

$$\frac{3.3}{10.3} + \frac{5.5}{6.5}$$

$$\frac{9}{30} + \frac{25}{30} = \frac{34}{30} = \frac{\cancel{2}, 17}{\cancel{2}, 15} = \frac{17}{15}$$

# 11.1 Rational Expressions

$$\frac{\text{Polynomial}}{\text{Polynomial}}$$

graphing

## Arithmetic

- ① Simplify
- ② multiply
- ③ dividing

$$\frac{36}{40} \stackrel{\text{Simplify}}{=} \frac{6 \cdot 6}{4 \cdot 10} = \frac{\cancel{2} \cdot 3 \cdot \cancel{2} \cdot 3}{\cancel{2} \cdot \cancel{2} \cdot 2 \cdot 5} = \frac{9}{10}$$

$$\frac{x^2 - 10x + 25}{x^2 - 25} = \frac{\cancel{(x-5)} (x-5)}{\cancel{(x-5)} (x+5)} = \frac{x-5}{x+5}$$

$$\frac{x+3}{3+x} = 1$$

$$\frac{7-2}{2-7} = \frac{5}{-5} = -1$$

$$-1 \frac{\cancel{x+6}}{\cancel{6-x}} = \frac{\cancel{x+6}}{-1(\cancel{x+6})} = -1$$

$$\frac{4-y^2}{y^2-2y-8} = \frac{(2+y)(2-y)}{(y-4)(y+2)}$$

$$= \frac{2-y}{y-4}$$

$$\frac{5x-2}{4-25x^2}$$

$$\frac{\cancel{5x}-2}{(2+5x)(\cancel{2-5x})}$$

$$\frac{-1}{5x+2} = -\frac{1}{5x+2} = \frac{\cancel{-1}}{\cancel{5x+2}}$$

Simplify

$$\frac{x^3 + 4x^2 - 3x - 12}{x+4}$$

$$\begin{aligned} & \textcircled{2} \quad x^3 + 4x^2 - 3x - 12 \\ & \quad x^2(x+4) - 3(x+4) \\ & \quad (x+4)(x^2-3) \\ & \quad \frac{(x+4)(x^2-3)}{x+4} \rightarrow x^2-3 \end{aligned}$$

$$\frac{6}{49} \cdot \frac{14}{15} \rightarrow \frac{\cancel{2} \cdot \cancel{7}}{7 \cdot 7} \cdot \frac{\cancel{2} \cdot \cancel{7}}{\cancel{7} \cdot 5} \rightarrow \frac{4}{35}$$

$$\frac{x^2 - 9}{x^2 - x - 6} \cdot \frac{x^2 + 5x + 6}{x^2 + x - 6} \rightarrow \frac{\cancel{(x+3)} \cancel{(x-3)}}{\cancel{(x-3)} \cancel{(x+2)}} \cdot \frac{\cancel{(x+2)} \cancel{(x+3)}}{\cancel{(x+3)} \cancel{(x-2)}} \cdot \frac{x+3}{x-2}$$

divide

$$\frac{y^2 + y}{y^2 - 4} \div \frac{y^2 - 1}{y^2 + 5y + 6}$$

$$\frac{y(y+1)}{(y+2)(y-2)} \cdot \frac{(y+3)(y+2)}{(y+1)(y-1)}$$

$$\frac{y(y+3)}{(y-2)(y-1)}$$



$$\frac{(x-y)^3}{x^3-y^3} \div \frac{x^2-2xy+y^2}{x^2-y^2}$$

$$\frac{\cancel{(x-y)} \cancel{(x-y)} \cancel{(x-y)}}{\cancel{(x-y)} (x^2+xy+y^2)} \div \frac{\cancel{(x+y)} \cancel{(x-y)}}{\cancel{(x-y)} (x-y)}$$

