

PMATH 12 - CHAPTER 2 - PRETEST

signature _____

Multiple Choice - First 5 questions, no calculator - 10 minutes

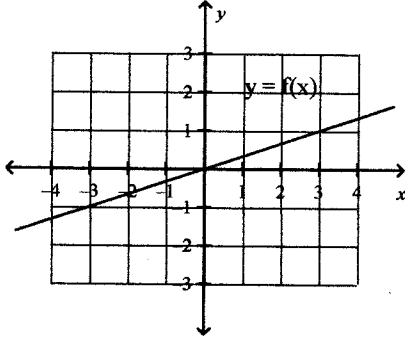
Circle the choice that best completes the statement or answers the question.



no calc.

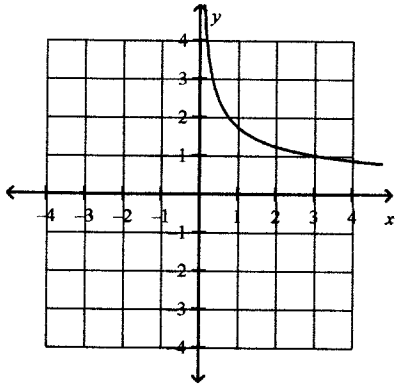
1. For the graph of $y = f(x)$ shown below, which graph best represents $y = \sqrt{f(x)}$?

new

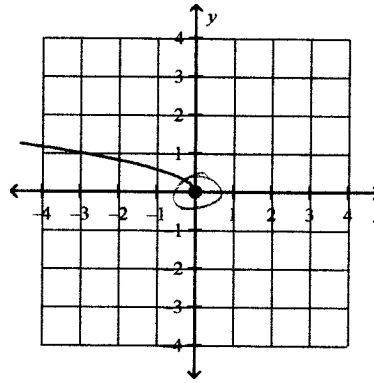


x	f(x)	$\sqrt{f(x)}$
0	0	0
3	1	1
-3	-1	X

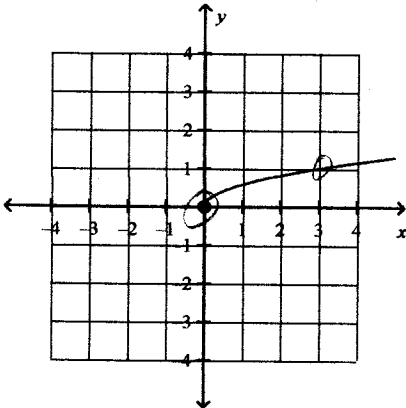
A.



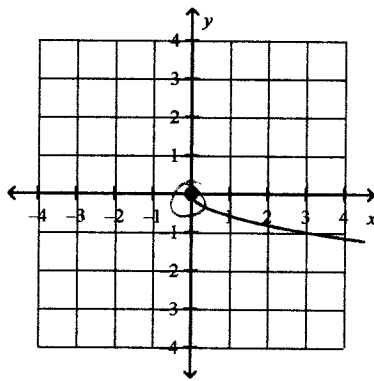
C.



B.



D.



2. What is the solution of this rational equation, to the nearest tenth if necessary?

$$\frac{4}{x-1} = -8$$

A. $x \approx 1.5$

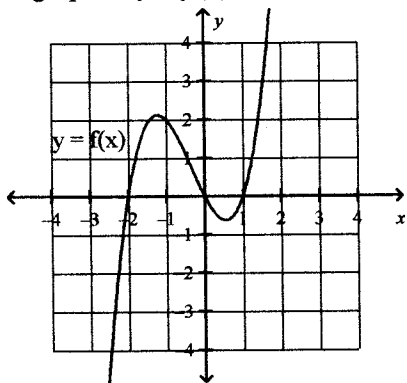
B. $x \approx 0.5$

C. $x \approx -1.5$

D. $x \approx -0.5$

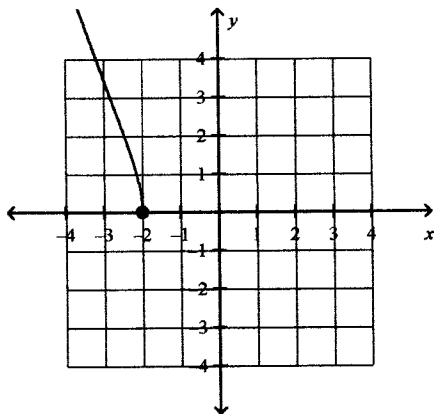
$$\begin{aligned} 4 &= -8x + 8 \\ -4 &= -8x \\ \frac{-4}{-8} &= x \\ \frac{1}{2} &= x \end{aligned}$$

