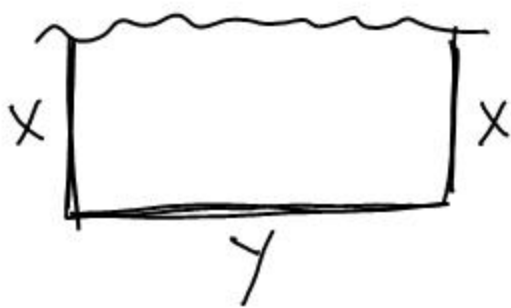
$$= (x - 1)^2 - 4$$

vertex
at $(1, -4)$
opens up

#40 $D: \mathbb{R}$ vertex: $(2, -11)$ \cup

$$R: [-11, \infty)$$

#65.



$$A = xy \quad \leftarrow \quad 2x + y = 600$$

$$A = x(600 - 2x) \quad \leftarrow \quad y = 600 - 2x$$

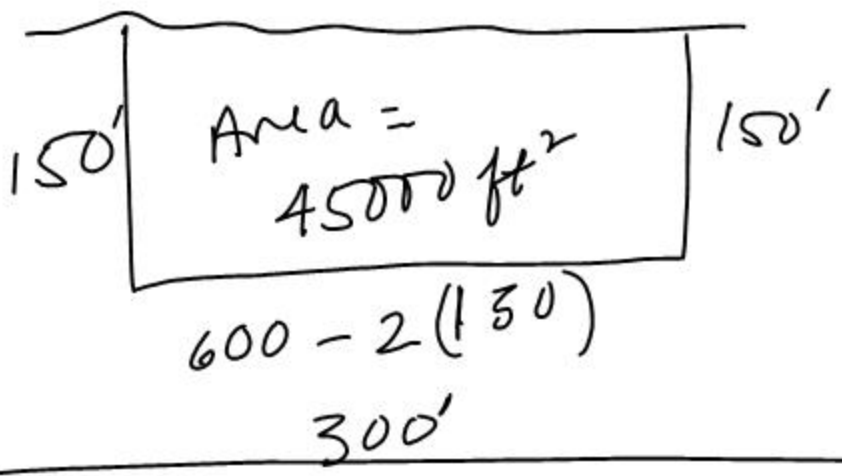
$$A = -2x^2 + 600x$$

$$A = -2(x^2 - 300x + 22500) + 45000$$

$$\begin{array}{r} -150 \\ -150 \\ \hline 7500 \\ 1500 \\ \hline 22500 \end{array}$$

$$A = -2(x - 150)^2 + 45000$$

vertex (+150, 45000)



Simplify

$$\frac{2 - \sqrt{-32}}{4}$$

$$\frac{\sqrt{-32}}{\sqrt{-1 \cdot 16 \cdot 2}}$$

$$= \frac{2 - 4\sqrt{2}i}{4}$$

$$4\sqrt{2}i$$

$$= \frac{2 - 4\sqrt{2}i}{4} = \frac{1}{2} - \frac{4\sqrt{2}i}{4}$$

$$= \frac{1}{2} - \sqrt{2}i$$

Ex. Simplify $(3-2i)(4+3i) = 12+9i-8i-6i^2$
 $12+i-6i^2 = 12+i+6 = 18+i$

Ex solve: $x^2 - 2x + 5 = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{2 \pm \sqrt{4 - 4(1)(5)}}{2(1)}$$

