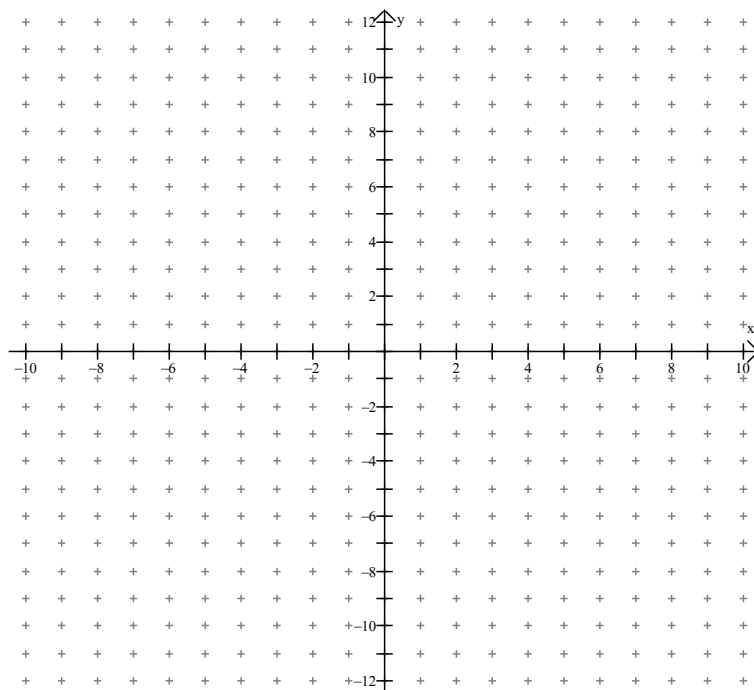1) Graph each of the following reciprocal functions. Start by graphing the function in the denominator. Show as much characteristic information about the graph as you can (e.g. intercepts, asymptotes with equations, other defining points, etc).
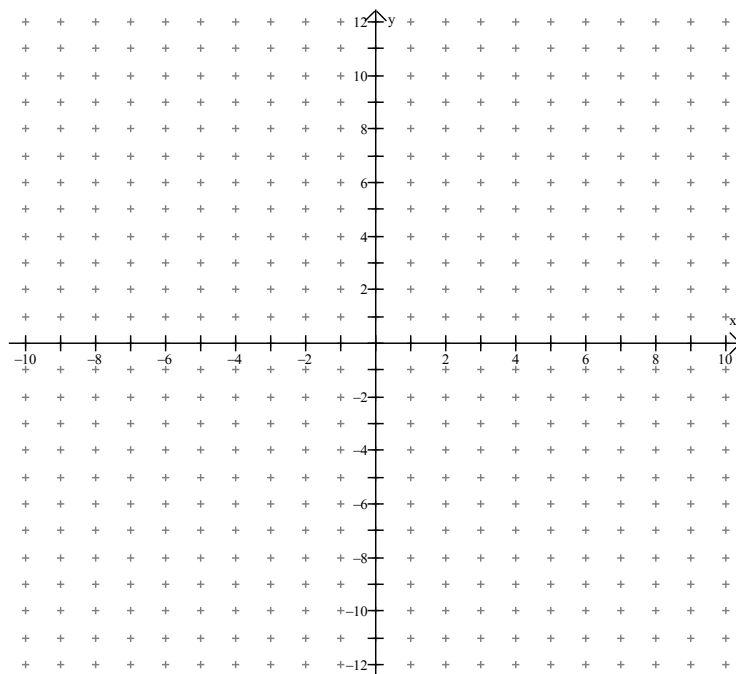
a) $f(x) = \frac{1}{x^2-4}$
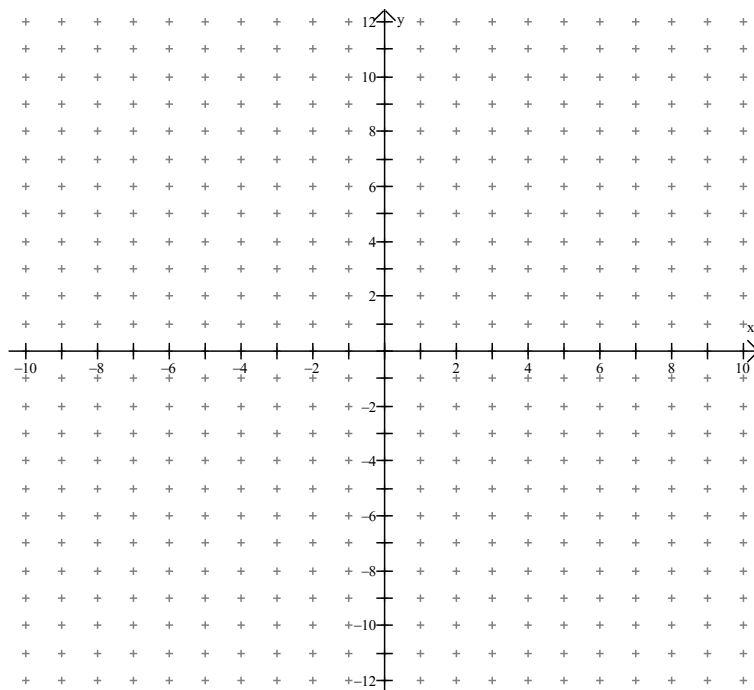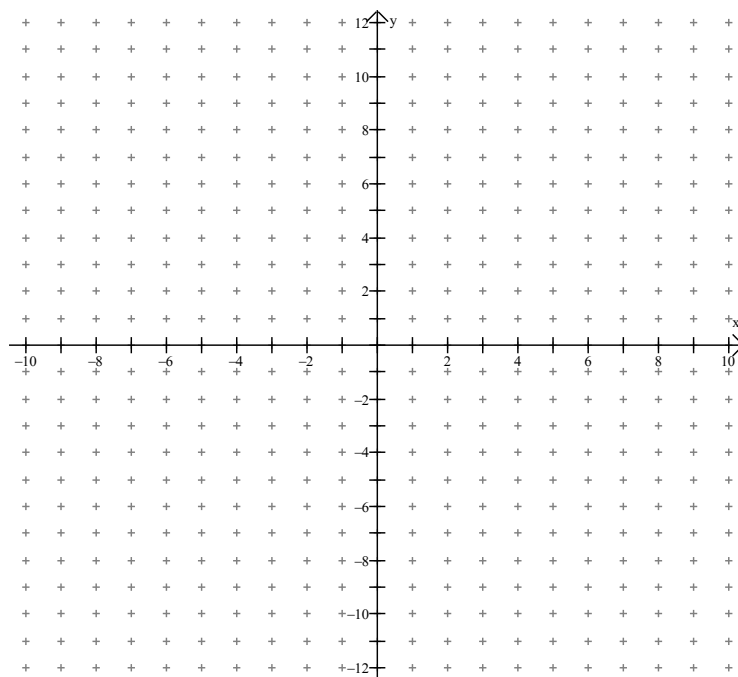
b) $g(x) = \frac{2}{x+3}$

