Precalculus A

Chapter 1

1.2 Functions and Their Properties

HW: Section 1.2 Practice Worksheet

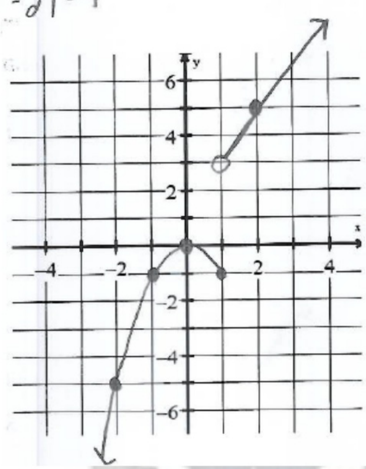
B. Paulson

Graph the following piecewise functions.

1. $f(x) = \begin{cases} -x^2, & x \leq 1 \\ 2x+1, & x > 1 \end{cases}$

$-x^2$	
1	-1
0	0
-1	-1
-2	-4

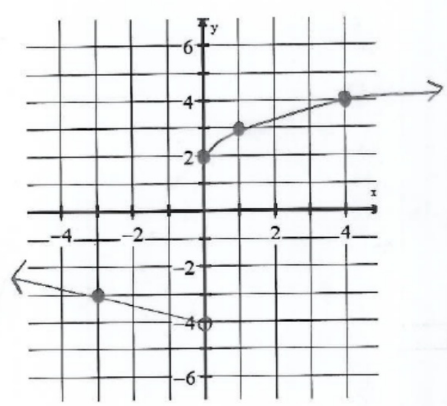
$2x+1$	
1	3
2	5
3	7



2. $f(x) = \begin{cases} -\frac{1}{3}x - 4, & x < 0 \\ \sqrt{x} + 2, & x \geq 0 \end{cases}$

$-\frac{1}{3}x - 4$	
0	-4
-3	-3
-6	-2

$\sqrt{x} + 2$	
0	2
1	3
4	4



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3. What is the value of c that will make the function continuous at $x = 1$?

$$f(x) = \begin{cases} 4x - 1, & x < 1 \\ x^2 + c, & x \geq 1 \end{cases}$$

$4(1) - 1 = (1)^2 + c$

$4 - 1 = 1 + c$

$3 = 1 + c$

$\boxed{2 = c}$

4. What is the value of c that will make the function continuous at $x = -2$?

$$f(x) = \begin{cases} cx - 5, & x \leq -2 \\ 3x + 2, & x > -2 \end{cases}$$

$-2c - 5 = 3(-2) + 2$

$-2c - 5 = -6 + 2$

$-2c - 5 = -4$

$-2c = 1$

$\boxed{c = -1/2}$

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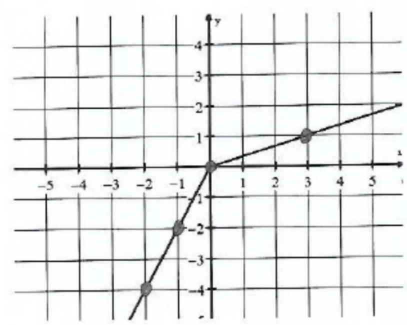
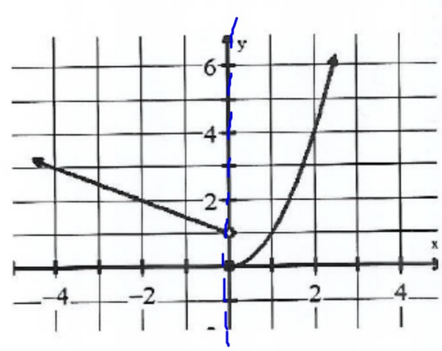
5. Write the equation of the piecewise function shown in the graph below.

$$f(x) = \begin{cases} 2x & x \leq 0 \\ 1/3x & x > 0 \end{cases}$$



6. Write the equation of the piecewise function shown in the graph below.

$$f(x) = \begin{cases} -1/2x + 1 & x < 0 \\ x^2 & x \geq 0 \end{cases}$$



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Finding Asymptotes

Vertical Asymptotes:

- Occur when you try to divide by zero.

$$y = \frac{1}{x}$$

$\boxed{x=0}$

$$y = \frac{1}{x-2}$$

$x - 2 = 0$
$+2 \quad +2$

$\boxed{x=2}$

Finding Asymptotes

Horizontal Asymptotes:

