

- 1) Solve the following inequality.

$$x^3 - x^2 - 6x > 0$$

Choose the correct solution.

- ☐ A. $(-\infty, -2) \cup (0, 3)$
☐ B. $[-2, 0] \cup [3, \infty)$
☒ C. $(-2, 0) \cup (3, \infty)$
☐ D. $(-\infty, -2) \cup (-2, 0) \cup (0, 3) \cup (3, \infty)$
☐ E. $(-\infty, \infty)$
☐ F. $\emptyset$

Analyze the graph of the function.

2)

$$R(x) = \frac{x + 14}{x(x + 17)}$$

(a) What is the domain of $R(x)$?

- ☒ A. $\{x|x \neq 0 \text{ and } x \neq -17\}$
☐ B. $\{x|x \neq 0 \text{ and } x \neq -14\}$
☐ C. $\{x|x \neq 0 \text{ and } x \neq -17 \text{ and } x \neq -14\}$
☐ D. All real numbers

(b) What is the equation of the vertical asymptote(s) of $R(x)$? Select the correct choice below and fill in any answer boxes within your choice.

- ☒ A. $x = 0, -17$
 (Use a comma to separate answers as needed. Type an integer or a fraction.)
☐ B. There is no vertical asymptote.

(c) What is the equation of the horizontal or oblique asymptote of $R(x)$? Select the correct choice below and fill in any answer boxes within your choice.

- ☒ A. $y = 0$ (Simplify your answer.)
☐ B. There is no horizontal or oblique asymptote.

(d) Which graph shown below is the correct graph for $R(x)$?

- 3) Analyze the graph of the function.

$$R(x) = \frac{10x + 10}{7x + 14}$$

(a) What is the domain of $R(x)$?

- ☐ A. $\{x|x \neq 0 \text{ and } x \neq -2\}$
☐ B. $\{x|x \neq 0 \text{ and } x \neq -2 \text{ and } x \neq -1\}$
☒ C. $\{x|x \neq -2\}$
☐ D. All real numbers

(b) What is the equation of the vertical asymptote(s) of $R(x)$? Select the correct choice below and fill in any answer boxes within your choice.

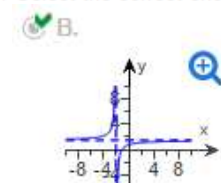
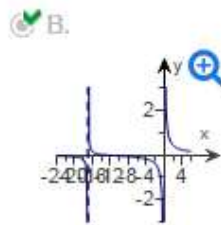
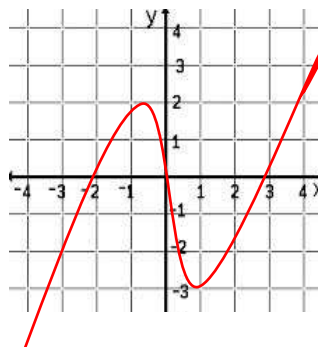
- ☒ A. $x = -2$
 (Use a comma to separate answers as needed. Type an integer or a fraction.)
☐ B. There is no vertical asymptote.

(c) What is the equation of the horizontal or oblique asymptote of $R(x)$? Select the correct choice below and fill in any answer boxes within your choice.

- ☒ A. $y = \frac{10}{7}$ (Simplify your answer.)
☐ B. There is no horizontal or oblique asymptote.

(d) Which graph shown below is the correct graph for $R(x)$?

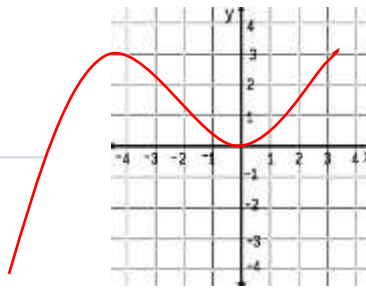
Easiest to graph $x(x-3)(x+2)$
crosses at -2,0,3 **ABOVE** x-axis



- 4) Solve the following inequality.

$$x^3 + 7x^2 > 0$$

The solution is $(-7, 0) \cup (0, \infty)$.



Easiest to graph $x^2(x+7)$

touches at $x=0$

crosses at $x= -7$ **ABOVE** x-axis

- 5) What is the domain of the following function?

$$f(x) = \sqrt{x^4 - 256}$$

Choose the correct domain.