2) Graph each of the following functions. Make sure to identify key characteristics of the functions including intercepts and asymptotes.

a) $f(x) = \dfrac{x-3}{2x-1}$

b) $g(x) = \dfrac{x+2}{x-1}$
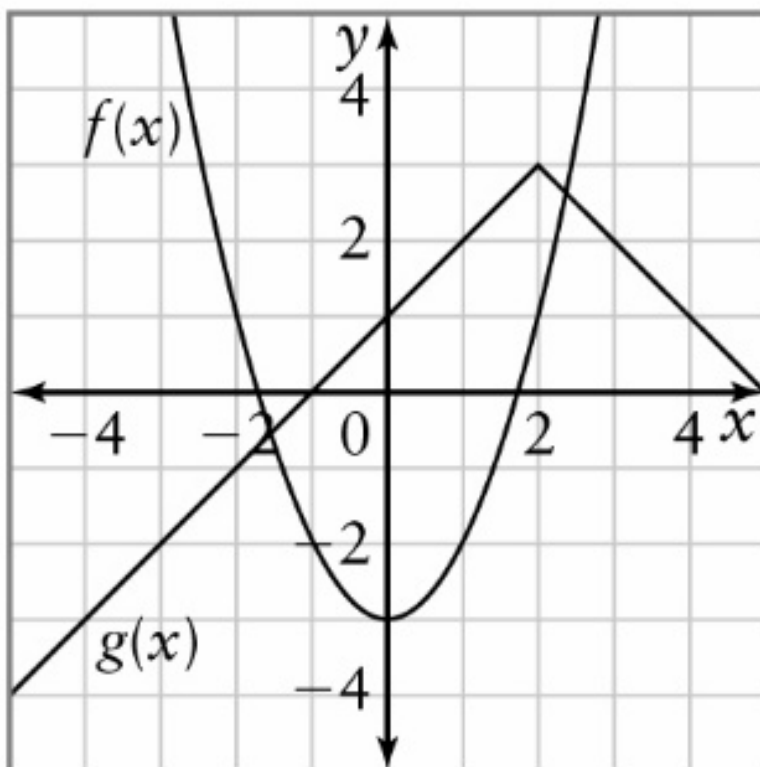
3) Use a calculator to approximate each to the nearest thousandth

