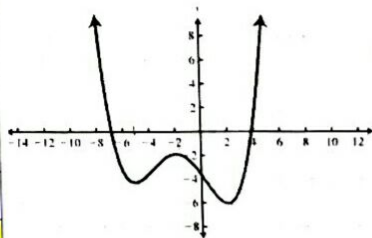


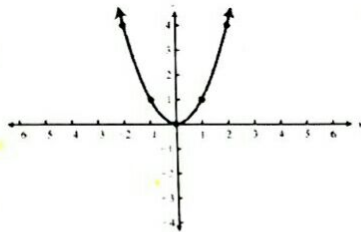
Part 1: Parts of a Graph

Identify the following from the graph of $f(x)$ to the right:

| | |
|--|--|
| 1. Domain | $(-\infty, \infty)$ |
| 2. Range | $[-6, \infty)$ |
| 3. x-intercept(s) | $(-7, 0)$ $(4, 0)$ |
| 4. y-intercept(s) | $(0, -4)$ |
| 5. Relative Minimum(s) | -2 |
| 6. Relative Maximum(s) | $\{-4, -6\}$ |
| 7. Increasing Interval(s) | $(-5, -2) \cup (2, \infty)$ |
| 8. Decreasing Interval(s) | $(-\infty, -5) \cup (-2, 2)$ |
| 9. End Behavior: | as $x \rightarrow -\infty$ $f(x) \rightarrow \infty$ as $x \rightarrow \infty$ $f(x) \rightarrow \infty$ |
| 10. In what domain interval(s) is $f(x) < 0$? | $(-7, 4)$ |



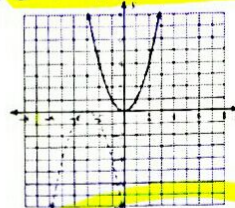
| | |
|--|--|
| 1. Domain | $(-\infty, \infty)$ |
| 2. Range | $[0, \infty)$ |
| 3. x-intercept(s) | $(0, 0)$ |
| 4. y-intercept(s) | $(0, 0)$ |
| 5. Relative Minimum(s) | 0 |
| 6. Relative Maximum(s) | None |
| 7. Increasing Interval(s) | $(0, \infty)$ |
| 8. Decreasing Interval(s) | $(-\infty, 0)$ |
| 9. End Behavior: | as $x \rightarrow -\infty$ $f(x) \rightarrow \infty$ as $x \rightarrow \infty$ $f(x) \rightarrow \infty$ |
| 10. In what domain interval(s) is $f(x) < 0$? | None |



Part 2: Parent Functions and Transformation

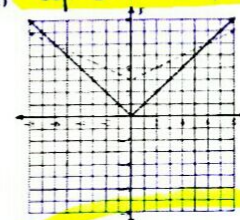
Describe the transformations necessary to transform the graph of $f(x)$ (solid line) into that of $g(x)$ (dashed line).

1) **Left 3, reflect over x**



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

2) **up 3, compress by 1/2**



$y = \frac{1}{2}|x| + 3$

Describe the transformations necessary to transform the graph of $f(x)$ into that of $g(x)$.

3) $f(x) = \sqrt{x}$
 $g(x) = -3\sqrt{x} - 1$

reflect over x
vert stretch by 3
down 1

4) $f(x) = x^3$
 $g(x) = 3(x+1)^3$

vertical stretch by 3
left 1

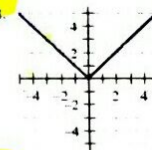
Part 3: Even and Odd Functions

1. If a function is even, its graph is symmetric with respect to the **y-axis**. This also means that $f(-x) = y$.

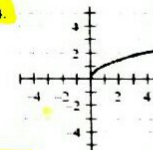
2. If a function is odd, its graph is symmetric with respect to the **origin**. This also means that $f(-x) = -y$.

