Sample Test for the STA282 Prerequisite Review
MTH 105 Intermediate Algebra

1.

Insert <, >, or = in the space provided to make the statement true.

0 __ -3

$0 \square -3$

2.

Find A∪B and A∩B for the set A and B.

$A = \{6, 8, 7\}, \ B = \{5, 1, 9\}$

$A \cup B = \{\square\}$
(Use a comma to separate answers as needed. Type N if the solution is the empty set.)

$A \cap B = \{\square\}$
(Use a comma to separate answers as needed. Type N if the solution is the empty set.)

3.

Find the absolute value.

$-\left| -\dfrac{2}{9} \right|$

$-\left| -\dfrac{2}{9} \right| = \square$

4.

Add: $-10 + (-8)$

$-10 + (-8) = \square$ (Type an integer.)

5.

Evaluate the expression without using a calculator.

$-\left(\dfrac{6}{7} \right)^3$

$-\left(\dfrac{6}{7} \right)^3 = \square$ (Type an integer or a fraction.)

6.

Evaluate the given exponential expression.

$$\frac{5^4}{5^2}$$

$\dfrac{5^4}{5^2} = \boxed{}$ (Type an integer or a fraction. Simplify your answer.)

7.

Use the quotient to a power rule to simplify.

$$\left(\frac{7b^6c^4}{d^2}\right)^3$$

$\left(\dfrac{7b^6c^4}{d^2}\right)^3 = \boxed{}$

8.

Express the number 0.0061 in scientific notation.

$0.0061 = \boxed{}$

(Use scientific notation. Use the multiplication symbol in the math palette as needed.)

9.

Divide and write the answer in scientific notation.

$$\frac{2.2 \times 10^{-16}}{5.3 \times 10^{-12}}$$

$\dfrac{2.2 \times 10^{-16}}{5.3 \times 10^{-12}} = \boxed{}$

(Use scientific notation. Use the multiplication symbol in the math palette as needed. Round to the nearest thousandth as needed.)

10.

Name the indicated property.

If $z = 11$, then $11 = z$.

Choose the correct answer.

○ transitive property
○ reflexive property
○ addition property
○ symmetric property
○ multiplication property

11.

Solve the equation.

$$\frac{1}{3} = \frac{9}{10}x - \frac{1}{9}$$

The solution is $x = \boxed{}$.
(Type an integer or fraction. Simplify your answer.)

12.

Evaluate the following formula for the values given.

$A = \pi r^2$, when $r = 4$ (a formula for finding the area of a circle)

The area of the circle is $\boxed{}$.
(Type an integer or decimal rounded to the nearest hundredth as needed.)

13.

Solve the equation for q_1.

$$F = \frac{kq_1 q_2}{r^2}$$

Choose the correct answer below.

A. $\dfrac{kr^2}{q_2}$

B. $\dfrac{Fr^2}{kq_2}$

C. $\dfrac{Fr}{kq_2}$

D. $Fkq_2 r^2$

14.

Select one variable to represent one quantity and express the second quantity in terms of the first.

a 9-foot piece of wood is cut into 2 pieces.

Let x represent the length of the first piece of wood. Express the length of the rest of the wood in terms of x.

☐

15.

Two friends, Don O'Neal and Judy McElroy, go hiking in the Rocky Mountains. While hiking they come across Bear Lake. They wonder what the distance around the lake is and decide to find out. Don knows he walks at 4.6 mph and Judy knows she walks at 4 mph. If they start walking at the same time in opposite directions around the lake, and meet in 2 hours, what is the distance around the lake?

The distance around the lake is ☐ mi.

16. The salinity (salt content) of an ocean averages 33 parts per thousand. If 71 ounces of water is collected and placed in the sun, how many ounces of pure water would need to evaporate to raise the salinity to 47 parts per thousand? (Only the pure water is evaporated; the salt is left behind.)
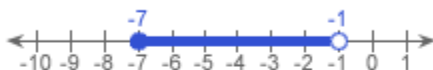
☐ oz

(Round to the nearest tenth as needed.)

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17. Express the inequality **a)** using a number line, **b)** in interval notation, and **c)** as a solution set (use set builder notation).
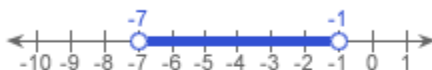
$$-7 < x \le -1$$

a) Choose the correct number line representation of the inequality below.

○ A. -7 ... -1
-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1

○ B. -7 ... -1
-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1

○ C. -7 ... -1
-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1

○ D. -7 ... -1
-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1

b) The interval notation of the inequality, $-7 < x \le -1$, is ☐.

c) Express the inequality using set builder notation.

{ ☐ }

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18. Solve the compound inequality.

$$x + 5 \ge 11 \quad \text{and} \quad x - 1 \le 7$$

Choose the correct solution set.

