

Work the following problems paying careful attention to formatting. Always start by writing the original problem to the left of the first equal sign. Simplifications belong to the right of the equal signs. If you have more than one simplification step, remember to line up your equal signs. One person from each group will hand in the work. Compare your answers and decide who will turn in this assignment for the group. Make sure each group member's name is on the sheet to be turned in! You must work as a group to earn credit. **No individual submissions.**

1. Solve and check $7(3w-2)+5=6(2w-1)+24$. Show all of your work. Show the check.

Write your answer in a complete sentence.

$$\begin{aligned}7(3w-2)+5 &= 6(2w-1)+24 \\21w-14+5 &= 12w-6+24 \\21w-9 &= 12w+18 \\21w-9-12w &= 12w+18-12w \\9w-9 &= 18 \\9w-9+9 &= 18+9 \\9w &= 27 \\\frac{9w}{9} &= \frac{27}{9} \\w &= 3\end{aligned}$$

check: If $w=3$, then

$$\begin{aligned}7(3w-2)+5 &= 7(3 \cdot 3-2)+5 \\&= 7(9-2)+5 \\&= 7(7)+5 \\&= 49+5 \\&= 54\end{aligned}$$

and

$$\begin{aligned}6(2w-1)+24 &= 6(2 \cdot 3-1)+24 \\&= 6(6-1)+24 \\&= 6(5)+24 \\&= 30+24 \\&= 54\end{aligned}$$

The solution is 3.

2. Solve and check $100 = -(d-1) + 4(d-6)$. Show all of your work. Show the check. Write your answer in a complete sentence.

$$\begin{aligned}
 100 &= -(d-1) + 4(d-6) \\
 100 &= -d + 1 + 4d - 24 \\
 100 &= 3d - 23 \\
 100 + 23 &= 3d - 23 + 23 \\
 123 &= 3d \\
 \frac{123}{3} &= \frac{3d}{3} \\
 41 &= d
 \end{aligned}$$

check: If $d = 41$, then

$$\begin{aligned}
 -(d-1) + 4(d-6) &= -(41-1) + 4(41-6) \\
 &= -40 + 4(35) \\
 &= -40 + 140 \\
 &= 100 \checkmark
 \end{aligned}$$

The solution is 41.

3. Solve and check $\frac{m}{5} - \frac{1}{2} = \frac{m}{6}$. Show all of your work. Show the check. Write your answer in a complete sentence.

$$\begin{aligned}
 30\left(\frac{m}{5} - \frac{1}{2}\right) &= 30\left(\frac{m}{6}\right) \\
 30 \cdot \frac{m}{5} - 30 \cdot \frac{1}{2} &= 5m \\
 6m - 15 &= 5m \\
 6m - 15 - 6m &= 5m - 6m \\
 -15 &= -m \\
 \frac{-15}{-1} &= \frac{-m}{-1} \\
 15 &= m
 \end{aligned}$$

check: If $m = 15$, then

$$\begin{aligned}
 \frac{m}{5} - \frac{1}{2} &= \frac{15}{5} - \frac{1}{2} \\
 &= 3 - \frac{1}{2} \\
 &= 2\frac{1}{2}
 \end{aligned}$$

and

$$\begin{aligned}
 \frac{m}{6} &= \frac{15}{6} \\
 &= \frac{3 \cdot 5}{3 \cdot 2} \\
 &= \frac{5}{2} \\
 &= 2\frac{1}{2}
 \end{aligned}$$

4. Solve $5v - 3(v+1) = 2(v+3) - 5$. Show all of your work. Write your answer in a complete sentence.

$$5v - 3(v+1) = 2(v+3) - 5$$

$$5v - 3v - 3 = 2v + 6 - 5$$

$$2v - 3 = 2v + 1$$

$$2v - 3 - 2v = 2v + 1 - 2v$$

$$-3 = 1 \quad \text{A false statement}$$

The given equation is inconsistent.

There are no solutions.

5. Solve $3(x-1) = 8x + 6 - 5x - 9$. Show all of your work. Write your answer in a complete sentence.

$$3(x-1) = 8x + 6 - 5x - 9$$

$$3x - 3 = 3x - 3$$

The given equation is an identity.

Every real number is a solution.

6. What is 8% of 300? Show your work. Write your answer in a sentence.

$$0.08(300) = 24$$

8% of 300 is 24.

7. ^P 32% of what number is ^B 51.2? Define your variable. Show your work. Write your answer in a sentence.

$$A = PB$$

Let B represent the number.

$$A = PB$$

$$51.2 = 0.32B$$

$$\frac{51.2}{0.32} = \frac{0.32B}{0.32}$$

$$160 = B$$

32% of 160 is 51.2.

- A P B
8. 18 is what percent of 90? Define your variable. Show your work. Write your answer in a sentence.

Let P represent the percent we are looking for

$$A = PB$$

$$18 = P \cdot 90$$

$$18 = 90P$$

$$\frac{18}{90} = \frac{90P}{90}$$

$$0.2 = P$$

$$P = 20\%$$

18 is 20% of 90.

9. A dictionary that normally sells for \$16.50 is on sale at 40% off.
- What is the discount amount?
 - What is the dictionary's sale price?

a. $0.40(16.50) = 6.6$

The discount amount is \$6.60.

b. $16.50 - 6.60 = 9.90$

The dictionary's sale price is \$9.90.

10. The price of a color printer is reduced by 30% of its original price. When it still does not sell, its price is reduced by 20% of the reduced price. That salesperson informs you that there has been a total reduction of 50%. Is the salesperson using percentages properly? If not, what is the actual percent reduction from the original price?

The salesperson is not using percentages properly. The 20% reduction is based on the already reduced price.

For instance, if the original price was \$100, reducing by 30% makes it \$70.

If we reduce that \$70 by 20%,

we get $70 - 0.20(70) = 70 - 14 = 56$

$$\$100 - \$56 = \$44$$

This is a 44% reduction, not a 50% reduction.