

1. Find the zero(s), vertical asymptote(s), horizontal asymptote (if one exists) and y intercepts.

a) $f(x) = \frac{3}{x-4} - 1$

V.A. $x=4$ zero $x=7$
H.A. $y=-1$ y int $(0, -\frac{7}{4})$

b) $f(x) = \frac{2x^2-8}{x^2-9}$

V.A. $x=3, -3$ zeros $x=2, -2$
H.A. $y=2$ y int $(0, \frac{8}{9})$

c) $f(x) = \frac{x^3+27}{x^2+3x-10}$

V.A. $x=-5, 2$
H.A. None
zero $x=-3$
y int $(0, -\frac{27}{10})$

2. Graph a and b from part 1.

3. Simplify the following.

a) $\frac{x^2+7x+12}{x^2-2x-24}$

$\frac{x+3}{x-6}$

b) $\frac{x^3-9x^2-x+9}{x^2-8x-9}$

$x-1$

c) $\frac{x^3-8}{x^3+2x^2+4x}$

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

4. Multiply or Divide.

a) $\frac{80x^4}{y^3} \cdot \frac{xy}{5x^2}$

$\frac{16x^3}{y^2}$

b) $\frac{2x^2-10}{x+1} \cdot \frac{x+2}{3x^2-15}$

$\frac{2(x+2)}{3(x+1)}$

c) $\frac{2xyz}{x^2z^2} \div \frac{6y^3}{3xz}$

$\frac{1}{y^2}$

d) $\frac{x^2+8x+16}{x+2} \div \frac{x^2+6x+8}{x^2-4}$

$\frac{(x+4)(x-2)}{x+2}$

e) $(x-5) \div \frac{x^2-11x+30}{x^2+7x+12} \cdot (x-6)$

$(x+3)(x+4)$

5. Add or subtract

a) $\frac{6}{4x^2} + \frac{2}{5x}$

$\frac{8x+30}{20x^2}$

b) $\frac{7}{6x-12} - \frac{x+3}{6x}$

$\frac{-x^2+6x+6}{6x(x-2)}$

c) $\frac{x^2+x-3}{x^2-12x+32} + \frac{3x}{x-8}$

$\frac{4x^2-11x-3}{(x-8)(x-4)}$

d) $\frac{4x}{x+1} + \frac{5}{2x-3} - \frac{4}{x}$

$\frac{8x^3-15x^2+9x+12}{(x+1)(2x-3)(x)}$

6. Simplify

a) $\frac{\frac{x}{2}-5}{6+\frac{3}{x}}$

$$\frac{x^2 - 10x}{12x + 6}$$

b) $\frac{\frac{4}{x^2-9} + \frac{2}{x-3}}{\frac{1}{x+3} + \frac{1}{x-3}}$

$$\frac{x+5}{x}$$

7. Solve

a) $\frac{x-2}{x+2} = \frac{3}{x}$

$$x = 6, -1$$

b) $\frac{6}{x+4} + 4 = \frac{2x+2}{x-1}$

$$-2 \pm \sqrt{19}$$

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

$$x = -4$$

8. The intensity I of a sound (in watts per square meter) varies inversely with the square of the distance d (in meters) for the sound's source. At a distance of 1 meter from the stage, the intensity of the sound at a Rolling Stones show is about 10 watts per square meter. Write an equation relating I and d . If you are sitting 15 meters from the stage, what is the intensity of the sound?

$$I = \frac{k}{d^2}$$

$$\frac{2}{45} \text{ watts/m}^2$$

9. You've paid \$120 for a membership at a health club. However, you still need to pay \$5 per hour for court time when you play racquetball. How many hours would you need to play before your average cost per hour is \$9?

30 hours

10. Suzy, who owns a beverage company, wants to redesign the cans she uses. She wants the cans to continue to hold 355 cubic centimeters of beverage. However, she wants to use the least amount of material. What should the dimensions of the can be?

$$r = 3.84 \text{ cm}$$

$$h = 7.66 \text{ cm}$$