1. Solve for $x$.

$$8x - 18y = 4$$

2. Solve for $b$.

$$r = (b + a)m$$

3. Solve for $d$.

$$\frac{b - c + d}{4} = a$$

4. Justin is saving money to buy a game. So far he has saved $30, which is five-sixths of the total cost of the game. How much does the game cost?

5. A garden table and a bench cost $600 combined. The cost of the garden table is three times the cost of the bench. What is the cost of the bench?

6. Amy purchased a prepaid phone card for $15. Long distance calls cost 24 cents a minute using this card. Amy used her card only once to make a long distance call. If the remaining credit on her card is $10.44, how many minutes did her call last?
7. Over the last three evenings, Martina received a total of 119 phone calls at the call center. The first evening, she received 6 fewer calls than the third evening. The second evening, she received 3 times as many calls as the third evening. How many phone calls did she receive each evening?

8. Three consecutive odd integers have a sum of 21. Find the integers.

9. Deandre works as a tutor for $15 an hour and as a waiter for $12 an hour. This month, he worked a combined total of 102 hours at his two jobs.

Let \( t \) be the number of hours Deandre worked as a tutor this month. Write an expression for the combined total dollar amount he earned this month.

10. At the city museum, child admission is $5.60 and adult admission is $9.50. On Saturday, four times as many adult tickets as child tickets were sold, for a total sales of $1133.60. How many child tickets were sold that day?

11. Two cars leave towns 800 kilometers apart at the same time and travel toward each other. One car’s rate is 10 kilometers per hour more than the other’s. If they meet in 4 hours, what is the rate of the faster car?

Do not do any rounding.

\[
\text{__ kilometers per hour}
\]

12. The length of a rectangle is three times its width.

If the area of the rectangle is 243 in\(^2\), find its perimeter.
13. An investment firm invested in two companies last year. They invested $20,000 in Company A and made a profit of 16%. They invested $12,000 in Company B and made a profit of 14%.

Answer the questions below. Do not do any rounding.

(a) What was the investment firm’s total profit?
   $\underline{\hspace{2cm}}$

(b) What was the percent profit for their total investment?
   $\underline{\hspace{2cm}}\%$

14. In the lab, Ivanna has two solutions that contain alcohol and is mixing them with each other. Solution A is 12% alcohol and Solution B is 40% alcohol. She uses 300 milliliters of Solution A. How many milliliters of Solution B does she use, if the resulting mixture is a 28% alcohol solution?

15. Graph the compound inequality on the number line.
   $x \geq 2 \text{ or } x \leq -5$

16. Write a compound inequality for the graph shown below.
   Use $x$ for your variable.
17. The sets $F$ and $H$ are defined as follows.

\[ F = \{ w \mid w < 2 \} \]
\[ H = \{ w \mid w \leq 7 \} \]

Write $F \cup H$ and $F \cap H$ using interval notation.
If the set is empty, write $\emptyset$.

18. Solve the compound inequality.

\[ 3x + 3 < -3 \text{ or } 4x + 2 \geq 26 \]

Graph the solution on the number line.

19. Solve the compound inequality.

\[ 2x + 6 < 14 \quad \text{and} \quad 4x + 3 \leq -5 \]

Write the solution in interval notation.
If there is no solution, enter $\emptyset$.

20. Solve for $y$.

\[ 4 \left\lfloor 5y \right\rfloor = 40 \]

21. Solve for $u$.

\[ \left| 2u - 2 \right| + 21 = 9 \]}
22. Solve for \( v \).

\[
|3v - 4| = |3v - 5|
\]

23. Graph the solution to the inequality on the number line.

\[
|3v - 12| \geq 9
\]

24. Solve.

\[
|3x| - 21 < -16
\]

25. Find the \( y \)-intercept and the slope of the line.

\[
3x + 5y = 4
\]

Write your answers in simplest form.

