Honors Algebra 2 Summer Work
Due at Meet the Teacher Night

Show all work. You will be graded on accuracy and completion. Partial credit will be given on problems where work is not shown.

1. Plot the points \( P(-2, -3) \), \( Q(1, 0) \), \( R(3, 0) \), and \( S(5, -3) \) in the coordinate plane. Connect the points in order. Identify the resulting figure. Find its area. Show work.

Graph the function.

2. \( y = 4x + 3 \);

3. \( y = -2x - 1 \);

Find the \( x \)-intercept and the \( y \)-intercept of the graph of the equation. Show work.

4. \( 3x - 2y = 8 \)

5. \( y = -0.4x + 1 \)

Find the slope of the line that passes through the points. Show work.

6. \( (-4, -3) \) and \( (-1, 1) \)

7. \( (-2, 3) \) and \( (1, -3) \)

In Exercises 8 and 9, use the following information.

The graph shows the distance of a car traveling along a straight road for 8 hours.

8. Give a verbal description of the trip.

9. What do the intercepts represent in this situation?
In Exercises 10 and 11, use the following information.
Your family and a friend’s family are going on vacation. The amount of fuel remaining in your family’s car after driving \( m \) miles is given by the equation \( a = -0.03m + 12 \) because it has a 12-gallon fuel tank and uses 0.03 gallon of fuel per mile driven. The amount of fuel remaining in your friend’s van is given by the equation \( a = -0.08m + 22 \).

10. Graph both equations in the coordinate plane.

![Graph of fuel remaining](image)

11. Use the graphs to find the difference of the amount of fuel remaining in the two fuel tanks after driving 100 miles. Show work.

Given that \( y \) varies directly with \( x \), write a direct variation equation that relates \( x \) and \( y \). Show work.

12. \( x = -8, y = 5 \)
13. \( x = \frac{1}{3}, y = 2 \)

Graph the function.

14. \( g(x) = x - 5 \)
15. \( h(x) = -\frac{1}{2}x \)
Write an equation in the given form of the line shown.

16. Slope-intercept form
17. Point-slope form

18. The freezing point of water is 0°C or 32°F. The boiling point of water is 100°C or 212°F. Develop the formula that relates the number of degrees in Fahrenheit to the number of degrees in Celsius. Show work.

Write an equation for a linear function $f$ that has the given values. Show work.

19. $f(-3) = 2$ and $f(-2) = -1$

Graph the equation.

20. $y + 2 = -\frac{4}{3}(x + 5)$
21. $y - 4 = \frac{1}{3}(x - 1)$

Find the value of $k$ so that the three points lie on the same line. Write the equation of the line in point-slope form. Show work.

22. $(1, -2), (-2, 4), (4, k)$
Write an equation in slope-intercept form of the line that passes through the given point and has the given slope \( m \) or that passes through the given points. Show work.

23. \((-5, -4), m = \frac{2}{5}\)

24. \((4, 9), (4, -1)\)

25. Determine whether the figure is a right triangle. A right triangle contains one 90° angle. Justify your answer using slopes. Show work.

In Exercises 26-28, use the table. It shows the gas mileages (in miles per gallon) for cars of different weights (in thousands of pounds).

<table>
<thead>
<tr>
<th>Weight</th>
<th>2</th>
<th>2.4</th>
<th>2.5</th>
<th>2.8</th>
<th>2.9</th>
<th>3.1</th>
<th>3.2</th>
<th>3.5</th>
<th>3.6</th>
<th>3.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mileage</td>
<td>34</td>
<td>34</td>
<td>28</td>
<td>23</td>
<td>25</td>
<td>23</td>
<td>23</td>
<td>22</td>
<td>24</td>
<td>18</td>
</tr>
</tbody>
</table>

26. Make a scatter plot of the data.

27. Describe the correlation.

28. Predict the gas mileage for a car the weights 3400 pounds.
Solve the inequality, if possible. Show work.

29. \[ x + 5.8 \leq 4.6 \]  

30. \[ x - \frac{3}{8} < \frac{1}{4} \]

31. \[ -\frac{4}{7}x \geq -12 \]

32. \[ 6(x - 2) > 3(2x - 5) \]

33. \[ 4x > 0.2(50 + 20x) \]

34. \[ 3(3 - 2x) > 5x - 6 + 2x \]

35. Write and solve an inequality to find the possible values of \( x \) if the minimum area of the trapezoid is to be at least 45 square feet. Show work.

