

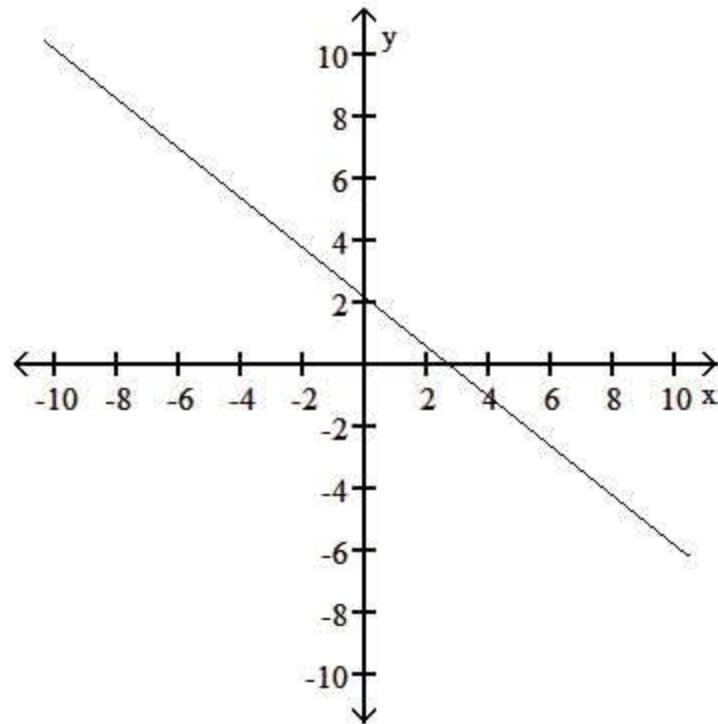
PART B (PRE-CALCULUS / MTT101)
SAMPLE QUESTIONS

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Graph the linear equation and determine its slope, if it exists.

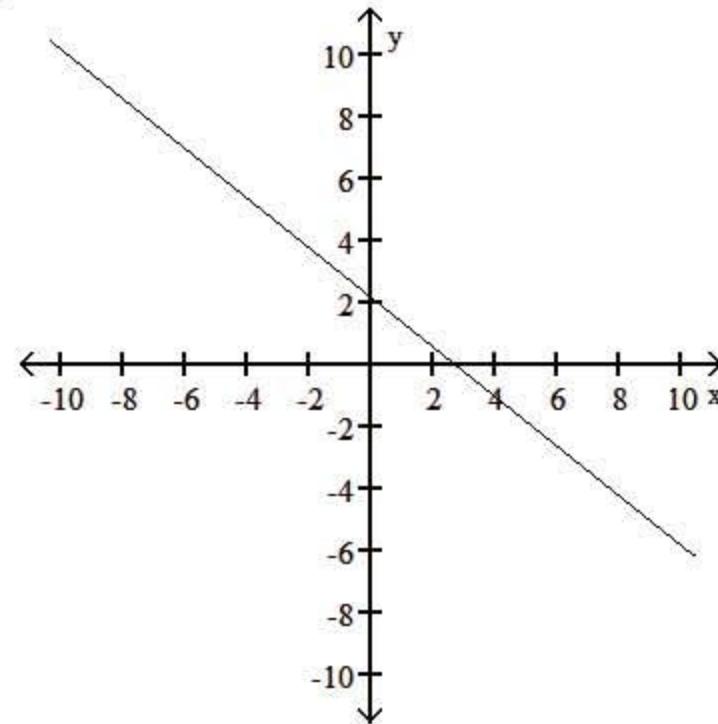
1) $4x + 5y = 11$

A)