26. A line passes through the point \((9, -5)\) and has a slope of 1.

Write an equation in point-slope form for this line.
27. Write an equation of the line below.

28. Find an equation for the line below.
29. Write equations for the horizontal and vertical lines passing through the point \((2, \ -2)\).

   horizontal line:
   
   vertical line:

30. Consider the line \(8x - 6y = -2\).

   What is the slope of a line perpendicular to this line?

   What is the slope of a line parallel to this line?

31. The equations of three lines are given below.

   Line 1: \(-2y = 3x + 4\)
   Line 2: \(6x - 4y = 2\)
   Line 3: \(y = -\frac{2}{3}x - 6\)

   For each pair of lines, determine whether they are parallel, perpendicular, or neither.

<table>
<thead>
<tr>
<th>Line 1 and Line 2:</th>
<th>Parallel</th>
<th>Perpendicular</th>
<th>Neither</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 1 and Line 3:</td>
<td>Parallel</td>
<td>Perpendicular</td>
<td>Neither</td>
</tr>
<tr>
<td>Line 2 and Line 3:</td>
<td>Parallel</td>
<td>Perpendicular</td>
<td>Neither</td>
</tr>
</tbody>
</table>

32. Consider the line \(y = 2x - 6\).

   (a) Find the equation of the line that is parallel to this line and passes through the point \((-7, \ -2)\).

   (b) Find the equation of the line that is perpendicular to this line and passes through the point \((-7, \ -2)\).
33. For each relation, decide whether or not it is a function.

<table>
<thead>
<tr>
<th>Relation 1</th>
<th>Relation 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain</strong></td>
<td><strong>Range</strong></td>
</tr>
<tr>
<td>y</td>
<td>0</td>
</tr>
<tr>
<td>w</td>
<td>-5</td>
</tr>
<tr>
<td>m</td>
<td>8</td>
</tr>
<tr>
<td>c</td>
<td></td>
</tr>
</tbody>
</table>

- Function
- Not a Function

<table>
<thead>
<tr>
<th>Relation 3</th>
<th>Relation 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain</strong></td>
<td><strong>Range</strong></td>
</tr>
<tr>
<td>(-7, 4), (-2, -2), (-7, -2), (-2, 4)</td>
<td>(4, t), (4, b), (0, m), (0, s)</td>
</tr>
</tbody>
</table>

- Function
- Not a Function

34. For each graph below, state whether it represents a function.

Function?:
- Yes
- No
Function?: Yes No
Function?: Yes No
Function?: Yes No
35. Suppose that the relation \( H \) is defined as follows.

\[ H = \{ (4, m), (4, p), (7, q), (0, 7) \} \]

Give the domain and range of \( H \).
Write your answers using set notation.

36. The function \( f \) is defined by the following rule.

\[ f(x) = 4x + 1 \]

Complete the function table.
37. The functions $f$ and $g$ are defined as follows.

$$f(x) = -3x + 4 \quad g(x) = 4x^2 - x$$

Find $f(6)$ and $g(-5)$. Simplify your answers as much as possible.

38. A printing service charges a set-up fee of $15.00 for each order and 15 cents more for each copy. The total cost, $C$ (in dollars), for an order of $x$ copies is given by the following function.

$$C(x) = 15.00 + 0.15x$$

What is the total cost for an order of 30 copies?

39. The graph of the relation $T$ is shown below.

![Graph of relation T]

Give the domain and range of $T$.
Write your answers using set notation.

40. Find the domain of the function.

$$g(x) = \sqrt{32 - 4x}$$

Write your answer using interval notation.
41. For each of the following equations, determine whether \( y \) is a function of \( x \).

