Solutions

1. Show the steps to solve the equation $58 = 6h + 4$. Explain each step.

$58 = 6h + 4$ SAMDEB

$58 - 4 = 6h + 4 - 4$

$\frac{54}{6} = \frac{6h}{6}$

$9 = h$

Verify

$58 = 6(9) + 4$

$58 = 54 + 4$ ✓

2. Matt and Leanne are solving the equation $75x + 43 = 643$.
Whose strategy is correct? Explain.

Use SANDER !

1ST – undo any add / subtract

2ND – next undo multiplying / dividing

3RD – then undo any exponents and anything in brackets

4. Model each equation.

a) $2c - 8 = 6$ **b)** $24 = 4v + 16$

$2c - 8 + 8 = 6 + 8$

$\frac{2c}{2} = \frac{14}{2}$

$c = 7$

$24 - 16 = 4v + 16 - 16$

$\frac{8}{4} = \frac{4v}{4}$

$2 = v$

c) $1 + 5n = 6$ **d)** $9w - 7 = 29$

$5n + 1 = 6$

$5n + 1 - 1 = 6 - 1$

$\frac{5n}{5} = \frac{5}{5}$

$n = 1$

$9w - 7 + 7 = 29 + 7$

$\frac{9w}{9} = \frac{36}{9}$

$w = 4$

5. Copy each equation.
- Circle the first operation you undo.
- Underline the second operation you undo.

a) $2n + 4 = 18$ **b)** $3x + 5 = 17$

c) $0.8y - 7 = 9.4$ **d)** $27 = 7q + 6$

7. Model and solve each equation. Check your solution.

a) $17 = 4k - 3$
b) $29 = 12n + 5$
c) $6x + 7 = 25$
d) $14 = 4n + 2$

a) $17 = 4k - 3$
$17 + 3 = 4k - 3 + 3$
$\frac{20}{4} = \frac{4k}{4}$
$5 = k$
$17 = 4(5) - 3$
$17 = 20 - 3$ ✓

b) $29 = 12n + 5$
$29 - 5 = 12n + 5 - 5$
$\frac{24}{12} = \frac{12n}{12}$
$2 = n$
$29 = 12(2) + 5$
$29 = 24 + 5$ ✓

c) $6x + 7 = 25$
$6x + 7 - 7 = 25 - 7$
$\frac{6x}{6} = \frac{18}{6}$
$x = 3$
$6(3) + 7 = 25$
$18 + 7 = 25$ ✓

d) $14 = 4n + 2$
$14 - 2 = 4n + 2 - 2$
$\frac{12}{4} = \frac{4n}{4}$
$3 = n$
$14 = 4(3) + 2$
$14 = 12 + 2$ ✓

8. Solve each equation. Verify your solution.

a) $9 + 5w = 49$
b) $1 + 16.2x = 49.6$
c) $23 = 10y - 7$
d) $0.9 = 0.7f - 1.2$

a) $9 + 5w = 49$
$9 + 5w - 9 = 49 - 9$
$\frac{5w}{5} = \frac{40}{5}$
$w = 8$
$9 + 5(8) = 49$
$9 + 40 = 49$ ✓

b) $1 + 16.2x = 49.6$
$1 + 16.2x - 1 = 49.6 - 1$
$\frac{16.2x}{16.2} = \frac{48.6}{16.2}$
$x = 3$
$1 + 16.2(3) = 49.6$
$1 + 48.6 = 49.6$ ✓

c) $23 = 10y - 7$
$23 + 7 = 10y - 7 + 7$
$\frac{30}{10} = \frac{10y}{10}$
$3 = y$
$23 = 10(3) - 7$
$23 = 30 - 7$ ✓

d) $0.9 = 0.7f - 1.2$
$0.9 + 1.2 = 0.7f - 1.2 + 1.2$
$\frac{2.1}{0.7} = \frac{0.7f}{0.7}$
$3 = f$
$0.9 = 0.7(3) - 1.2$
$0.9 = 2.1 - 1.2$ ✓

