

Lesson 1: Review of Functions

$$f(x) = 4x^2 - x + 5$$

$$f(1) = 4(1)^2 - (1) + 5 = 8$$

$$f(a+1) = 4(a+1)^2 - (a+1) + 5$$

$$= 4(a^2 + 2a + 1) - a - 1 + 5$$

$$= 4a^2 + 8a + 4 - a - 1 + 5$$

$$= 4a^2 + 7a + 8$$

$$\begin{aligned}(a+1)^2 &= (a+1)(a+1) \\ &= a^2 + 2a + 1\end{aligned}$$

Domain

- all possible numbers x can be

$$f(x) = \frac{1}{x-2} \quad x \neq 2$$

$$\text{domain: } (-\infty, 2) \cup (2, \infty)$$

→ no division by zero

→ no negative numbers under
even root

$$\sqrt{x^2 - 8x}$$

domain?

$$x^2 - 8x \geq 0$$

$$x(x-8) \geq 0$$

Solve: $x(x-8) = 0$

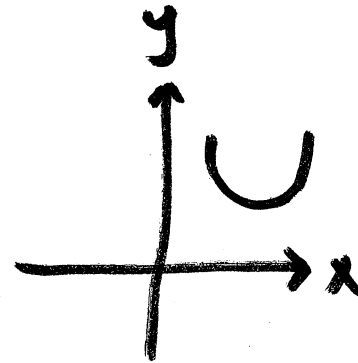
$x=0, x=8$

| | | | | | |
|----------|-----|-------|---|-------|-----|
| x | - | 0 | + | 0 | + |
| $x-8$ | - | 0 | - | 0 | + |
| $x(x-8)$ | (+) | 0 | - | 0 | (+) |
| | | | | | |
| | | $x=0$ | | $x=8$ | |