3. For the graph of $y = f(x)$ shown below, which graph best represents $y = \sqrt{f(x)}$?

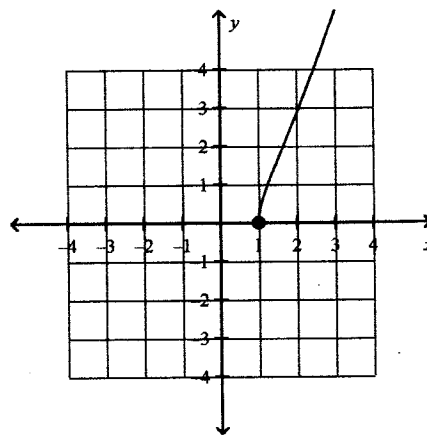


x	$f(x)$	$\sqrt{f(x)}$
0	0	0
1	0	0
-1	2	$\sqrt{2} = 1.4$
-2	0	0
2	+	$\sqrt{4} = 2$ ✓
-3	-	$\sqrt{-}$ ✗

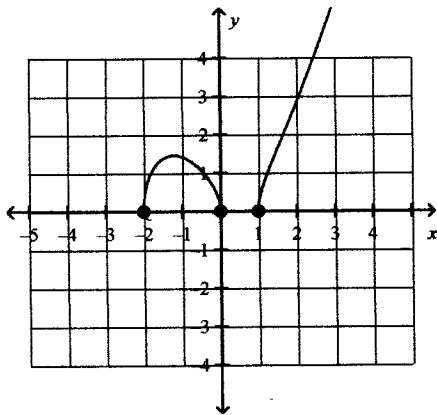
A.



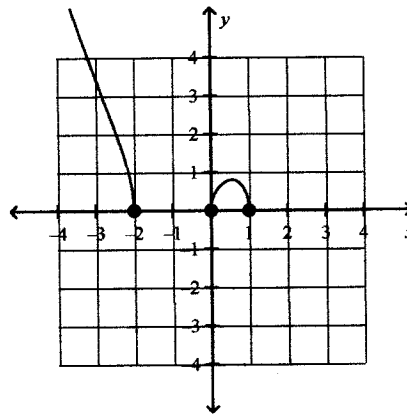
C.



B.



D.



4. The graph of which function below has a hole?

A. $y = \frac{x+2}{x^2+2}$

B. $y = \frac{x^2-9}{x+3}$ ($(x-3)(x+3)$)

C. $y = \frac{x^2}{x-4}$

D. $y = \frac{x^2-3}{x^2-2}$

5. The graph of which function below has a horizontal asymptote?

A. $y = \frac{x^2-7x+12}{x+7}$

B. $y = \frac{x^2-3}{x+7}$

C. $y = \frac{x^2+3}{x^2-2}$

D. $y = \frac{x^2}{x+3}$

6. What is the equation of the vertical asymptote of the graph of this function?

$$y = \frac{x+4}{x^2 + 10x + 25} \Rightarrow \frac{x+4}{(x+5)(x+5)}$$

- A. $x = -5$
 B. $x = 0$
 C. $x = -4$
 D. The graph has no vertical asymptote.

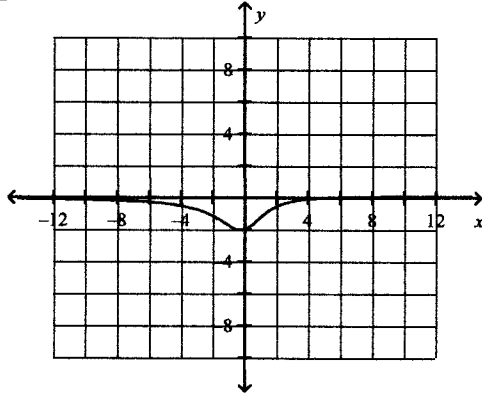
7. State the domain of this function.

$$y = \frac{x^2 + 7x + 10}{-2 - x} \quad \begin{matrix} -x - 2 \neq 0 \\ -2 \neq x \end{matrix}$$

- A. $x \neq \pm 2$
 B. $x \neq -2$
 C. $x \neq -2, x \neq -5$
 D. $x \in \mathbb{R}$

8. For the graph of this rational function, state the domain and write the equations of any asymptotes.

$$y = \frac{x-6}{x^2+3}$$



- A. domain: $x \in \mathbb{R}$;
 horizontal asymptote: $y = 0$
 C. domain: $x \neq 0$;
 vertical asymptote: $x = 0$
- B. domain: $x \neq 3$;
 horizontal asymptote: $y = 0$
 D. domain: $x \in \mathbb{R}$;
 no vertical or horizontal asymptotes