Determine whether each function graphed is even, odd, or neither

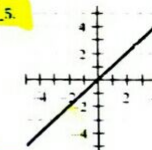
E₃



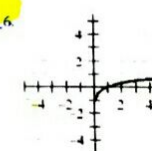
N₄



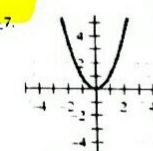
O₅



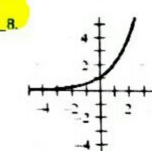
N₆



E₇



N₈



Part 4: Inverse

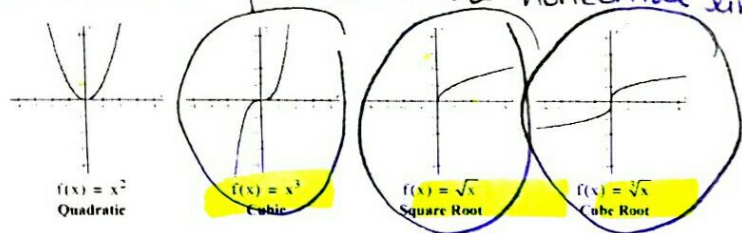
Find the inverse of each:

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

$$f(x) = \frac{2x-3}{4} \rightarrow x = \frac{2y-3}{4} \rightarrow 4x = 2y-3 \rightarrow 4x+3 = 2y \rightarrow y = \frac{4x+3}{2} \rightarrow f^{-1}(x) = \frac{4x+3}{2}$$

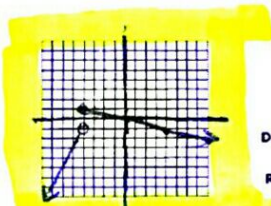
$$f(x) = \frac{x+3}{x-2} \rightarrow x = \frac{y+3}{y-2} \rightarrow x(y-2) = \frac{y+3}{y-2} \rightarrow xy - 2x = \frac{y+3}{y-2} \rightarrow xy - y = 2x + 3 \rightarrow y(x-1) = 2x+3 \rightarrow y = \frac{2x+3}{x-1} \rightarrow f^{-1}(x) = \frac{2x+3}{x-1}$$

State if the following all pass vertical & horizontal line test



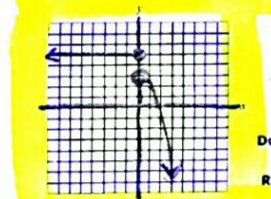
Part 5: Piecewise Functions

$$f(x) = \begin{cases} 2x+7 & \text{if } x < -4 \\ -\frac{1}{4}x & \text{if } x \geq -4 \end{cases}$$



Domain: $(-\infty, -4)$
Range: $(-\infty, 1]$

$$p(x) = \begin{cases} 5 & \text{if } x \leq 0 \\ -x^2 + 3 & \text{if } x > 0 \end{cases}$$



Domain: $(-\infty, \infty)$
Range: $(-\infty, 3] \cup \{5\}$

Evaluate the piecewise function.

$$1) f(x) = \begin{cases} 3x-5, & x > 4 \\ x^2, & x \leq 4 \end{cases}$$

a) $f(7) = 3(7) - 5 = 21 - 5 = 16$

b) $f(4) = 4^2 = 16$

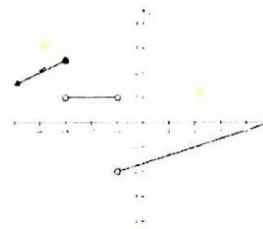
c) $f(-3) = (-3)^2 = 9$

$$2) f(x) = \begin{cases} -2|x+1|, & x \leq 1 \\ 3, & 1 < x < 3 \\ 6-2x, & x \geq 3 \end{cases}$$

a) $f(10) = 6 - 2(10) = 6 - 20 = -14$

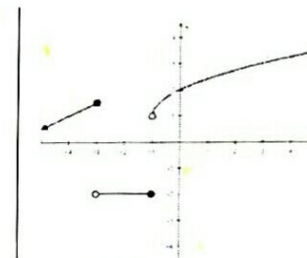
b) $f(2) = 3$

c) $f(0) = -2|0+1| = -2|1| = -2$



$f(2) = -1$
 $f(-3) = 2.5$
 $f(-1) = \text{undefined}$
 $f(-4) = 2$

$3 + f(2) - f(-4) = 3 + (-1) - 2 = 3 - 1 - 2 = 2 - 2 = 0$



$f(0) = 2$
 $f(-4) = 1$
 $f(-1) = -2$
 $f(3) = 3$

$-f(0) + 2f(-1) = -2 + 2(-2) = -2 - 4 = -6$