○ A. $[8,6]$
○ B. $[6,8]$
○ C. $(6,8)$
○ D. $(-\infty,6] \cup [8,\infty)$

19.

Find the solution set for the inequality.

$$|p| \le 12$$

The solution set is $\left\{ p \mid \boxed{} \right\}$.
(Type an inequality or a compound inequality. Type N if the solution is the empty set. Type R if the solution is all real numbers.)

20.
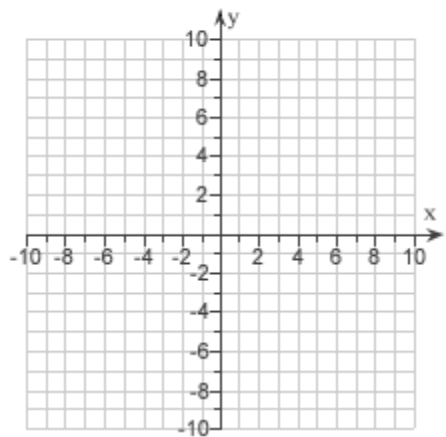
Find the solution set for the equation.

$$|2x - 9| = \left| \frac{1}{2}x + 4 \right|$$

The solution set is $\left\{ \boxed{} \right\}$.
(Use a comma to separate answers as needed. Type N if there is no solution.)

21.

Graph the equation.

$$y = x + 3$$

Use the graphing tool to graph the equation.

[Click to enlarge graph]

22.

a) Determine whether the graph illustrated represents a function.
b) Give the domain and range of each function or relation.
c) Approximate the value or values of x where y = 2.
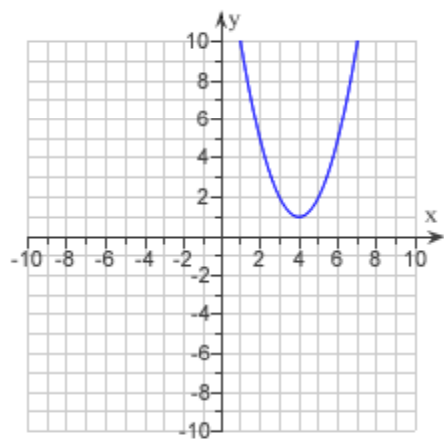
a) Does the graph represent a function?

○   Yes
○   No

b) The domain is D = ☐.
(Type R if the answer is all real numbers.)

The range is R = {☐}.
(Type R if the answer is all real numbers.)
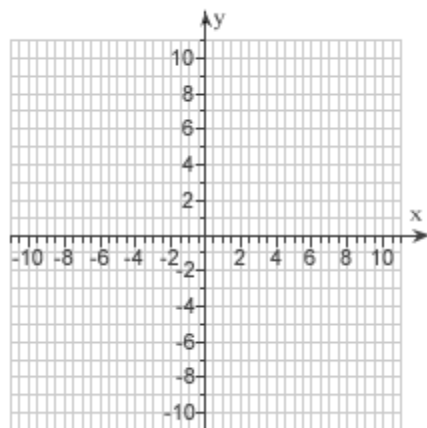
c) List the values of x where y = 2.

☐ (Use a comma to separate answers as needed.)

23.

Graph the equation using the x- and y-intercepts.

$y = -2x + 8$

Use the graphing tool to graph the linear equation. Use the intercepts when drawing the line. If only one intercept exists, use it and another point to draw the line.

[Click to enlarge graph]

24.

Find the slope of the line in the figure. If the slope of the line is undefined, so state. Then write an equation of the given line.

The slope of the line is ☐.
(Type an integer or a fraction. Type N if the slope is undefined.)

Write the slope-intercept form of the linear equation.

☐

(Type an equation using x as the variable. Use integers or fractions for any numbers in the equation.)
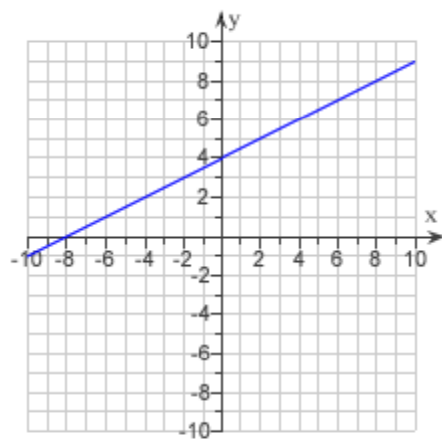
25.

Use the point-slope form to find the equation of a line with the properties given. Then write the equation in slope-intercept form.

$$\text{Slope} = -\frac{1}{3}, \text{ through } (3, -7)$$

The equation in slope-intercept form is ☐.
(Type an equation. Use integers or fractions for any numbers in the equation.)

26.

