

Do Now: #s 1-3

Function	Hole(s)	Vertical Asymptote(s)	Horizontal Asymptote	Oblique Asymptote	x-intercept(s)	y-intercept
① $y = \frac{(x-2)(x+1)}{x^2-x-2}$ $y = \frac{x^2-x-2}{x+1}$ RF: $y = x-2$	$(-1, -3)$	none	none	none	$(2, 0)$	$(0, -2)$
② $y = \frac{x+3}{x^2+9}$	none	$x^2+9=0$ <del><math>x = \pm 3i</math></del> none	$y=0$	none	$x+3=0$ $(-3, 0)$	$(0, \frac{1}{3})$
③ $y = \frac{(x-3)(x+2)}{x^2-x-6}$ $y = \frac{x^2-x-6}{(x-5)(x+4)}$	none	$x = 5, -4$	$y = 1$	none	$(x-3)(x+2)=0$ $(3, 0), (-2, 0)$	$(0, \frac{3}{10})$
④ $y = \frac{(x-5)(x+3)}{x^2-2x-15}$ <del><math>x-5</math></del> RF: $y = x+3$	$(5, 8)$	none	none	none	$x+3=0$ $(-3, 0)$	$(0, 3)$
⑤ $y = \frac{x+3}{2x}$	none	$2x=0$ $x=0$	$y = \frac{1}{2}$	none	$x+3=0$ $(-3, 0)$	none
⑥ $y = \frac{x(x-3)}{3x^2+6x}$ <del><math>x</math></del> $3x(x+2)$	$(0, -\frac{1}{2})$	$3(x+2)=0$ $x = -2$	$y = \frac{1}{3}$	none	$x-3=0$ $(3, 0)$	<del><math>(0, -\frac{1}{2})</math></del> none

RF:  $y = \frac{x-3}{3(x+2)}$

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$y = \frac{(x-3)(x+2)}{x^2-x-6}$ $= \frac{(x-3)(x+2)}{(2x+1)(x-3)}$	$(3, \frac{5}{7})$	$x = -\frac{1}{2}$	$y = \frac{1}{2}$	none	$(-2, 0)$	$(0, 2)$
$y = \frac{(x-1)(x+1)}{x^2-1}$ $= \frac{(x-1)(x+1)}{(2x-1)(x+1)}$	$(-1, \frac{2}{3})$	$x = \frac{1}{2}$	$y = \frac{1}{2}$	none	$(1, 0)$	$(0, 1)$
$y = \frac{x(x-4)(x-8)}{x^3-12x^2+32x}$ $= \frac{x(x-4)(x-8)}{x^2-2x-8}$ $= \frac{x(x-4)(x-8)}{(x-4)(x+2)}$	$(4, -\frac{8}{3})$	$x = -2$	none	$\begin{array}{r} -2 \mid -8 \ 0 \\ \quad -3 \ 20 \\ \hline 1 \ -10 \ 20 \end{array}$ $y = x - 10$	$x(x-8) = 0$ $(0, 0)$ $(8, 0)$	$(0, 0)$
$y = \frac{(x-7)(x-2)}{x^2-9x+14}$ $= \frac{(x-7)(x-2)}{x^2+3x+2}$ $= \frac{(x-7)(x-2)}{(x+2)(x+1)}$	none	$x = -2, -1$	$y = 1$	none	$(7, 0)$ , $(2, 0)$	$(0, 7)$
$y = \frac{5+2x^2}{2-x-x^2}$ $= \frac{5+2x^2}{-(x^2+x-2)}$ $= \frac{5+2x^2}{-(x+2)(x-1)}$	none	$x = -2, 1$	$y = -2$	none	none	$(0, \frac{5}{2})$
$y = \frac{(x-3)(x+2)}{x^2-x-6}$ $= \frac{(x-3)(x+2)}{x^3-4x^2-7x+10}$ $= \frac{(x-3)(x+2)}{(x+2)(x-1)(x-5)}$	$(-2, \frac{-5}{21})$	$x = 1, 5$	$y = 0$	none	$(3, 0)$	$(0, \frac{-3}{5})$

prz:  $\pm 1, \pm 2, \pm 5, \pm 10$

$$\begin{array}{r} -2 \mid 1 \ -4 \ -7 \ 10 \\ \quad -2 \ 12 \ -10 \\ \hline 1 \ -6 \ 5 \ 0 \end{array}$$

