

For each rational expression, state the vertical asymptotes (VA), horizontal asymptotes (HA), and removable discontinuities (holes). Then, simplify the expression.

$$1) \frac{x-5}{x^2-10x+25}$$

VA: _____

HA: _____

RD: _____

$$2) \frac{x^2-7x-30}{x^2-5x-24}$$

VA: _____

HA: _____

RD: _____

$$3) \frac{4n-4}{6n-20}$$

VA: _____

HA: _____

RD: _____

$$4) \frac{x^3-x^2-42x}{2x^2-20x+42}$$

VA: _____

HA: _____

RD: _____

$$5) \frac{x^2+2x-80}{2x^3-24x^2+64x}$$

VA: _____

HA: _____

RD: _____

Rationalize!

$$\frac{3}{4+4\sqrt{5}}$$

$$7) \frac{2+5\sqrt{3}}{-4+4\sqrt{2}}$$

Factor!

8) $4n^2 - 49$

9) $p^2 - 36$

10) $20a^2 - 45$

11) $x^3 + 125$

12) $8x^3 + 27$

13) $3x^3 - 375$

Simplify and state the asymptotes / discontinuities.

14) $\frac{x^2 - 49}{x^2 + 11x + 28}$

15) $\frac{2x^3 - 16}{x^2 + x - 6}$

16) $\frac{x^3 + 64}{x^2 + 3x - 4}$

VA: _____
HA: _____
RD: _____

VA: _____
HA: _____
RD: _____

VA: _____
HA: _____
RD: _____

Complete the composition of functions for $f(x) = 4x + 4$ and $g(x) = x^2 - 1$.

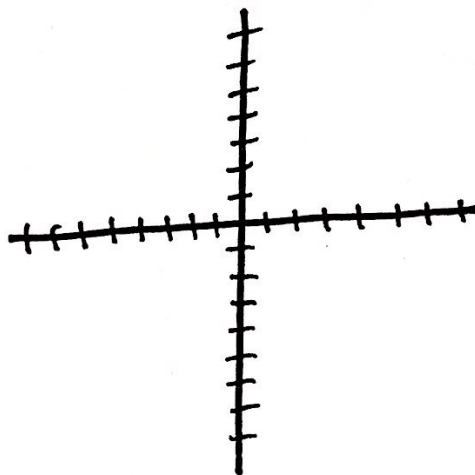
17) $f(g(x))$

18) $g(f(x))$

19) $f(g(-2))$

Graph the piecewise function.

$$f(x) = \begin{cases} -4, & x \leq -2 \\ x-2, & -2 < x < 2 \\ -2x+4, & x \geq 2 \end{cases}$$



$f(-2) =$

$f(2) =$

$f(5) =$