1. **Solve the following:**

    a. y varies inversely with the square of x. If $y = 50$ when $x = 4$, find y when $x = 5$.

    b. d varies jointly with r and t. If $d = 110$ when $r = 55$ and $t = 2$, find r when $d = 40$ and $t = 3$.

2. **Graph the following; label all asymptotes.**

    a. $y = \dfrac{-1}{x-2} + 3$
    b. $y = \dfrac{x-7}{x^2+6x+5}$
    c. $y = \dfrac{x^2+3x}{x+3}$

3. **Perform the indicated operations and simplify.**

    a. $\dfrac{x^2-6x+8}{x^2-5x+6} \div \dfrac{x^2-7x+12}{x^2-4x+4}$
    b. $\dfrac{x+5}{5-x} \cdot \dfrac{x^2-4x-5}{x^2}$

    c. $\dfrac{3a}{9a^2-4b^2} - \dfrac{1}{3a+2b}$
    d. $\dfrac{16x-x^2}{x^2-4} + \dfrac{2x+3}{2-x} + \dfrac{3x-2}{x+2}$

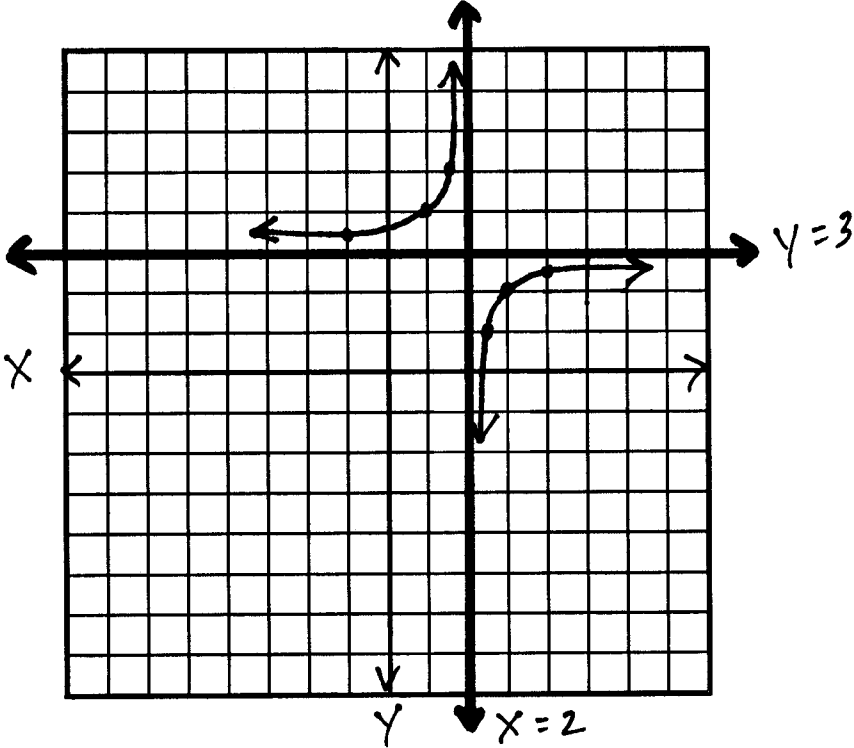   **e.** $\dfrac{3-\dfrac{6}{x+5}}{1+\dfrac{7}{x-4}}$