$$m = -\frac{4}{5}$$

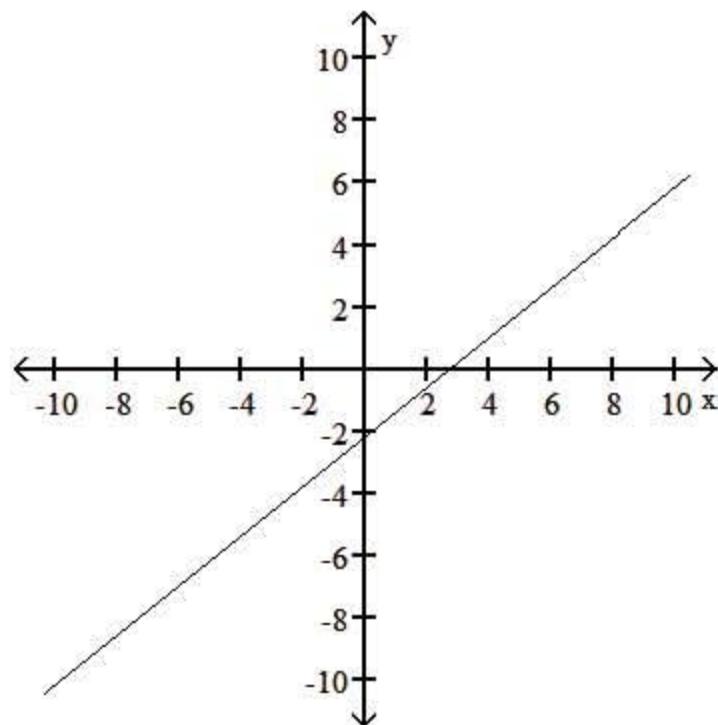
B)



$$m = -\frac{4}{5}$$

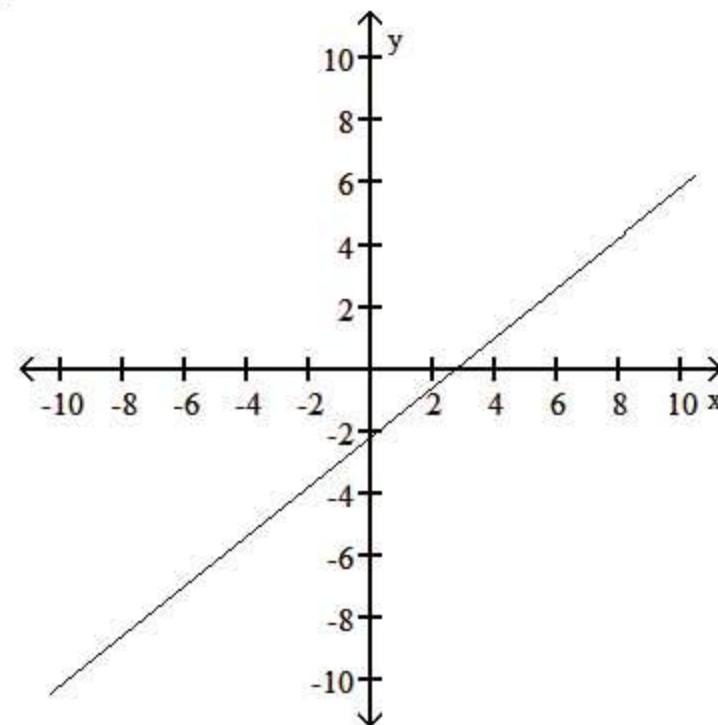
1) _____

C)



$$m = \frac{4}{5}$$

D)



$$m = \frac{4}{5}$$

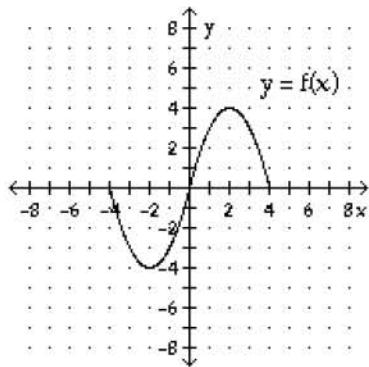
Answer the question.

