

Name _____ Class _____ Date _____

Practice 1-3**Solving Equations**

Solve each formula for the indicated variable.

1. $V = \frac{\pi}{3} r^2 h$, for h

2. $S = L(1 - r)$, for r

3. $S = \ell w + wh + \ell h$, for w

Solve for x . State any restrictions on the variables.

4. $\frac{4}{9}(x + 3) = g$

5. $a(x + c) = b(x - c)$

6. $\frac{x + 3}{t} = t^2$

7. Two brothers are saving money to buy tickets to a concert. Their combined savings is \$55. One brother has \$15 more than the other. How much has each saved?

8. The sides of a triangle are in the ratio 5 : 12 : 13. What is the length of each side of the triangle if the perimeter of the triangle is 15 in.?

9. Find three consecutive numbers whose sum is 126.

Solve each equation.

10. $\frac{1}{2}(x - 3) + \left(\frac{3}{2} - x\right) = 5x$

11. $5w + 8 - 12w = 16 - 15w$

12. $7y + 5 = 6y + 11$

13. $1.2(x + 5) = 1.6(2x + 5)$

14. $t - 3\left(t + \frac{4}{3}\right) = 2t + 3$

15. $0.5(c + 2.8) - c = 0.6c + 0.3$

16. $3(x + 1) = 2(x + 11)$

17. $\frac{u}{5} + \frac{u}{10} - \frac{u}{6} = 1$

18. Mike and Adam left a bus terminal at the same time and traveled in opposite directions. Mike's bus was in heavy traffic and had to travel 20 mi/h slower than Adam's bus. After 3 hours, their buses were 270 miles apart. How fast was each bus going?

19. Two trains left a station at the same time. One traveled north at a certain speed and the other traveled south at twice the speed. After 4 hours, the trains were 600 miles apart. How fast was each train traveling?

20. Find four consecutive odd integers whose sum is 336.

21. The length of a rectangle is 5 cm greater than its width. The perimeter is 58 cm. Find the dimensions of the rectangle.

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Enrichment 1-3

Equations, Identities, and Impossibilities

Equations can be subdivided into three distinct types:

- a. **conditional equations**, or equations that are true for some values of x .
For example, the equation $x + 1 = 0$ is true only for $x = -1$.
- b. **identities**, for which every possible value of the variable belongs to the solution set. For example, the equation $x = x$ is an identity, as it is true for all values of x .
- c. **impossibilities**, for which no possible values of the variable belong to the solution set. For example, the equation $x = x + 1$ is an impossibility, as it is never true.

For each of the following equations, find the solution if it is a conditional equation, or classify the equation as an *identity* or an *impossibility*.

1. $x + (2x - 4) = 11$
2. $x = x + 2$
3. $x + (2x - 1) = 3x - 1$
4. $x = (2 + 2x) - x$
5. $(x - 2) + (2x + 4) = x$
6. $x + 2 = x + 3$
7. $2x = 3x$
8. $2x + 8 = 6 - x$
9. $2x - 4 + 3x = 8x - 5$
10. $2x + 5 = 5 + 2x$
11. $2(x + 3) = 5x - (3x - 6)$
12. $x + 3(x + 3) = 3(x - 3)$
13. $(x + 3) + (x - 3) = 3$
14. $(x + 3) - (x - 3) = 3$
15. $2(x + 5) - 4 = 3(x + 2) - 1$
16. $1 - (x - 5) = 3 - (x - 5)$
17. $4(x - 1) + 3 = 4x - (x + 1)$

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Suppose that you buy an electronic keyboard and sound system for \$500 using a credit card. When you get your first monthly statement, the minimum payment is \$25. The minimum payment is either \$15 or 5% of your balance, whichever is greater. Interest is calculated at 1.8% per month. You pay the minimum each month.


ACTIVITY

You can examine the situation described above with a spreadsheet. Write cell formulas for row 3 of the spreadsheet.

	A	B	C	D	E	F	G
1	Month	Balance	Interest	Payment	New Balance	Total Interest	Total Paid
2	1	\$500.00	\$9.00	\$25.00	\$484.00	\$9.00	\$25.00
3	2	\$484.00	\$8.71	\$24.20	\$468.51	\$17.71	\$49.20
4	3	\$468.51	\$8.43	\$23.43	\$453.52	\$26.15	\$72.63

Month	$A3 = A2 + 1$	Increase the month by 1.
Balance	$B3 = E2$	balance from the previous month
Interest	$C3 = B3 \cdot 0.018$	1.8% of the month's balance
Payment	$D3 = B3 \cdot 0.05$	5% of the month's balance
New Balance	$E3 = B3 + C3 - D3$	Add the interest and subtract the payment.
Total Interest	$F3 = F2 + C3$	Add the month's interest to the previous total interest.
Total Paid	$G3 = G2 + D3$	Add the month's payment to the previous total.

EXERCISES

- Create a spreadsheet for the situation in the Example.
 - In which month will the minimum payment first be \$15?
 - After how many months will the balance reach zero?
 - What is the total interest paid?
 - What is the total amount you will pay?
 - How many payments are required to reduce the balance to \$400?
 - Rewrite the right side of $E3 = B3 + C3 - D3$ in terms of $B3$.
- Create a new spreadsheet for an account that charges 14.9% annual interest. Use a minimum payment of 10% or \$20, whichever is greater. What is the total interest paid for the keyboard and sound system?
-  **Writing** Why is it better to pay off a credit card debt as soon as you can rather than pay just the minimum each month?