<table>
<thead>
<tr>
<th>Equation</th>
<th>Function/Not a function</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y = 6x )</td>
<td>Function</td>
</tr>
<tr>
<td>( y = 2x + 5 )</td>
<td>Not a function</td>
</tr>
<tr>
<td>( y^2 = -2x )</td>
<td>Function</td>
</tr>
<tr>
<td>( y = \frac{2}{5}x^2 )</td>
<td>Not a function</td>
</tr>
</tbody>
</table>
42. For each ordered pair, determine whether it is a solution to the system of equations.

\[
\begin{align*}
9x - 2y &= 8 \\
-7x + 3y &= 1
\end{align*}
\]

<table>
<thead>
<tr>
<th>( (x, y) )</th>
<th>Is it a solution?</th>
</tr>
</thead>
<tbody>
<tr>
<td>((-4, -9))</td>
<td>(\bigcirc) (\bigcirc)</td>
</tr>
<tr>
<td>((5, 2))</td>
<td>(\bigcirc) (\bigcirc)</td>
</tr>
<tr>
<td>((0, -4))</td>
<td>(\bigcirc) (\bigcirc)</td>
</tr>
<tr>
<td>((-8, 1))</td>
<td>(\bigcirc) (\bigcirc)</td>
</tr>
</tbody>
</table>

43.

For each system of linear equations shown below, classify the system as "consistent dependent," "consistent independent," or "inconsistent." Then, answer the question about its solutions.

L1: \(y = x + 1\)
L2: \(y = -\frac{1}{2}x - \frac{7}{2}\)

This system of equations is:

- consistent dependent   - consistent independent   - inconsistent

This means the system has:
This system of equations is:
- consistent dependent  - consistent independent  - inconsistent

This means the system has:
- a unique solution:  - no solution  - infinitely many solutions

L1: \( y = 3x - 3 \)
L2: \( y = 3x \)

L1: \( y = \frac{1}{3}x + 4 \)
L2: \(-x + 3y = 12\)

This system of equations is:
- consistent dependent  - consistent independent  - inconsistent

This means the system has:
- a unique solution: \( (x, y) \)  
- no solution  
- infinitely many solutions

44. Use substitution to solve the system.

\[
3x + 4y = 25 \\
3y - 9 = x
\]

\[
x = 3 \\
y = 5
\]

45. Solve the following system of equations.

\[
3x + 6y = -6 \\
-3x + 2y = 14
\]

46. Solve the following system of equations.

\[
-9x - 7y = 12 \\
-5x - 3y = 4
\]

47. Solve the following system of equations.

\[
\frac{1}{4}x + \frac{1}{3}y = 8 \\
\frac{1}{5}x - 2y = -\frac{2}{5}
\]
48. Two systems of equations are given below. 
For each system, choose the best description of its solution. 
If applicable, give the solution.

<table>
<thead>
<tr>
<th>System 1</th>
<th>System 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-x + 3y = 6)</td>
<td>(-x + 3y = 6)</td>
</tr>
<tr>
<td>(x - 3y = 6)</td>
<td></td>
</tr>
</tbody>
</table>

- The system has no solution.
- The system has a unique solution: 
  \((x, y) = (\square, \square)\)
- The system has infinitely many solutions. 
  They must satisfy the following equation: 
  \(y = \square\)

<table>
<thead>
<tr>
<th>System 1</th>
<th>System 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(x - 4y = 4)</td>
<td>(x - 4y = 4)</td>
</tr>
<tr>
<td>(-x - 4y = 4)</td>
<td></td>
</tr>
</tbody>
</table>

- The system has no solution.
- The system has a unique solution: 
  \((x, y) = (\square, \square)\)
- The system has infinitely many solutions. 
  They must satisfy the following equation: 
  \(y = \square\)
49. Latoya and Shen are driving separate cars to Boston. They begin the trip with full gas tanks. The amount of gas (in gallons) remaining in the tank of each car depends on the number of miles driven, as shown below.

- After 150 miles driven, which car will have less gas remaining? How much less gas will it have?
- After how many miles will the tanks contain the same amount of gas? If the number of miles driven is less than this, which car will have less gas remaining?

