

In 1 - 5, identify the domain, range, vertical and horizontal asymptotes of each function and then sketch the graph.

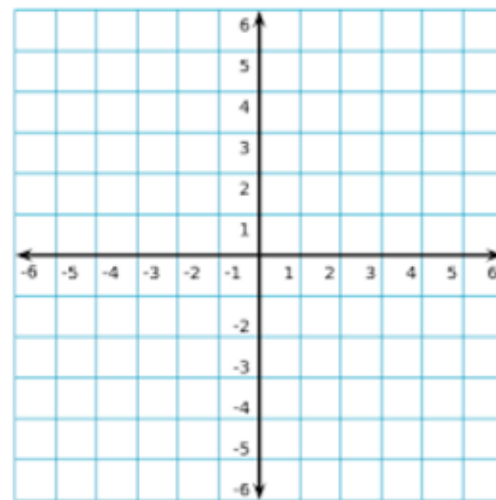
1.)  $f(x) = \frac{-4}{x}$

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Horizontal Asymptote(s): \_\_\_\_\_



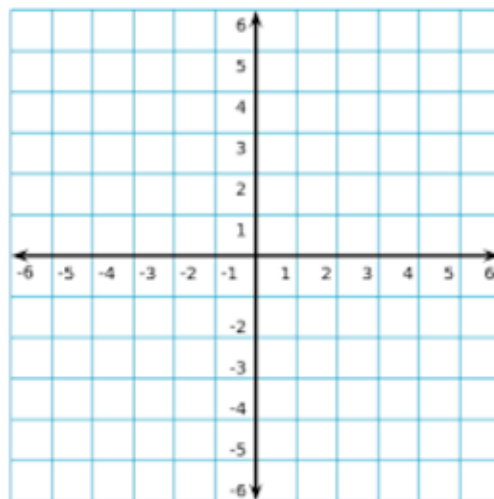
2.)  $f(x) = \frac{4}{x-1} + 1$

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Horizontal Asymptote(s): \_\_\_\_\_



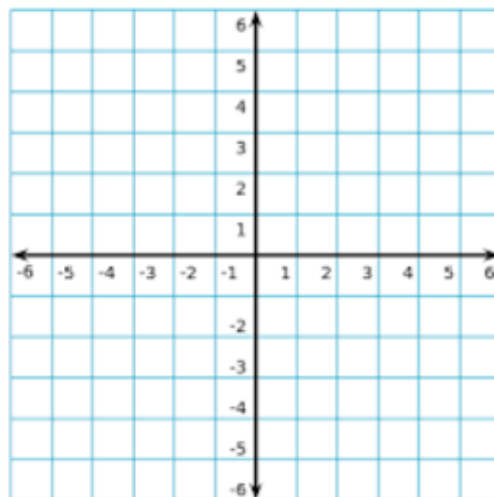
3.)  $f(x) = \frac{-3}{x-1} - 1$

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Horizontal Asymptote(s): \_\_\_\_\_



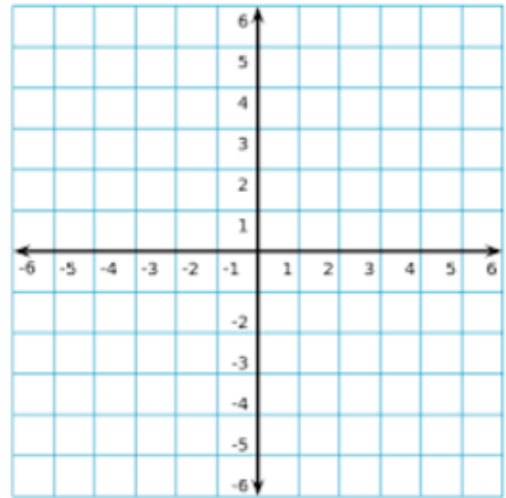
$$4.) f(x) = \frac{2}{x-3} + 1$$

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Horizontal Asymptote(s): \_\_\_\_\_



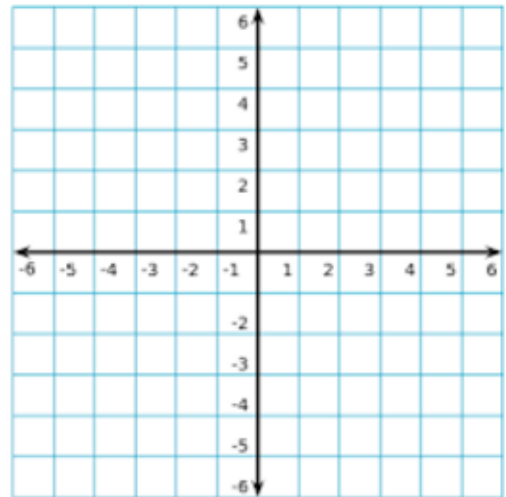
$$5.) f(x) = \frac{3}{x+1} - 2$$

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Horizontal Asymptote(s): \_\_\_\_\_



**In 6 - 15, identify any holes and all vertical and horizontal asymptotes of each function.**

$$6.) f(x) = \frac{1}{3x^2 + 3x - 18}$$

$$7.) f(x) = \frac{x-2}{x-4}$$

$$8.) f(x) = \frac{x^3 - x^2 - 6x}{-3x^2 - 3x + 18}$$

$$9.) f(x) = \frac{x^2 + x - 6}{-4x^2 - 16x - 12}$$

$$10.) f(x) = \frac{-4}{x^2 - 3x}$$

$$11.) f(x) = \frac{x - 4}{-4x + 64}$$

$$12.) f(x) = \frac{x^3 - 9x}{3x^2 - 6x - 9}$$

$$13.) f(x) = \frac{x + 2}{2x + 6}$$

$$14.) f(x) = \frac{2x^2 + 10x + 12}{x^2 + 3x + 2}$$

$$15.) f(x) = \frac{3}{6x^2 + x - 35}$$