2) How can the graph of $f(x) = \frac{1}{x} - 9$ be obtained from the graph of $y = \frac{1}{x}$? _____

- A) Reflect it across the y-axis. Shift it 9 units up.
- B) Reflect it across the x-axis. Shift it 9 units down.
- C) Reflect it across the x-axis. Shift it 9 units up.
- D) Reflect it across the y-axis. Shift it 9 units down.

The graph of the function f is shown below. Match the function g with the correct graph.

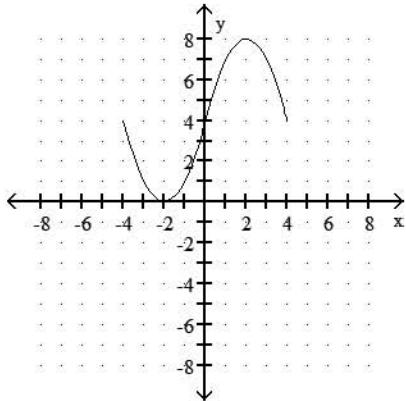
3)



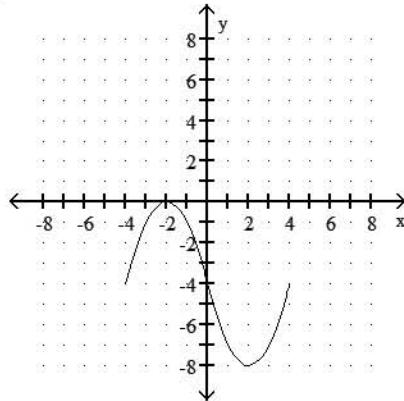
3)

$$g(x) = -f(-x) - 4$$

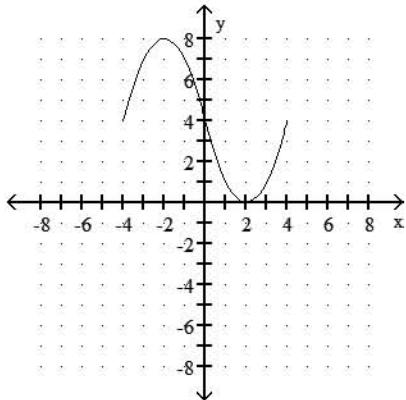
A)



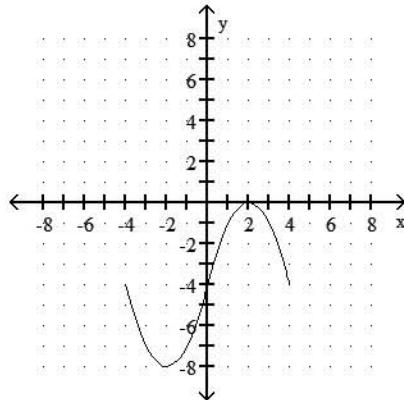
B)



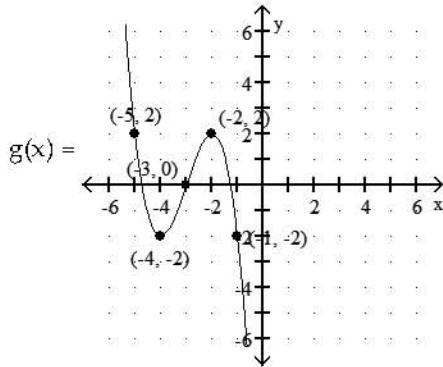
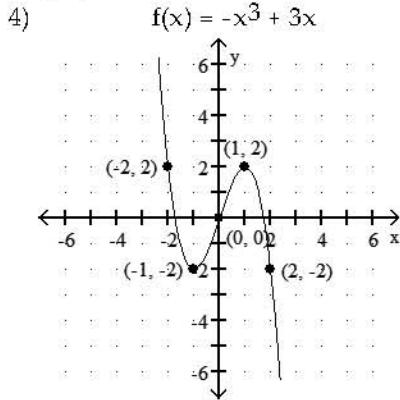
C)



D)



Given the graph of the function $f(x) = -x^3 + 3x$; find a formula for $g(x)$.