$$\rightarrow \frac{(x-y)(x+y)}{x^2+xy+y^2}$$

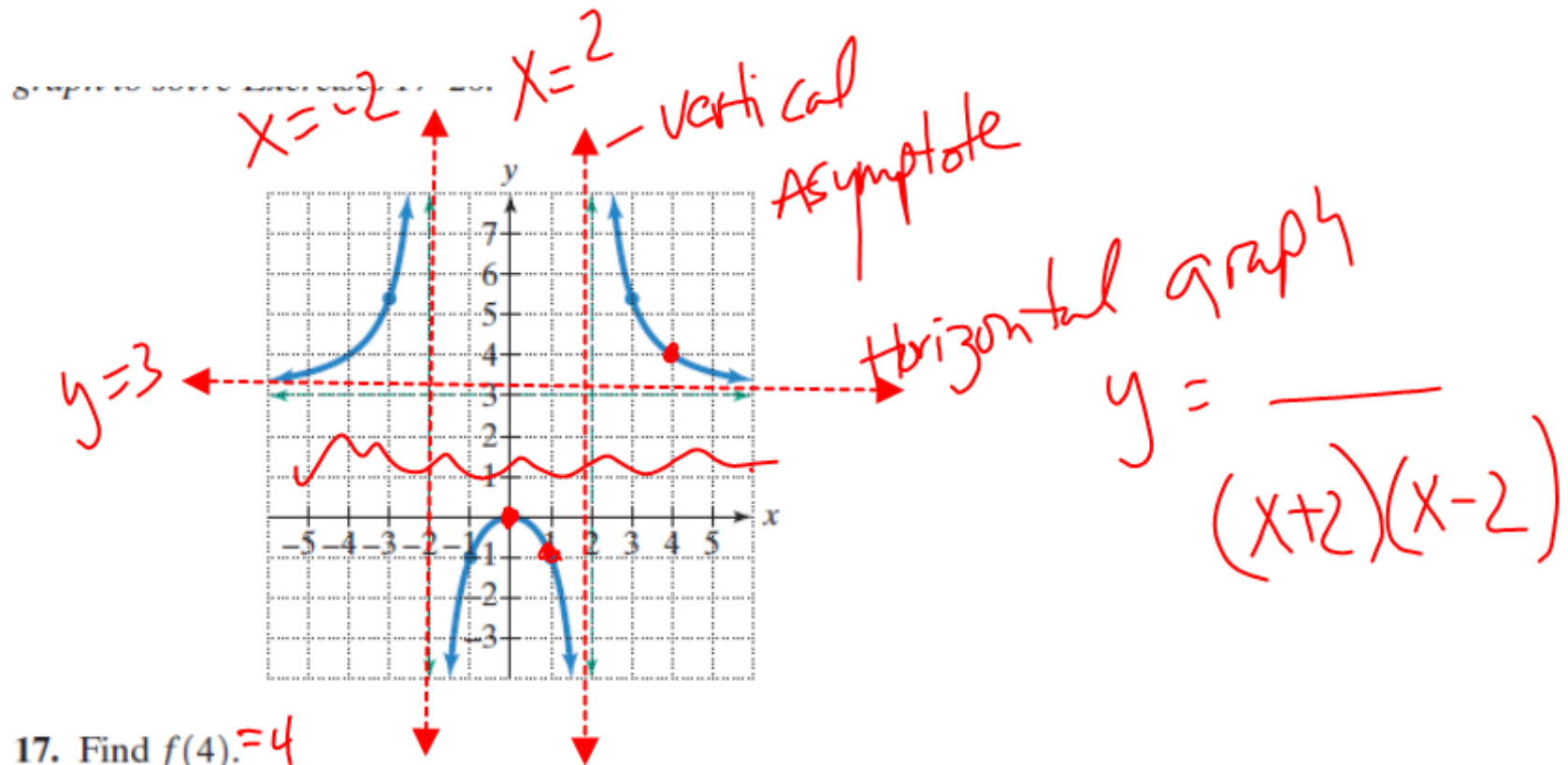
Graphing Domain

$$f(x) = \frac{x-5}{x^2-2x-8} = \frac{x-5}{(x-4)(x+2)}$$

X is any ~~real~~ but  $X \neq -2$ ,  $X \neq 4$

$$(-\infty, -2) \cup (-2, 4) \cup (4, \infty)$$

to  
the  
ion



17. Find  $f(4)$ .  $= 4$

18. Find  $f(1)$ .  $-1$

19. What is the domain of  $f$ ? What is the range of  $f$ ?

$D (-\infty, -2) \cup (-2, 2) \cup (2, \infty)$   
 $R (-\infty, 0] \cup (3, \infty)$