- Top Heavy:
  - Goes to ∞ so there is no HA.

$$\boxed{y = \frac{x^2 + x}{2x + 5}}$$

- Bottom Heavy:
  - Goes to 0, so the HA is y = 0.

$$\boxed{y = \frac{x + 3}{x^2 - 1}}$$

- Equal:
  - Goes to the ratio.

$$\boxed{y = \frac{3x - 1}{1x + 4}}$$

$y=3$

+2

-6

$y=5$

$y=-3$

* Pre-shifts

Finding Asymptotes

$$y = \frac{1}{x+2} - 3$$

$y = 0$

$\boxed{y = -3}$

$$y = \frac{1}{x-7} + 4$$

$y = 0$

$\boxed{y = 4}$

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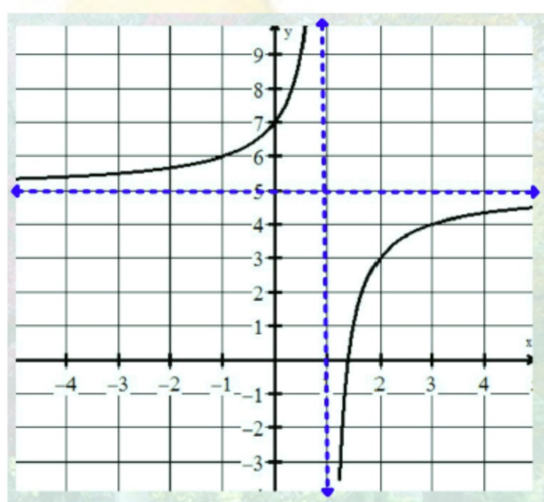
Domain and Range

Use the equation and graph to determine the domain, range, continuity, vertical asymptote and horizontal asymptote.

Infinite discont.

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



VA: $x = 1$

HA: $y = 5$

Domain: $(-\infty, 1) \cup (1, \infty)$

$\mathbb{R}$, except $x = 1$

Range: $(-\infty, 5) \cup (5, \infty)$

$\mathbb{R}$ except $y = 5$

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Domain and Range

Use the graph to determine the domain, range, continuity, vertical asymptote and horizontal asymptote.

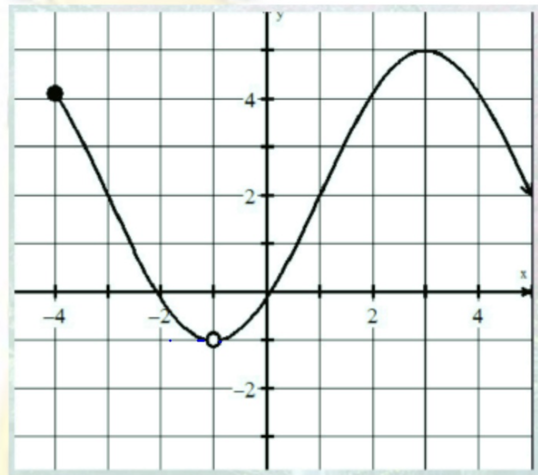
VA: None

HA: None

Domain: $[-4, -1) \cup (-1, \infty)$

Range: $(-\infty, 5]$

Removable



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Domain and Range

Use the graph to determine the domain, range, continuity, vertical asymptote and horizontal asymptote.

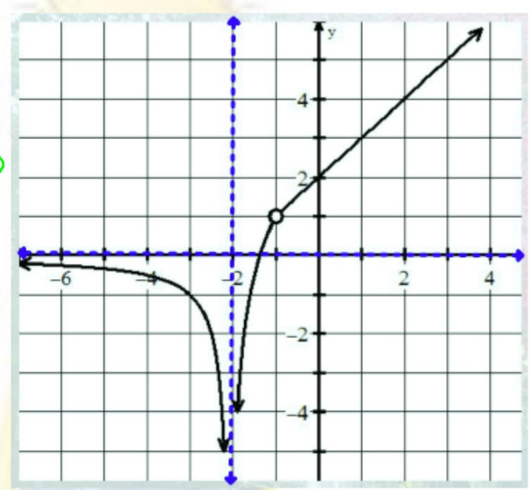
VA: $x = -2$

HA: $y = 0$

Domain: $(-\infty, -2) \cup (-2, -1) \cup (-1, \infty)$

Range: $(-\infty, 1) \cup (1, \infty)$

Removable, infinite



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