9. For the graph of this rational function, identify the equations of any asymptotes and the coordinates of any hole.

$$y = \frac{x^2 + 5x + 6}{x-3} = \frac{(x+3)(x+2)}{x-3} \quad \text{no hole}$$

$$\begin{array}{r} 3 \overline{) 1 \ 5 \ 6} \\ \underline{3 \ 15} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

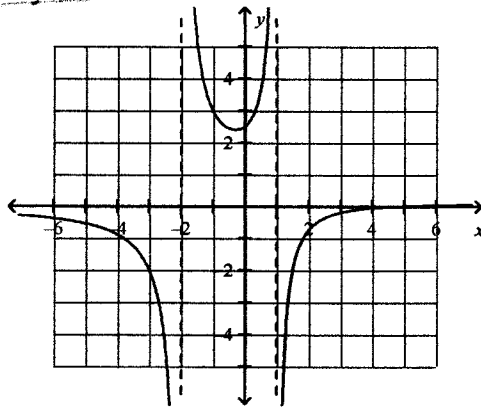
$$y = x + 8$$

- A. The graph has a ~~hole~~ at (3, 30).
 B. The graph has a vertical asymptote at $x = 3$, and an oblique asymptote at $y = x - 3$.
 C. The graph has a vertical asymptote at $x = 3$, and an oblique asymptote at $y = x + 8$.
 D. The graph has a horizontal asymptote at $y = 0$.

10. For the graph of this rational function, state the domain and write the equations of any asymptotes and the coordinates of any hole.

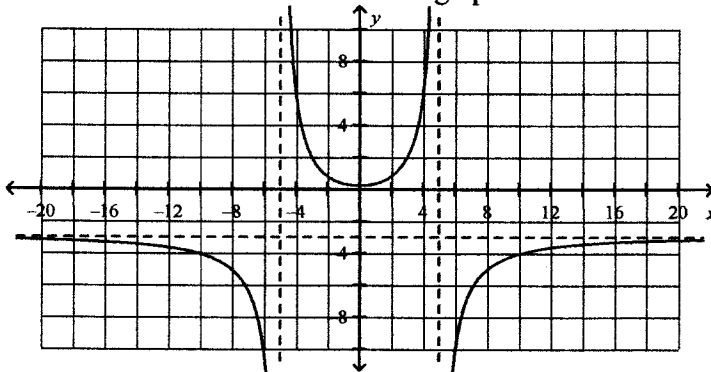
$$y = \frac{x-5}{x^2+x-2}$$

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



- A. domain: $x \neq 1$ and $x \neq -2$;
vertical asymptotes: $x = 1, x = -2$;
horizontal asymptote: $y = 1$
- B. domain: $x \neq 1$ and $x \neq -2$;
~~hole: $(-2, -7)$~~
vertical asymptote: $x = 1$;
horizontal asymptote: $y = 0$
- C. domain: $x \neq 0$;
~~hole: $(0, -7)$~~
vertical asymptote: $x = 0$;
horizontal asymptote: $y = 0$
- D.** domain: $x \neq 1$ and $x \neq -2$;
vertical asymptotes: $x = 1, x = -2$;
horizontal asymptote: $y = 0$

11. Which function below describes this graph?



- A.** $y = \frac{x^2-5}{x^2-25}$ B. $y = \frac{2x^2-5}{x^2-25}$ C. $y = \frac{-3x^2-5}{x^2+5}$ D. $y = \frac{-3x^2-5}{x^2}$

12. Use graphing technology to solve: $\sqrt{3x-1} = -x+5$
Give the solution to the nearest tenth.

- A. $x \approx 10.5$ B. $x \approx 10.8$ C. $x \approx 2.2$ **D.** $x \approx 2.5$

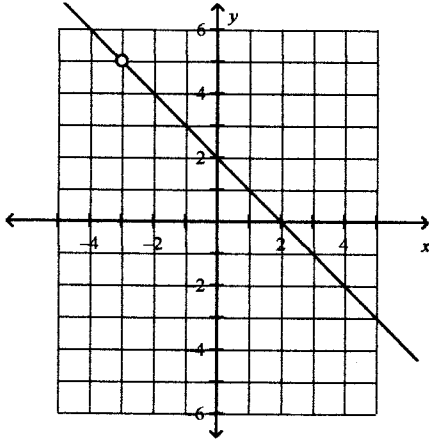
$$3x-1 = x^2 - 10x + 25$$

$$= x^2 - 13x + 26$$

$$x = \frac{13 \pm \sqrt{169-104}}{2}$$

$$x = \frac{13 \pm \sqrt{65}}{2} \begin{matrix} 52.4 \\ 2.5 \end{matrix}$$

13. Which function below describes this graph?



- A. $y = \frac{-x^2 - x + 6}{x - 3}$
 $-(x^2 + x - 6)$
 $= -(x+3)(x-2)$
- B.** $y = \frac{-x^2 - x + 6}{x + 3}$
 $-(x^2 + x - 6)$
 $= -(x+3)(x-2)$
- C. $y = \frac{-x^2 + 6x + 1}{x + 3}$
- D. $y = \frac{x + 3}{-x^2 - x + 6}$