$$= \frac{2 \pm \sqrt{-16}}{2}$$

$$= \frac{2 \pm 4i}{2}$$

$$= \underline{\underline{1 \pm 2i}}$$

1 Find the vertex of $y = x^2 - 8x + 10$

$$y = (x^2 - 8x + \underline{16}) + 10 - 16$$

$$y = (x - 4) - 6 \quad \text{vertex} \\ (4, -6)$$

QUIZ 8-30
NO CALCULATORS

(1) Write in $a+bi$ form: $\frac{3 + \sqrt{-50}}{2}$

(2) Multiply: $(5+4i)(5+4i)$

(3) Solve: $x^2 - 4x + 8 = 0$

(4) Find the vertex: $y = x^2 + 12x - 9$

Sketching Polynomial Functions

EX $y = (x+2)(x-4)(x+5)$ ← NOTE the factored form

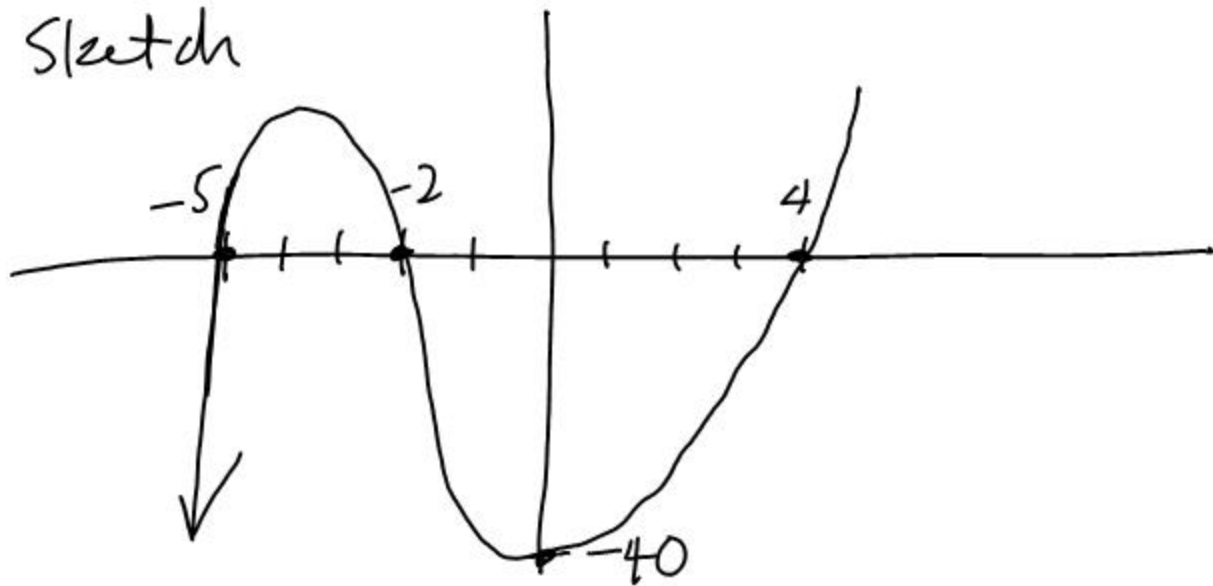
zeros (x-intercepts): -2, 4, -5

$$0 = (x+2)(x-4)(x+5)$$

y-intercept: -40 (there can only be one)