- ☒ A. $\{x|x \leq -4 \text{ or } x \geq 4\}$
☐ B. $\{x|-4 \leq x \leq 4\}$
☐ C. $\{x|x < -4 \text{ or } x > 4\}$
☐ D. $\{x|-4 < x < 4\}$
☐ E. $(-\infty, \infty)$

Factor $(x^2 - 16)(x^2 + 16)$
 $(x-4)(x+4)$

Check sections -5, -1, 1, 5 $\rightarrow$ has to be ≥ 0

- 6) Analyze the graph of the function.

$$R(x) = \frac{x}{x^2 - 25}$$

- (a) What is the domain of $R(x)$?

- ☐ A. $\{x|x \neq 0 \text{ and } x \neq 5 \text{ and } x \neq -5\}$
☒ B. $\{x|x \neq 5 \text{ and } x \neq -5\}$
☐ C. $\{x|x \neq 0\}$
☐ D. All real numbers

- (b) What is the equation of the vertical asymptote(s) of $R(x)$? Select the correct choice below and fill in any answer boxes within your choice.

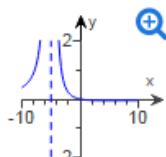
- ☒ A. $x = -5, 5$
 (Use a comma to separate answers as needed. Type an integer or a fraction.)
☐ B. There is no vertical asymptote.

- (c) What is the equation of the horizontal or oblique asymptote of $R(x)$? Select the correct choice below and fill in any answer boxes within your choice.

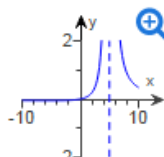
- ☒ A. $y = 0$ (Simplify your answer.)
☐ B. There is no horizontal or oblique asymptote.

- (d) Which graph shown below is the correct graph for $R(x)$?

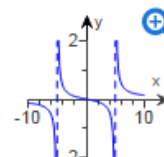
☐ A.



☐ B.



☒ C.



7) Solve the following inequality.

$$\frac{(x-6)(x+7)}{x} \geq 0$$

Choose the correct solution.

- ☐ A. $(-\infty, -7] \cup (0, 6]$
☐ B. $(-\infty, -7] \cup [-7, 0) \cup (0, 6) \cup (6, \infty)$
☐ C. $(-7, 0) \cup (6, \infty)$
☒ D. $[-7, 0) \cup [6, \infty)$
☐ E. $(-\infty, \infty)$
☐ F. $\emptyset$

Critical points are -7, 0, 6

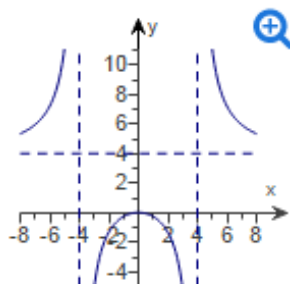
Check intervals:

-8	-7	-1	0	1	6	7
	-	+		-	+	

USE intervals with + sign excluding x=0

8) Which rational function has the given graph?

We know vertical asymptotes are -4 and 4 makes bottom $x^2 - 16$



Check the x=0 point and locate that one on the graph

☐ A. $R(x) = -\frac{4x^2}{x^2 + 16}$

☒ B. $R(x) = \frac{4x^2}{x^2 - 16}$

Analyze the graph of the function.

9) $R(x) = \frac{x^2 - 9}{x^4 - 16}$

(a) What is the domain of R(x)?

- ☐ A. $\{x|x \neq 0\}$
☒ B. $\{x|x \neq 2 \text{ and } x \neq -2\}$
☐ C. $\{x|x \neq 0 \text{ and } x \neq 2 \text{ and } x \neq -2\}$
☐ D. All real numbers

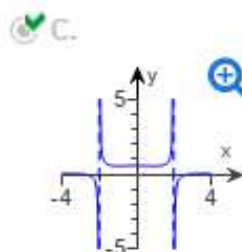
(b) What is the equation of the vertical asymptote(s) of R(x)? Select the correct choice below and fill in any answer boxes within your choice.

- ☒ A. $x = -2, 2$
 (Use a comma to separate answers as needed. Type an integer or a fraction.)
☐ B. There is no vertical asymptote.

(c) What is the equation of the horizontal or oblique asymptote of R(x)? Select the correct choice below and fill in any answer boxes within your choice.

- ☒ A. $y = 0$ (Simplify your answer.)

We know vertical asymptotes are -2 and 2
check $x = 0 \rightarrow$ positive 9/16



10) What is the domain of the function $g(x) = \sqrt{\frac{x-6}{x+3}}$?

The domain is $(-\infty, -3) \cup [6, \infty)$.

Critical points are -3, 6

Check intervals:

-4 -3 0 6 7

+ - +

USE intervals with + sign excluding $x=-3$ because bottom of fraction