For the functions $f(x) = -4x^2 + 2x - 3$ and $g(x) = x^3 + 4x^2$, find **a)** $(f + g)(x)$, **b)** $(f + g)(a)$, and **c)** $(f + g)(4)$.

a) $(f + g)(x) =$ ☐

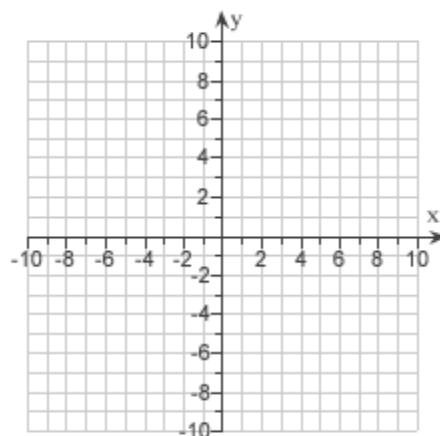**b)** $(f + g)(a) =$ ☐

c) $(f + g)(4) =$ ☐

27.

Graph the inequality.

$$y \geq -\frac{4}{9}x$$
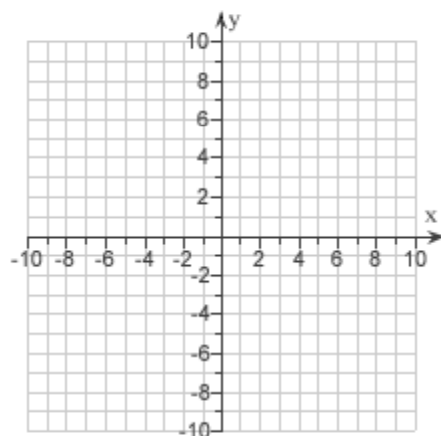
Use the graphing tool to graph the inequality.

Click to enlarge graph

28.

Determine the solution to the system of equations graphically. If the system is inconsistent or dependent, so state.

$$y = x + 5$$
$$y = -x + 7$$

Use the graphing tool to graph the system. If both equations yield the same line, graph the line twice.

Click to enlarge graph

The solution to the system is ☐.

(Type an ordered pair. Type I if there are infinitely many solutions. Type N if there is no solution.)

29.

Use substitution to solve the system of linear equations. Check your solutions.

$$x + y - 2z = 18$$
$$-2y + z = -15$$
$$z = -5$$

The solution is ($\boxed{}$, $\boxed{}$, $\boxed{}$).

(Type an exact answer in simplified form. If there is no solution, type N for each coordinate. If there are infinitely many solutions, type an expression involving z for each coordinate where z represents all real numbers.)

30.

A rowing team rowed an average of 13.8 miles per hour with the current and 7.4 miles per hour against the current. Determine the team's rowing speed in still water and the speed of the current.

The team's rowing speed in still water is $\boxed{}$ miles per hour.

The speed of the current is $\boxed{}$ miles per hour.

1. $>$

2. 6,8,7,5,1,9
   N

3. $-\dfrac{2}{9}$

4. -18

5. $-\dfrac{216}{343}$

6. 25

7. $\dfrac{343b^{18}c^{12}}{d^6}$

8. 6.1×10^{-3}

9. 4.151×10^{-5}

10. the fourth choice

11. $\dfrac{40}{81}$

12. 50.27

13. B

14. $9 - x$

15. 17.2

16. 21.1

17. D
    $(-7, -1]$
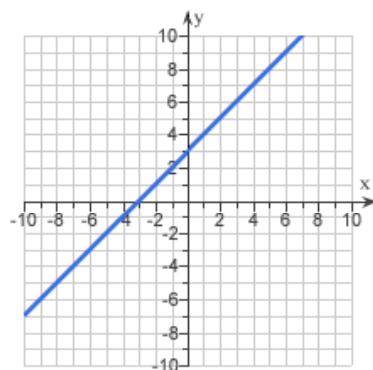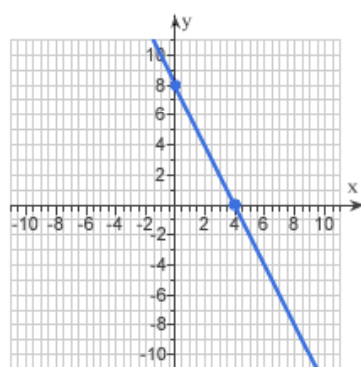 $x \mid -7 < x \le -1$

18. B

19. $-12 \le p \le 12$

20. $\dfrac{26}{3}, 2$

21.

22. the first choice
    R
    $y \mid y \ge 1$
    3,5

23.

24. $\dfrac{1}{2}$
    $y = \dfrac{1}{2}x + 4$

25. $y = -\dfrac{1}{3}x - 6$

26. $x^3 + 2x - 3$
    $a^3 + 2a - 3$
    69

27.