

Name Ima Key

Date _____

Slant Asymptotes: If the degree on the Top is one degree higher than the degree on the bottom, then the function has a slant asymptote, $y = mx + b$.

- Use Synthetic Division to find the equation. Disregard remainder

Ex 1. $f(x) = \frac{x^2 + x - 6}{x + 2}$

$$\begin{array}{r|rrrr} -2 & 1 & 1 & -6 & \\ & \downarrow & -2 & 2 & \\ \hline & 1 & -1 & -4 & \end{array}$$

$y = x - 1$

Ex 2. $f(x) = \frac{x^2 + 7x + 12}{x - 3}$

$$\begin{array}{r|rrrr} 3 & 1 & 7 & 12 & \\ & \downarrow & 3 & 30 & \\ \hline & 1 & 10 & 42 & \end{array}$$

$y = x + 10$

Ex 3. What if $f(x) = \frac{x^3 + x^2 - x + 5}{x^2 - 4}$?
 $(x-2)(x+2)$

$$\begin{array}{r|rrrrr} 2 & 1 & 1 & -1 & 5 & \\ & \downarrow & 2 & 6 & 10 & \\ \hline -2 & 1 & 3 & 5 & 15 & \\ & \downarrow & -2 & -2 & & \\ \hline & 1 & 1 & 3 & & \end{array}$$

$y = x + 1$

Increasing & Decreasing: X-values, read from left to right. *Stop For holes and VA

Only use parenthesis.

1. $f(x) = \frac{x^2 + 2x - 15}{x + 2}$

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

$$\begin{array}{r|rrrr} -2 & 1 & 2 & -15 & \\ & \downarrow & -2 & & \\ \hline & 1 & 0 & -15 & \end{array}$$

$y = x$

V.A.: $x = -2$

H.A.: _____

S.A.: $y = x$

x-int(s): $(-5, 0)(3, 0)$

y-int: $(0, -7.5)$

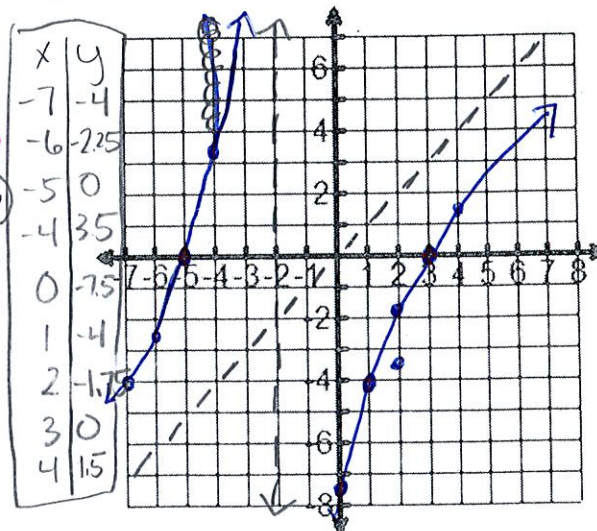
Hole: _____

Inc: $(-\infty, -2) \cup (-2, \infty)$

Dec: _____

Domain: $\mathbb{R}, x \neq -2$

Range: \mathbb{R}



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

V.A.: $x = 2$

Holes: NA

H.A.: NA

Inc: $(-\infty, 2) \cup (2, \infty)$

S.A.: $y = x + 1$

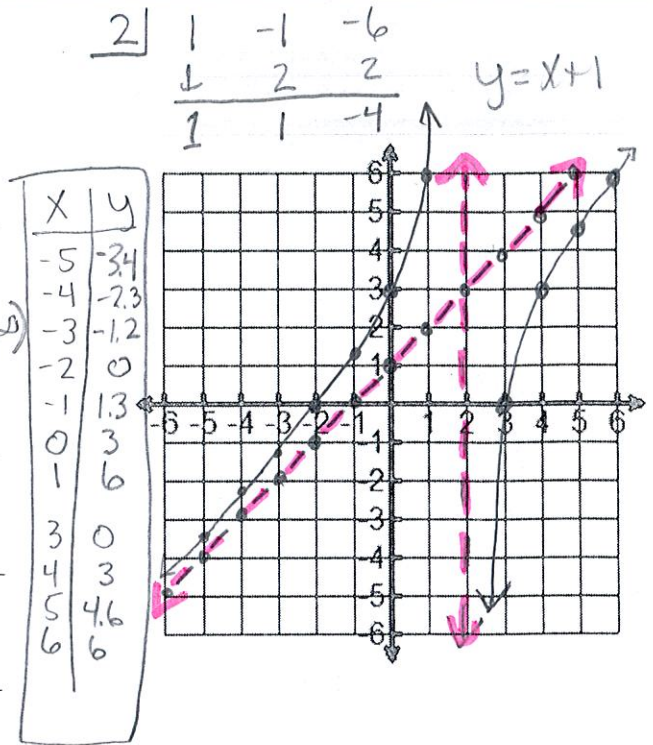
Dec: NA

x-int(s): $(-2, 0)(3, 0)$

Domain: $\mathbb{R}, x \neq 2$

y-int: $(0, 3)$

Range: \mathbb{R}



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

V.A.: $x = 3$

Holes: NA

H.A.: —

Inc: $(-\infty, 1) \cup (5, \infty)$

S.A.: $y = x + 2$

Dec: —

x-int(s): $(2, 0)(-1, 0)$

Domain: $\mathbb{R}, x \neq 3$

y-int: $(0, \frac{2}{3})$

Range: $(-\infty, 1] \cup [10, \infty)$