$$y = (0+2)(0-4)(0+5) = -40$$

Sketch

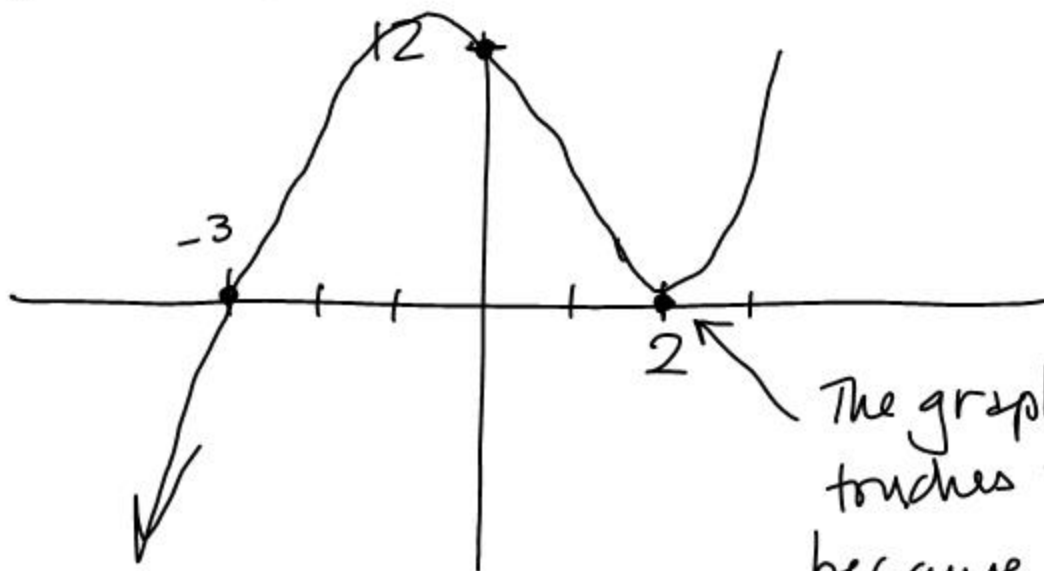


Ex $y = (x - 2)^2 (x + 3)$

x-intercepts: 2, -3

y-intercept: 12

$$(0 - 2)^2 (0 + 3) = 12$$

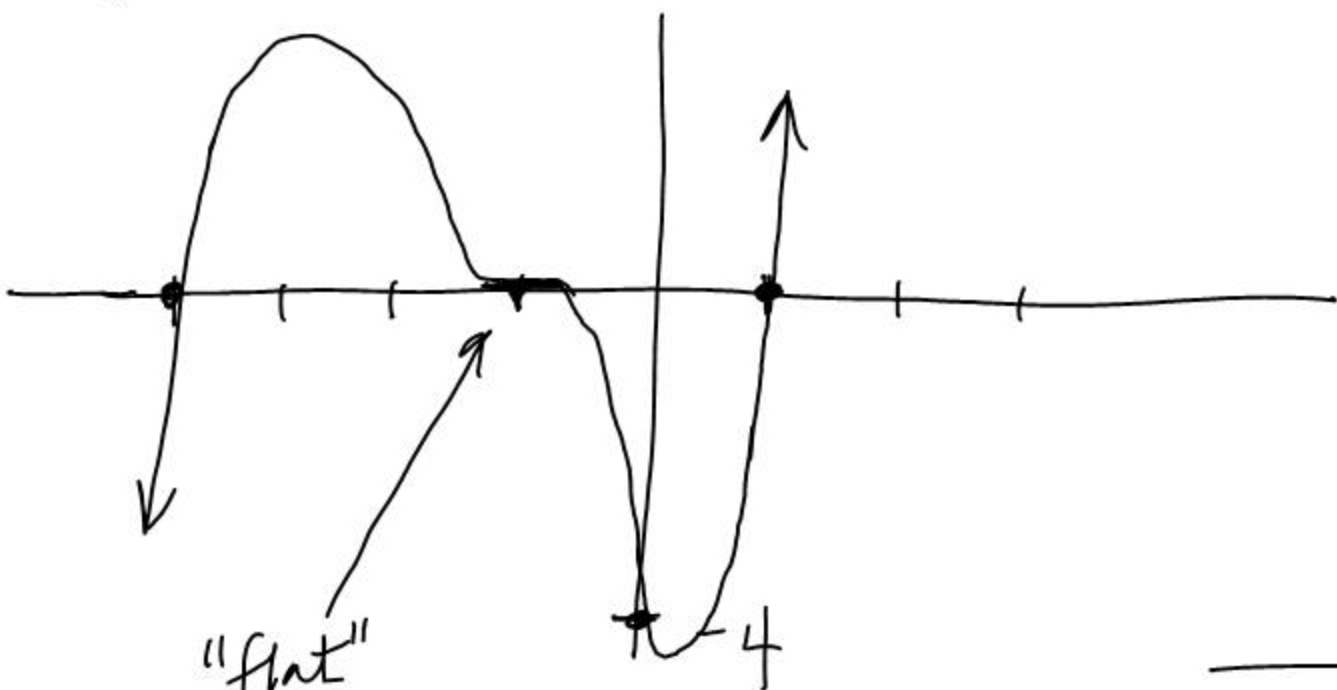


The graph just touches the x-axis because of the square

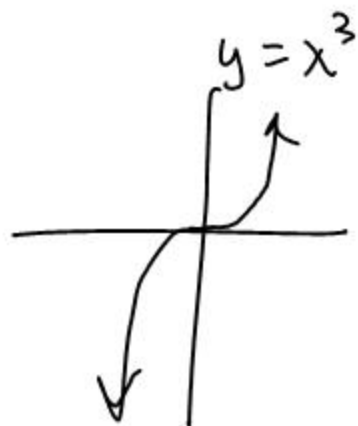
Ex $y = (x+1)^3 (x-1) (x+4)$

x-intercepts -1, 1, -4

y-intercept -4 $(0+1)^3 (0-1) (0+4)$



"flat" spot
a point of inflection



HW p. 313 # 55-60

$$x^2 - 4 \\ (x+2)(x-2)$$

$$y = x(x+2)(x-1)$$

↑