Short Answer - show your work

1. Use technology to graph this function, then complete the table below.

$$y = \frac{x+5}{x^2 - 9x + 20} \quad (x-5)(x-4)$$

Vertical Asymptote(s)	Horizontal Asymptote	Non-permissible values of x
$x = 4, 5$	$y = 0$	$x \neq 4, 5$

2. The graph of this function has an oblique asymptote! Write the equation of the asymptote.

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

$$\begin{array}{r|rr} -3 & 1 & 0 & 0 \\ & & -3 & 9 \\ \hline & 1 & -3 & 9 \\ & \downarrow & \downarrow & \\ & y = x - 3 & & \end{array}$$

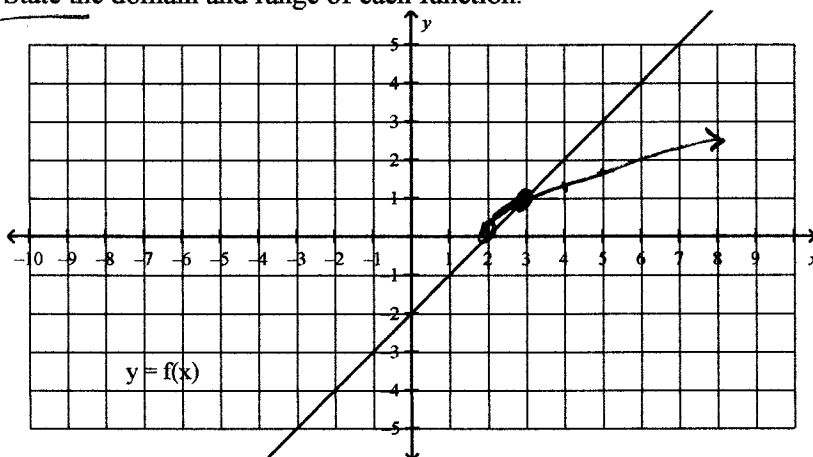
Problem - show your work

1. Write an equation for a rational function whose graph has exactly 1 hole. Explain why it has a hole.

$$y = \frac{\cancel{(x+3)}(x-2)}{x+3} \quad \text{or} \quad \frac{x^2 + x - 6}{x+3}$$

- many answers.
 - denom. is a factor of numerator

2. For the graph of $y = f(x)$ shown below, sketch the graph of $y = \sqrt{f(x)}$.
State the domain and range of each function.



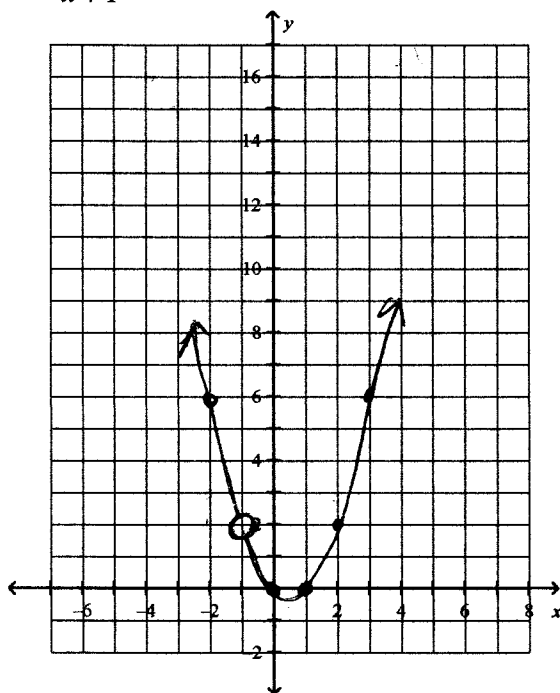
x	f(x)	$\sqrt{f(x)}$
0	-2	X
1	-1	X
2	0	0
3	1	1
4	2	1.4
5	3	1.7

$f(x)$ - domain $x \in \mathbb{R}$
- range $y \in \mathbb{R}$

$\sqrt{f(x)}$ - domain $x \geq 2$
- range $y \geq 0$

3. Sketch the graph of this function, and state the domain and range. Show your work.

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



WORK

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

$$y = x^2 - x$$

parabola

$$\begin{array}{r|l} x & y \\ \hline 0 & 0 \\ 1 & 0 \\ 0.5 & -0.25 \end{array}$$

$$x \neq -1 \rightarrow y \neq 2$$

hole (-1, 2)

Domain $x \neq -1$
Range $y \neq 2$
 $y \geq -0.25$