$$(x+2)(x^2-6x+5)$$

# Homework 01-05

Name: Key  
 PC: Even More Vertical, Horizontal and Oblique Asymptotes

Date: \_\_\_\_\_  
 Ms. Loughran

Function	Hole(s)	Vertical Asymptote(s)	Horizontal Asymptote	Oblique Asymptote	x-intercept(s)	y-intercept
$y = \frac{x-1}{x-3}$ $\frac{(x-1)(x-1)}{(x-3)(x-2)}$	$(-2, \frac{3}{5})$	$x = 3$	$y = 1$	none	$(1, 0)$	$(0, \frac{1}{3})$
$y = \frac{3}{x-2}$	none	$x = 2$	$y = 0$	none	none	$(0, -\frac{3}{2})$
$y = \frac{2x^2}{x^2-1}$	none	$x = \pm 1$	$y = 2$	none	$(0, 0)$	$(0, 0)$
$y = \frac{2x-1}{x}$	none	$x = 0$	$y = 2$	none	$(\frac{1}{2}, 0)$	none
$y = \frac{x+4}{x+3}$ $\frac{(x+4)(x-3)}{(x+3)(x-3)}$	$(3, \frac{7}{6})$	$x = -3$	$y = 1$	none	$(-4, 0)$	$(0, \frac{4}{3})$
$y = \frac{x^2-4}{x+3}$	none	$x = -3$	none	$y = x-3$	$(-2, 0)$	$(0, -\frac{4}{3})$

$$\begin{array}{r} -3 \overline{) 1 \ 0 \ -4} \\ \underline{-3 \quad 9} \\ 1 \ -3 \ 5 \end{array}$$

x-int

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

$$\frac{x(x-1) = 0}{x=0 \quad | \quad x=1}$$

$$\begin{array}{r} -1 \quad 1 \quad -1 \quad 0 \\ \quad \quad -1 \quad \quad 2 \\ \hline 1 \quad -2 \quad 2 \end{array}$$

$$\begin{array}{r} 1 \quad 1 \quad -1 \quad -2 \\ \quad \quad 1 \quad \quad 0 \\ \hline 1 \quad 0 \quad -2 \end{array}$$

Function	Hole(s)	Vertical Asymptote (s)	Horizontal Asymptote	Oblique Asymptote	x-intercept(s)	y-intercept
⑦ $y = \frac{x(x-1)}{x+1}$	none	$x = -1$	none	$y = x - 2$	$(0, 0)$ $(1, 0)$	$(0, 0)$
⑧ $y = \frac{(x-2)(x-1)}{x-1}$	none	$x = 1$	none	$y = x$	$(2, 0)$ $(-1, 0)$	$(0, 2)$
⑨ $y = \frac{x+1}{x^2+3x+2}$ <del><math>(x+1)(x+2)</math></del>	$(-1, 1)$	$x = -2$	$y = 0$	none	none	$(0, \frac{1}{2})$
⑩ $y = \frac{(x+3)(x-3)}{x^2-9}$ <del><math>(x-3)(x+1)</math></del>	$(3, \frac{3}{2})$	$x = -1$	$y = 1$	none	$(-3, 0)$	$(0, 3)$
⑪ $y = \frac{(x-9)(2x^2+x+1)}{2x^3-17x^2-8x-9}$ $3-x^2$	none	$x = \pm\sqrt{3}$	none	$y = -2x+17$	$(9, 0)$	$(0, -3)$
⑫ $y = \frac{(3x^2+1)(x-3)}{3x^2(x-3)+1(x-3)}$ <del><math>(x-3)</math></del>	$(3, 28)$	none	none	none	none	$(0, 1)$

$$\begin{aligned} 3x^2 + 1 &= 0 \\ 3x^2 &= -1 \end{aligned}$$

pr2:  $\pm 1, \pm 3, \pm 9, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{9}{2}$

$$2 - 17 - 8 - 9$$

$$\begin{array}{r} 9 \quad 2 \quad -17 \quad -8 \quad -9 \\ \quad \quad 18 \quad 9 \quad 9 \\ \hline 2 \quad 1 \quad 1 \quad 0 \\ 2x^2 + x + 1 \end{array}$$