- A) $g(x) = f(x + 3)$ B) $g(x) = f(x - 3)$ C) $g(x) = f(x) - 3$ D) $g(x) = f(x) + 3$

Solve.

5) $45x + 9x^2 = 0$

A) -22.5

B) -9, -5

C) -5

D) 0, -5

5) _____

6) $\frac{7x}{x - 7} - \frac{4}{x} = \frac{28}{x^2 - 7x}$

A) $\frac{4}{7}$

B) $\frac{4}{7}, -\frac{4}{7}$

C) $\frac{2}{7}, -\frac{2}{7}$

D) $\frac{7}{4}$

6) _____

7) $|2x| = -3$

A) -0.67, 0.67

B) \emptyset

C) 1.5

D) -1.5

7) _____

A polynomial $P(x)$ and a divisor $d(x)$ are given. Use long division to find the quotient $Q(x)$ and the remainder $R(x)$ when $P(x)$ is divided by $d(x)$, and express $P(x)$ in the form $d(x) \cdot Q(x) + R(x)$.

8) $P(x) = x^4 + 3x^2 + 14$

$d(x) = x^2 - 3$

A) $(x^2 - 3) \cdot (x^2 - x + 6) + 14$

C) $(x^2 - 3) \cdot (x^2 - 3x + 6) + 32$

B) $(x^2 - 3) \cdot (x^2 + 6) + 32$

D) $(x^2 - 3) \cdot (x^2 + 6) + 18$

8) _____

Factor the polynomial $f(x)$. Then solve the equation $f(x) = 0$.

9) $f(x) = x^3 - 11x^2 + 36x - 36$

A) $(x + 2)(x - 3)(x + 6); -2, 3, -6$

C) $(x - 2)(x - 3)(x - 7); 2, 3, 7$

B) $(x - 2)(x - 3)(x - 6); 2, 3, 6$

D) $(x - 2)(x + 3)(x - 6); -2, 3, -6$

9) _____

Find the horizontal asymptote, if any, of the rational function.

10) $f(x) = \frac{7x^4 + 6x - 7}{x^2 - 7}$

A) $y = 0$

B) $y = 1$

C) $y = 7$

D) None

10) _____

State the domain of the rational function.

11) $f(x) = \frac{11}{16 - x}$

11) _____

- A) $(-\infty, -16) \cup (-16, 16) \cup (16, \infty)$
C) $(-\infty, -11) \cup (-11, 11) \cup (11, \infty)$

- B) $(-\infty, 11) \cup (11, \infty)$
D) $(-\infty, 16) \cup (16, \infty)$

Solve.

12) $\frac{x+12}{x+8} < 6$

12) _____

- A) $(-\infty, -\frac{36}{5}) \cup (8, \infty)$
B) \emptyset
C) $(-\infty, -8) \cup \left(-\frac{36}{5}, \infty\right)$
D) $(-8, -\frac{36}{5})$

Find the domain and range of the inverse of the given function.

13) $f(x) = 2 - x^2 ; x \geq 0$

13) _____

- A) Domain: $[2, \infty)$; range: $[0, \infty)$
C) Domain: $[0, \infty)$; range: $(-\infty, 2]$
B) Domain: $(-\infty, 2]$; range: all real numbers
D) Domain: $(-\infty, 2]$; range: $[0, \infty)$

Find the domain and the vertical asymptote of the function.

14) $f(x) = \ln(10 - x)$

14) _____

- A) Domain: $(-\infty, -10)$; vertical asymptote: $x = -10$
B) Domain: $(-10, \infty)$; vertical asymptote: $x = -10$
C) Domain: $(-\infty, 10)$; vertical asymptote: $x = 10$
D) Domain: $(10, \infty)$; vertical asymptote: $x = 10$

Find the exact acute angle θ for the given function value.