50. At a hockey game, a vendor sold a combined total of 160 sodas and hot dogs. The number of sodas sold was 54 more than the number of hot dogs sold. Find the number of sodas sold and the number of hot dogs sold.

51. Latoya the trainer has two solo workout plans that she offers her clients: Plan A and Plan B. Each client does either one or the other (not both). On Wednesday there were 6 clients who did Plan A and 2 who did Plan B. On Thursday there were 3 clients who did Plan A and 5 who did Plan B. Latoya trained her Wednesday clients for a total of 10 hours and her Thursday clients for a total of 10 hours. How long does each of the workout plans last?

52. Suppose that there are two types of tickets to a show: advance and same-day. The combined cost of one advance ticket and one same-day ticket is $65. For one performance, 40 advance tickets and 35 same-day tickets were sold. The total amount paid for the tickets was $2450. What was the price of each kind of ticket?

   Advance ticket: 
   Same-day ticket:
53. The Royal Fruit Company produces two types of fruit drinks. The first type is 40% pure fruit juice, and the second type is 90% pure fruit juice. The company is attempting to produce a fruit drink that contains 85% pure fruit juice. How many pints of each of the two existing types of drink must be used to make 110 pints of a mixture that is 85% pure fruit juice?

   First fruit drink: _____ pints
   Second fruit drink: _____ pints

54. A theater group made appearances in two cities. The hotel charge before tax in the second city was $1000 lower than in the first. The tax in the first city was 6%, and the tax in the second city was 9.5%. The total hotel tax paid for the two cities was $718.75. How much was the hotel charge in each city before tax?
Problem Packet for Class Practice 2.2 - 4.2 #1 Answers for class MAT 135 Spring 2017 Master

1. \[ x = \frac{4 + 18y}{8} \]

2. \[ b = \frac{r}{m} - a \]

3. \[ d = 4a - b + c \]

4. $36

5. $150

6. 19 minutes

7. 
   Number of phone calls the first evening: 19
   Number of phone calls the second evening: 75
   Number of phone calls the third evening: 25

8. 5, 7, 9

9. total earned (in dollars) = 3t + 1224

10. 26 tickets

11. 105 kilometers per hour

12. 72 in

13. 
   (a) What was the investment firm’s total profit?
      $4880
   (b) What was the percent profit for their total investment?
      15.25%
14. Number of milliliters of Solution B: 400

15.

16. $x \leq 5$ or $x > 7$

17. $F \cup H = (-\infty, 7]$  
$F \cap H = (-\infty, 2)$

18.

19. $(-\infty, -2]$  

20. $y = 2$, $-2$  

21. No solution

22. $v = \frac{3}{2}$

23.

24. $-\frac{5}{3} < x < \frac{5}{3}$
25. \( y \)-intercept: \( \frac{4}{5} \)
   
   slope: \( -\frac{3}{5} \)

26. \( y + 5 = x - 9 \)

27. \( y = -2x + 1 \)

28. \( y = -\frac{3}{2}x + \frac{11}{2} \)

29. horizontal line: \( y = -2 \)
   
   vertical line: \( x = 2 \)

30.

   Slope of a perpendicular line: \( \frac{3}{4} \)

   Slope of a parallel line: \( \frac{4}{3} \)

31.

   Line 1 and Line 2: \( \square \) Parallel \( \square \) Perpendicular \( \square \) Neither
   
   Line 1 and Line 3: \( \square \) Parallel \( \square \) Perpendicular \( \square \) Neither
   
   Line 2 and Line 3: \( \square \) Parallel \( \square \) Perpendicular \( \square \) Neither

32.

   Equation of parallel line: \( y = 2x + 12 \)

   Equation of perpendicular line: \( y = -\frac{1}{2}x - \frac{11}{2} \)
33.