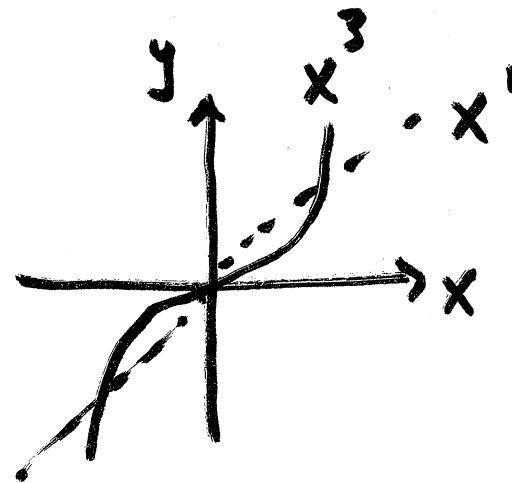
domain: $(-\infty, 0] \cup [8, \infty)$

Graphs of Basic Functions

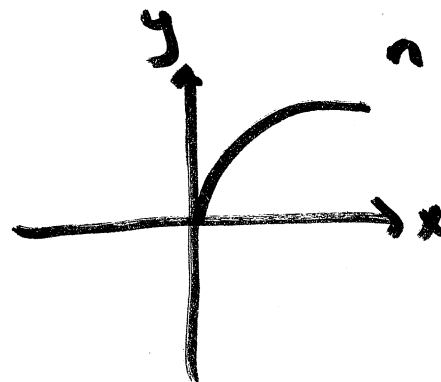
$$f(x) = x^n \quad n \text{ even}$$



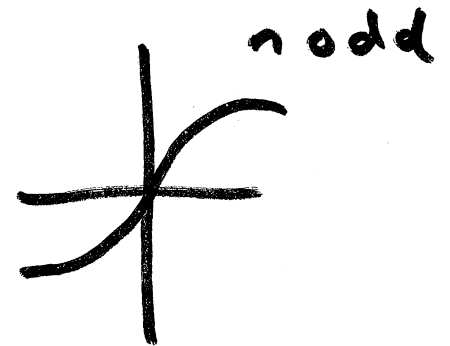
n odd



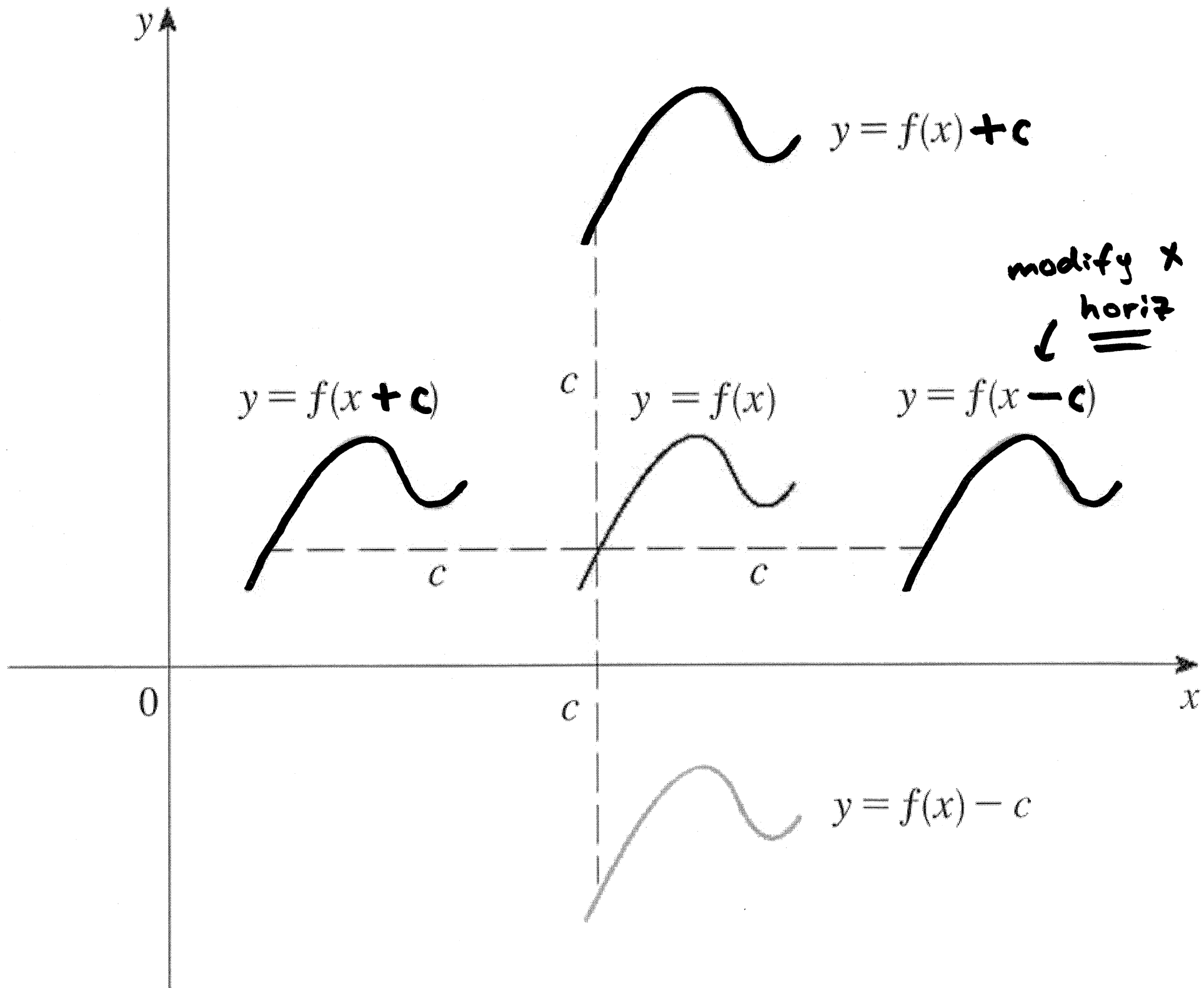
$$f(x) = \sqrt[n]{x} = x^{1/n}$$



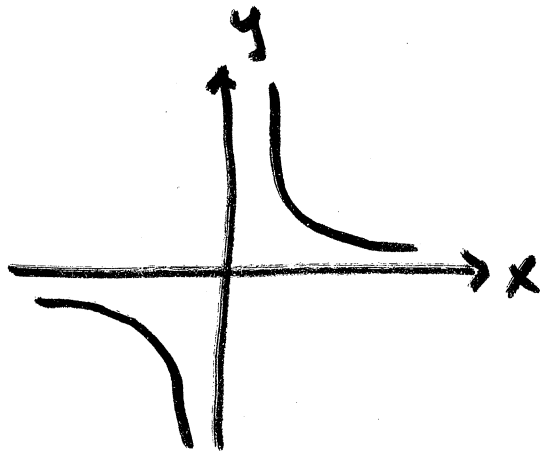
n even



n odd



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



$$f(x) = \frac{1}{x-5}$$

vs $f(x) = \frac{1}{x}$

↓
move $\frac{1}{x}$ 5 units to
right

