

Day 6. you can graph, use a table, or use the equal values method. If using the equal values method, make sure you find the value of both variables, so you can write the point  $(x, y)$ .

## Problems

Find the point of intersection  $(x, y)$  for each system of linear equations.

Do work on a separate piece of paper.

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|--|--|--|
| <p>1. <math>y = x - 6</math><br/><math>y = 12 - x</math></p>   | <p>2. <math>y = 3x - 5</math><br/><math>y = x + 3</math></p> | <p>3. <math>y = 2x + 16</math><br/><math>y = 5x + 4</math></p> |
| <p>4. <math>y = 3x - 5</math><br/><math>y = 2x + 14</math></p> | <p>5. <math>y = x + 7</math><br/><math>y = 4x - 5</math></p> | <p>6. <math>y = 7 - 3x</math><br/><math>y = 2x - 8</math></p>  |

$$\begin{array}{r}
 x - 6 = 12 - x \\
 +x \quad +x \\
 \hline
 2x - 6 = 12 \\
 +6 \quad +6 \\
 \hline
 2x = 18 \\
 \frac{2x}{2} = \frac{18}{2} \\
 x = 9 \\
 y = 9 - 6 = 3 \\
 (9, 3)
 \end{array}$$

Write a system of linear equations for each problem and use them to find a solution.

- Jacques will wash the windows of a house for \$15.00 plus \$1.00 per window. Ray will wash them for \$5.00 plus \$2.00 per window. Let  $x$  be the number of windows and  $y$  be the total charge for washing them. Write an equation that represents how much each person charges to wash windows. Solve the system of equations and explain what the solution means and when it would be most economical to use each window washer.
- Elle has moved to Hawksbluff for one year and wants to join a health club. She has narrowed her choices to two places: Thigh Hopes and ABSolutely fABulus. Thigh Hopes charges a fee of \$95 to join and an additional \$15 per month. ABSolutely fABulus charges a fee of \$125 to join and a monthly fee of \$12. Write two equations that represent each club's charges. What do your variables represent? Solve the system of equations and tell when the costs will be the same. Elle will only live there for one year, so which club will be less expensive?
- Misha and Nora want to buy season passes for a ski lift but neither of them has the \$225 needed to purchase a pass. Nora decides to get a job that pays \$6.25 per hour. She has nothing saved right now but she can work four hours each week. Misha already has \$80 and plans to save \$15 of her weekly allowance. Who will be able to purchase a pass first?
- Ginny is raising pumpkins to enter a contest to see who can grow the heaviest pumpkin. Her best pumpkin weighs 22 pounds and is growing at the rate of 2.5 pounds per week. Martha planted her pumpkins late. Her best pumpkin weighs 10 pounds but she expects it to grow 4 pounds per week. Assuming that their pumpkins grow at these rates, in how many weeks will their pumpkins weigh the same? How much will they weigh? If the contest ends in seven weeks, who will have the heavier pumpkin at that time?
- Larry and his sister, Betty, are saving money to buy their own laptop computers. Larry has \$215 and can save \$35 each week. Betty has \$380 and can save \$20 each week. When will Larry and Betty have the same amount of money?

**Answers**

1. (9, 3)
  2. (4, 7)
  3. (4, 24)
  4. (19, 52)
  5. (4, 11)
  6. (3, -2)
7. Let  $x$  = number of windows,  $y$  = cost. Jacques:  $y = 15 + 1x$ ; Roy:  $y = 5 + 2x$ . The solution is (10, 25), which means that the cost to wash 10 windows is \$25. For fewer than 10 windows use Roy; for more than 10 windows, use Jacques.
8. Let  $x$  = weeks,  $y$  = total charges. Thigh Hopes:  $y = 95 + 15x$ ; ABSolutely fABulus:  $y = 125 + 12x$ . The solution is (10, 245). At 10 months the cost at either club is \$245. For 12 months use ABSolutely fABulus.
9. Let  $x$  = weeks,  $y$  = total savings. Misha:  $y = 15x + 80$ ; Nora:  $y = 25x$ . The solution is (8, 200). Both of them will have \$200 in 8 weeks, so Nora will have \$225 in 9 weeks and be able to purchase the lift pass first. An alternative solution is to write both equations, then substitute 225 for  $y$  in each equation and solve for  $x$ . In this case, Nora can buy a ticket in 9 weeks, Misha in 9.67 weeks.
10. Let  $x$  = weeks and  $y$  = weight of the pumpkin. Ginny:  $y = 2.5x + 22$ ; Martha:  $y = 4x + 10$ . The solution is (8, 42), so their pumpkins will weigh 42 pounds in 8 weeks. Ginny would win (39.5 pounds to 38 pounds for Martha).
11. Let  $x$  = weeks,  $y$  = total money saved. Larry:  $y = 35x + 215$ ; Betty:  $y = 20x + 380$ . The solution is (11, 600). They will both have \$600 in 11 weeks.