4. **Solve the following.**

    a. $\dfrac{5x}{x-5} + \dfrac{4}{x+6} = \dfrac{54x+5}{x^2+x-30}$
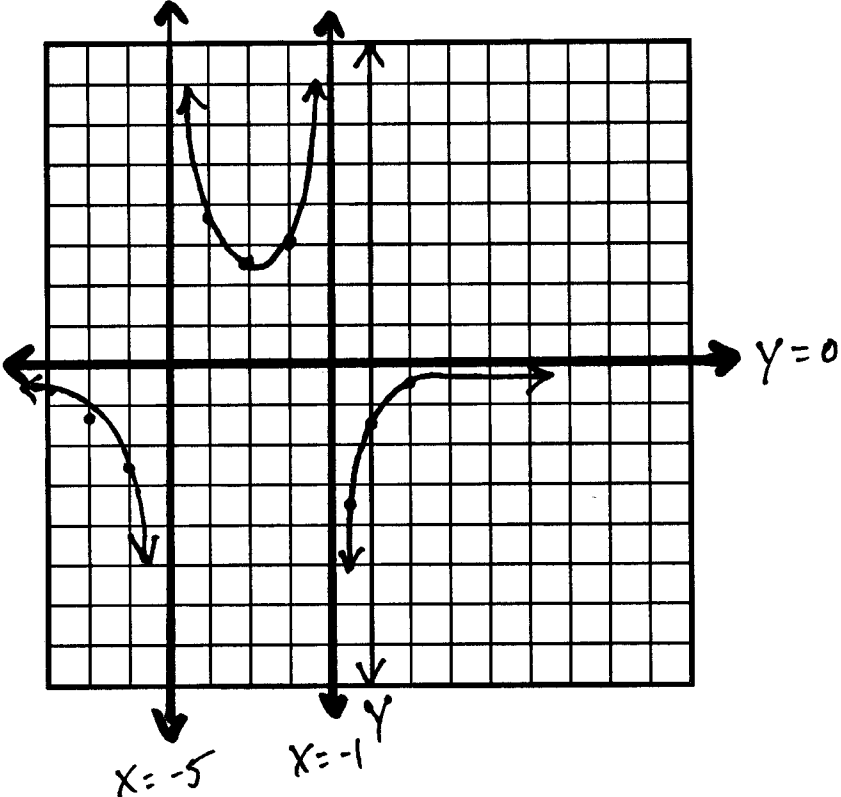   **b.** $\dfrac{x}{x-1} - \dfrac{2}{1-x^2} = \dfrac{8}{x+1}$

1a. $y = 32$

1b. $r = \dfrac{40}{3}$

2a.

$Y = 3$

$X = 2$

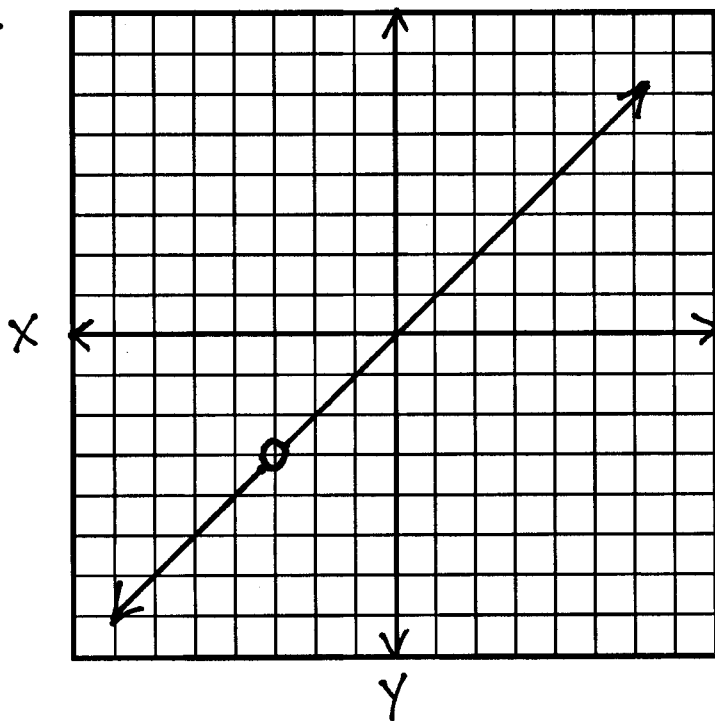**2b.**

$Y = 0$

$X = -5$ $X = -1$

2c.

} No horizontal asymptote

3a. $\dfrac{x^2 - 4x + 4}{x^2 - 6x + 9}$

3b. $-\dfrac{x^2 + 6x + 5}{x^2}$ or $\dfrac{-x^2 - 6x - 5}{x^2}$ or $\dfrac{x + 6x + 5}{-x^2}$

3c. $\dfrac{2b}{9a^2 - 4b^2}$

3d. $\dfrac{1}{x + 2}$

3e. $\dfrac{3x - 12}{x + 5}$

4a. $x = -1$ (5 extraneous)

4b. $x = 2$ or 5