15) $\csc \theta = 2$

15) _____

- A) 45°
B) 60°
C) 30°

Give the coordinates of the point described on the unit circle.

16) The reflection of the point $\left(\frac{2}{5}, \frac{1}{5}\right)$ across the origin

16) _____

- A) $\left(-\frac{2}{5}, -\frac{1}{5}\right)$
B) $\left(\frac{2}{5}, -\frac{1}{5}\right)$
C) $\left(-\frac{2}{5}, \frac{1}{5}\right)$
D) $\left(\frac{2}{5}, \frac{1}{5}\right)$

Multiply and simplify.

17) $\sec x (\cot x + \sin x)$

17) _____

- A) $\sin x + \csc x$
B) $\cos^2 x + 2 \sin^2 x$
C) $\cos^2 x - \cot x$
D) $\csc x + \tan x$

Solve the system of equations using Gaussian elimination or Gauss-Jordan elimination.

18) $x + 5y + 4z = -9$

18) _____

$5y + 4z = -11$

$z = -4$

- A) $(-4, 1, 2)$
B) $(2, -4, 1)$
C) No solution
D) $(2, 1, -4)$

Provide an appropriate response.

- 19) Fill in the blanks to complete the statement. For a system of 4 equations and 4 unknowns, the corresponding augmented matrix will have rows and columns.

19) _____

A) 4; 5

B) 5; 5

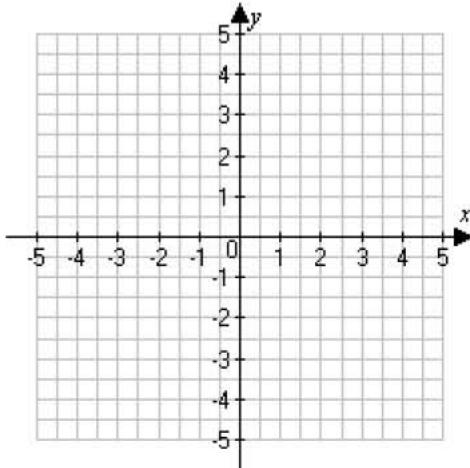
C) 4; 4

D) 5; 4

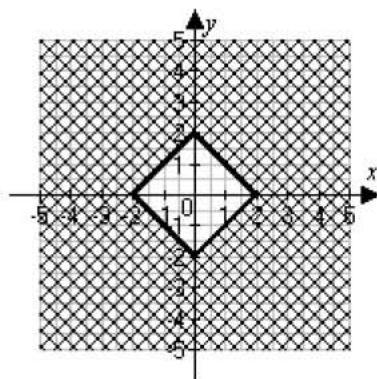
Graph the inequality.

20) $|x + y| \geq 2$

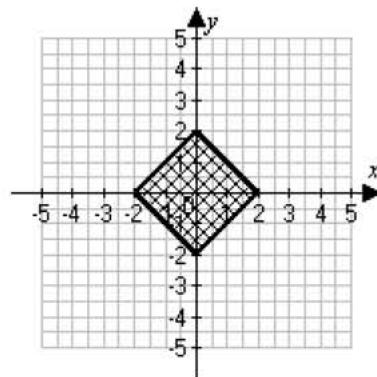
20) _____



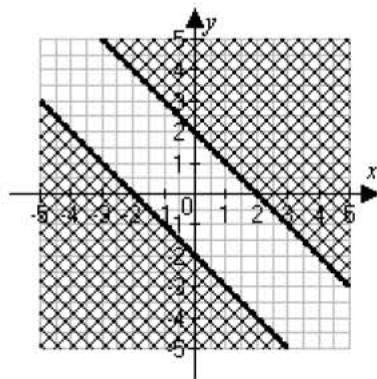
A)



B)



C)



D)