36. The difference of 11 and \( c \) is at least –23.

37. The product of –3.9 and \( w \) is at most 19.5.

38. Three times the difference of \( 3x \) and 1 is greater than the sum of \( 3x \) and 4.

39. The quotient of the difference of 5 times a number \( n \) and 9 and 2 is greater than –2 and less than or equal to 3.
Solve the inequality, if possible. Graph your solution. Show work.

40. \[ 1 \leq 3 + \frac{2}{3}x < 7 \]

41. \[ -\frac{2}{3}x < 4 \text{ and } \frac{3}{4}x < -6 \]

42. \[ \frac{1}{2}(x + 1) > 3 \text{ or } 0 < -2 - x \]

43. \[ 3x - 9 \leq 9 \text{ or } 4 - x \leq 3 \]

44. Your scores on four algebra tests are 93, 69, 89, and 97. After the next test, you want your average to be between 84 and 92, which is a B average. What are the possible scores for your next test? Show work.

Solve the equation, if possible. Show work.

45. \[ -3 \left| 2 - \frac{5}{4}x \right| = 18 \]

46. \[ 2 \left| 3x + 8 \right| - 13 = -5 \]

47. \[ \left| \frac{9 - 4x}{2} \right| = 3 \]
Solve the inequality. Graph your solution. Show work.

48. \(-3 \left| 4 - \frac{1}{2}x \right| \leq -12\)

49. \(\frac{5}{3} \left| 7 - 4x \right| - 9 > 6\)

50. For your chemistry experiment, you are trying to keep the water temperature at 35ºC. For the experiment to work properly, the actual temperature can vary by as much as 1%. Write and solve an absolute value inequality to find the acceptable temperatures of the water. Show work.

Graph the inequality. Show work.

51. \(4(x - 2) < y - 5\)

52. \(2x - 3(y + 1) \geq y - (4 - x)\)
Solve the linear system by graphing. Show work.

53. \(3x + 5y = -18\) 
   \(4x + 2y = -10\)

54. \(2x - y = 6\) 
   \(4x - 2y = 8\)

Answers

53. \_

54. \_

55. \(3x + 4y = 24\) 
   \(\frac{3}{2}x + y = 3\)

56. \(3x - 2y = 6\) 
   \(4y = -8\)

57. \(4x + 3y = 11\) 
   \(3x - y = 5\)

Solve the linear system using substitution. Show work.

58. \(x + 6y = -17\) 
   \(0.4x + 0.5y = -1.1\)

59. \(x - \frac{1}{2}y = 1\) 
   \(\frac{2}{3}x - \frac{1}{3}y = 1\)
Solve the linear system using elimination. Show work.

60. \(3x - 6y = 6\) \hspace{1cm} 61. \(3x - 4y = 8\) \hspace{1cm} 62. \(5y + 2x = 5x + 1\)
\(9x - 3y = 8\) \hspace{1cm} \(5x + 3y = -6\) \hspace{1cm} \(3x - 2y = 3 + 3y\)

63. \(\frac{2}{5} x - \frac{1}{3} y = 1\) \hspace{1cm} 64. \(\frac{5}{3} x + \frac{2}{3} y = 5\)

Without solving the linear system, tell whether the linear system has one solution, no solution, or infinitely many solutions.

64. \(12x - 16y = 8\) \hspace{1cm} 65. \(0.4x + 0.5y = 0.2\) \hspace{1cm} 66. \(0.2x - 0.6y = 0.6\)
\(3x - 4y = 2\) \hspace{1cm} \(0.3x - 0.1y = 1.1\) \hspace{1cm} \(0.4x - 1.2y = 2.4\)

Write a system of linear inequalities for the shaded region.

67. \hspace{1cm} 68.