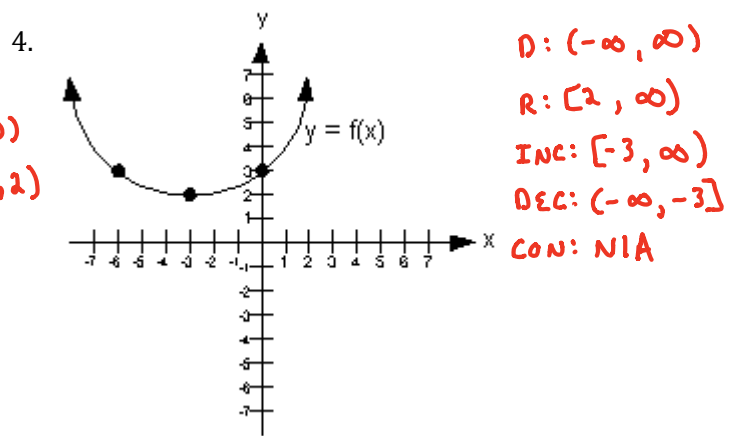
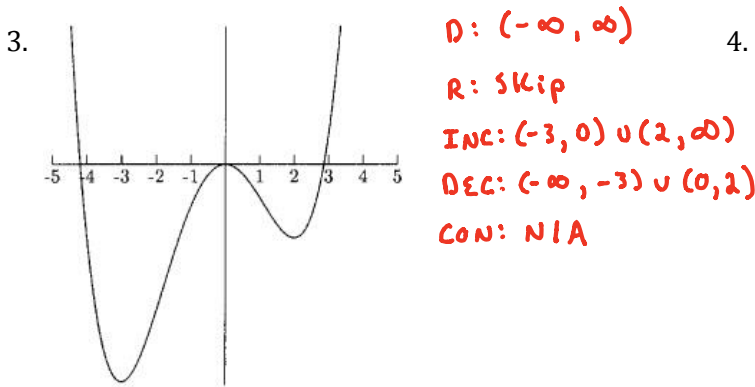
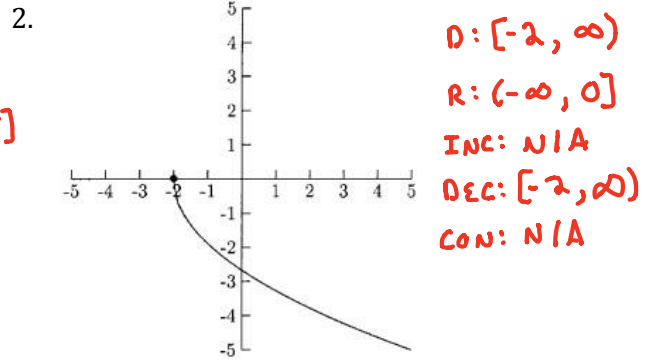
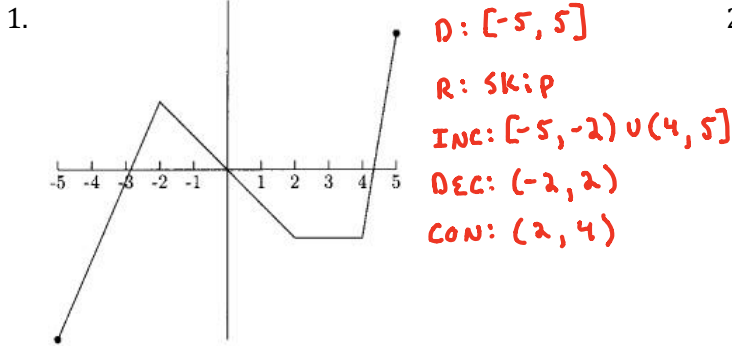


State the domain and range, where the graph is increasing, decreasing and constant in interval notation.



Find the **domain** of each of the following functions.

5. $f(x) = x^2 - 3$ $(-\infty, \infty)$

6. $f(x) = \frac{1}{x^2 - 6x + 9}$ $(-\infty, 3) \cup (3, \infty)$
 $(x-3)(x-3) \neq 0$
 $x \neq 3$

7. $f(x) = \frac{3x}{x^2 - 8x + 15}$ $(-\infty, 3) \cup (3, 5) \cup (5, \infty)$
 $(x-3)(x-5) \neq 0$
 $x \neq 3$ $x \neq 5$

8. $g(x) = \sqrt{3x - 7} \geq 0$ $[\frac{7}{3}, \infty)$
 $x \geq \frac{7}{3}$

9. $f(x) = |x + 4|$ $(-\infty, \infty)$

10. $f(x) = \frac{\sqrt{x+1}}{x-7} \geq 0$ $x \geq -1$ $x \neq 7$ $[-1, 7) \cup (7, \infty)$
 $x \geq -1$
 $x \neq 7$

Evaluate the following functions:

11. If $f(x) = x^3 + 2$, find:

a) $f(-2) = -6$

b) $f(3) = 29$

c) $f(0) = 2$

d) $f(a) = a^3 + 2$

12. Find $\frac{f(a-h) - f(a)}{h}$, $h \neq 0$ for $f(x) = -2x^2 + 1$

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

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

$\frac{-2a^2 + 4ah - 2h^2 + 1 - (-2a^2 + 1)}{h}$
 $\frac{-2a^2 + 4ah - 2h^2 + 1 + 2a^2 - 1}{h}$
 $\frac{4ah - 2h^2}{h} = 4a - 2h$