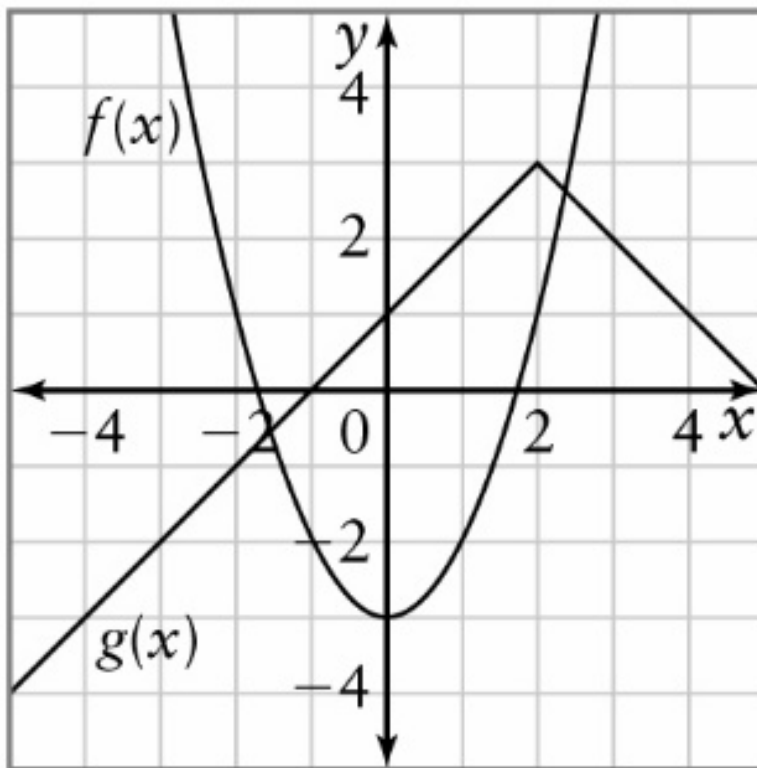**a)** ln 7   **b)** ln e **c)** e^5

4) Use the superposition principal to draw a graph of each.

a) $y = f(x) + g(x)$

b) $y = g(x) - f(x)$

5) Given that $f(x) = 2x + 3$ and $g(x) = x^2 + x$, and $h(x) = x^2 - 3$, develop an algebraic model for...

a) $y = f(x) - g(x)$

b) $y = f(x) - g(x) + h(x)$

6) If $f(x) = 2x + 3$ and $g(x) = x^2 + x$, and $h(x) = x^2 - 3$, develop algebraic models for each.

a) $y = f(h(x))$ **b)** $y = g(f(x))$ **c)** $y = f(f^{-1}(x))$

7) Solve the following equations

a) $\frac{10}{x+1} = x - 2$ **b)** $\frac{x+3}{x-1} = 2x + 1$

c) $\frac{3}{3x+2} = \frac{6}{5x}$ **d)** $\frac{x-2}{x+3} = \frac{x-4}{x+5}$

e) $\frac{2}{x} + \frac{5}{3} = \frac{7}{x}$

f) $\frac{10}{x+3} + \frac{10}{3} = 6$

g) $\frac{3}{x} + \frac{4}{x+1} = 2$

h) $3 = \frac{6}{2x^2-x-4}$

2) Solve the following rational inequalities using a factor table

a) $\frac{6x}{x+1} > 4$

b) $\frac{1}{2x+10} \geq \frac{1}{x+3}$

c) $\dfrac{2x-3}{x+5} \geq \dfrac{2x+7}{x-3}$

d) $\dfrac{7}{x-3} \geq \dfrac{2}{x+4}$

e) $\dfrac{x^2-x-12}{x-1} < 0$

f) $\dfrac{6x^2-5x+1}{2x+1} < 0$

g) $\dfrac{2x-10}{x} > x - 5$