Relation 1

\[
\begin{array}{c|c}
\text{Domain} & \text{Range} \\
\hline
y & 0 \\
w & -5 \\
m & 8 \\
c & \\
\end{array}
\]

Function

Relation 2

\[
\begin{array}{c|c}
\text{Domain} & \text{Range} \\
\hline
s & s \\
r & r \\
d & d \\
b & \\
\end{array}
\]

Function

Relation 3

\(\{(−7, 4), (−2, −2), (−7, −2), (−2, 4)\}\)

Function

Relation 4

\(\{(4, t), (4, b), (0, m), (0, s)\}\)

Function

Not a Function

Not a Function
34.

35. domain = \{4, 7, 0\}
range = \{m, p, q, 7\}

36.

<table>
<thead>
<tr>
<th>(x)</th>
<th>(f(x))</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>-3</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
</tr>
</tbody>
</table>

37.

\[ f(6) = -14 \]
\[ g(-5) = 105 \]
38. 19.50 dollars

39. domain = \{1, \ -4\} 
range = \{3, \ -3, \ -2\}

40. \((-\infty, \ 8]\)

41.

<table>
<thead>
<tr>
<th>Equation</th>
<th>Function</th>
<th>Not a function</th>
</tr>
</thead>
<tbody>
<tr>
<td>(y = 6x)</td>
<td>☑️</td>
<td>☐️</td>
</tr>
<tr>
<td>(y = 2x + 5)</td>
<td>☑️</td>
<td>☐️</td>
</tr>
<tr>
<td>(y^2 = -2x)</td>
<td>☑️</td>
<td>☐️</td>
</tr>
<tr>
<td>(y = \frac{2x^2}{5})</td>
<td>☑️</td>
<td>☐️</td>
</tr>
</tbody>
</table>

42.

| \((x, y)\)     | Is it a solution? |  |
|----------------|--------------------|
| Yes            | No                 |
| \((-4, \ -9)\) | ☐️                  |
| \((5, \ 2)\)   | ☐️                  |
| \((0, \ -4)\)  | ☐️                  |
| \((-8, \ 1)\)  | ☐️                  |

43.  
L1: \(y = x + 1\) 
L2: \(y = -\frac{1}{2}x - \frac{7}{2}\)
This system of equations is:
- consistent independent

This means the system has:
- a unique solution:
Solution: \((-3, -2)\)

L1: \(y = 3x - 3\)
L2: \(y = 3x\)

This system of equations is:
- inconsistent

This means the system has:
- no solution

L1: \(y = \frac{1}{3}x + 4\)
L2: \(-x + 3y = 12\)
This system of equations is:
- consistent dependent
This means the system has:
- infinitely many solutions

44.  
x = 3  
y = 4

45.  
x = -4  
y = 1

46.  
x = 1  
y = -3

47.  
x = 28  
y = 3
48.

\[
\begin{align*}
-x + 3y &= 6 \\
-x - 3y &= 6
\end{align*}
\]

○ The system has no solution.
○ The system has a unique solution:
\[
(x, y) = (\square, \square)
\]
○ The system has infinitely many solutions. They must satisfy the following equation:
\[
y = \square
\]

\[
\begin{align*}
x - 4y &= 4 \\
x - 4y &= 4
\end{align*}
\]

○ The system has no solution.
○ The system has a unique solution:
\[
(x, y) = (0, -1)
\]
○ The system has infinitely many solutions. They must satisfy the following equation:
\[
y = \square
\]

49.

(a) After 150 miles driven, which car will have less gas remaining?

Latoya’s car

How much less gas will it have?
7

(b) After how many miles will the tanks contain the same amount of gas?

300

If the number of miles driven is less than this, which car will have less gas remaining?

Latoya’s car

50.

Number of sodas sold: 107

Number of hot dogs sold: 53
51. Length of each Plan A workout: 1.25 hour(s)
Length of each Plan B workout: 1.25 hour(s)

52. Advance ticket: $35
Same-day ticket: $30

53.
First fruit drink: 11 pints
Second fruit drink: 99 pints

54. First city: $5250
Second city: $4250