

LESSON 133

1.
$$\frac{x-2}{x+2}$$

2.
$$x+1$$

3. 0

4.
$$\frac{x}{x-2}$$

5. $x = -2$

6. No solutions

7. Vertical: $x = -3$

Horizontal: $y = 2$

9. 12 hours

10. 2 amperes

Worked-out solutions:

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

2.
$$\frac{x^2 - 9}{x+3} \div \frac{x-3}{x+1} = \frac{x^2 - 9}{x+3} \cdot \frac{x+1}{x-3}$$

$$= \frac{(x+3)(x-3)}{x+3} \cdot \frac{x+1}{x-3} = x+1$$

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

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

$$= \frac{x-1-2x+x+1}{x(x+1)} = \frac{0}{x(x+1)} = 0$$

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

$$= \frac{2x}{x+x-4} = \frac{2x}{2x-4} = \frac{x}{x-2}$$

5.
$$\frac{1}{2x} - \frac{1}{4} = \frac{1}{x}$$

Restrictions: $x \neq 0$
LCD = $4x$

$$4x \left(\frac{1}{2x} - \frac{1}{4} \right) = 4x \left(\frac{1}{x} \right)$$

$$2 - x = 4$$

$$x = -2$$

Simplify.

Solve for x .

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

Restrictions: $x \neq 0, 1$
LCD = $x(x-1)$

$$x(x-1) \left(\frac{3-x}{x-1} \right) = x(x-1) \left(\frac{2}{x} + \frac{2}{x(x-1)} \right)$$

$$x(3-x) = 2(x-1) + 2$$

$$x^2 - x = 0$$

$$x(x-1) = 0$$

$$x = 0, x = 1$$

Simplify.

Write in standard form.

Solve for x .

Both are extraneous, so there are no solutions.

7. The vertical asymptote is $x = -3$ because it is the value of x that makes the denominator zero.

The horizontal asymptote is $y = 2/1 = 2$ because it is the ratio of the leading coefficients of the numerator and denominator when their degrees are equal.

8. The vertical asymptote is $x = h = 2$.

The horizontal asymptote is $y = k = 1$.

9. Let $x = \text{Paul's time alone}$

Joe's rate + Paul's rate = combined rate, so

$$\frac{1}{6} + \frac{1}{x} = \frac{1}{4}$$

Solve for x , and you get $x = 12$.

It will take 12 hours.

10. $x = \text{resistance}, y = \text{current}$

Plug $x = 3$ and $y = 4$ into $y = k/x$.

$$4 = k/3; k = 12$$

The equation is $y = 12/x$.

When $x = 6, y = 2$.

It will be 2 amperes.