9. Solve each equation. Verify your solution.

a) $4.5k + 3 = 21$
b) $16y - 8 = 113$
c) $139 = 9x - 14$
d) $1.3v + 19 = 45$

a) $4.5k + 3 = 21$
$4.5k + 3 - 3 = 21 - 3$
$\frac{4.5k}{4.5} = \frac{18}{4.5}$
$k = 4$
$4.5(4) + 3 = 21$
$18 + 3 = 21$ ✓

b) $16y - 8 = 113$
$16y - 8 + 8 = 113 + 8$
$\frac{16y}{16} = \frac{121}{16}$
$y = 7.5625$
$16(7.5625) - 8 = 113$
$121 - 8 = 113$ ✓

c) $139 = 9x - 14$
$139 + 14 = 9x - 14 + 14$
$\frac{153}{9} = \frac{9x}{9}$
$17 = x$
$139 = 9(17) - 14$
$139 = 153 - 14$ ✓

d) $1.3v + 19 = 45$
$1.3v + 19 - 19 = 45 - 19$
$\frac{1.3v}{1.3} = \frac{26}{1.3}$
$v = 20$
$1.3(20) + 19 = 45$
$26 + 19 = 45$ ✓

10. HTAM radio holds a Guess-the-Band contest. The radio station gives away three CDs for every correct answer, plus one CD just for being on the air. Leila got 10 CDs.

a) Write an equation to model Leila's CDs.

b) Solve your equation to find how many correct answers she gave.

Let n = # of correct answers

a) $3n+1=10$

b) $3n+1=10$

$3n+1-1=10-1$

$\frac{3n}{3}=\frac{9}{3}$

$\Rightarrow$ She gave 3 correct answers.

11. A clothing store is having a "Start the Summer!" sale. Nora pays $37 for two tank tops and a pair of sunglasses.

a) Model Nora's purchase with an equation.

b) Solve the equation to find the price of one tank top.

Let n = cost of a tank top

a) $2n+13=37$

b) $2n+13=37$

$2n+13-13=37-13$

$\frac{2n}{2}=\frac{24}{2}$

$n=12$

$\Rightarrow$ Tank tops cost $12

12. Steve is saving for a ski vacation that costs $500. If he triples his savings, he will still need $35. This can be modelled as $3s + 35 = 500$, where s represents his savings.

a) Explain how $3s + 35 = 500$ models Steve's savings.

b) How much money has Steve saved so far?

c) What other strategy can you use to find Steve's savings?

a) 3s means his savings "s" are multiplied by 3 (tripled). If he adds on $35 he will have the $500 he needs.

b) $3s + 35 = 500$

$3s + 35 - 35 = 500 - 35$

$\frac{3s}{3} = \frac{465}{3}$

$s = 155$

$\Rightarrow$ Steve has $155 in savings.

c) Guess and check!

13. The total cost of heating a house using solar energy can be modelled with the formula $C = 200n + 9000$, where C represents the cost, in dollars, and n represents the number of years that the solar panel has been in use.

a) After how many years will the cost be $10 600?

b) After how many years will the cost be $13 000?

a) $C = 200n + 9000$

$10600 = 200n + 9000$

$10600 - 9000 = 200n + 9000 - 9000$

$\frac{1600}{200} = \frac{200n}{200}$

$8 = n$

$\Rightarrow$ After 8 years

b) $C = 200n + 9000$

$13000 = 200n + 9000$

$13000 - 9000 = 200n + 9000 - 9000$

$\frac{4000}{200} = \frac{200n}{200}$

$20 = n$

$\Rightarrow$ After 20 years.

14. A camp charges schools $100 per day to use the camp's equipment plus $25 per day for food and sleep cabins for each student. The cost for one day can be modelled by the formula $C = 25n + 100$.

a) What do the variables C and n represent?
b) If 30 students want to go, how much will it cost per day?
c) The school raised $300 for a one-day trip. How many students can go?

a) C = Total cost
n = # of students

b) $C = 25n + 100$
$C = 25(30) + 100$
$C = 750 + 100$
$C = 850$
$\Rightarrow$ Total cost is $850

c) $C = 25n + 100$
$300 = 25n + 100$
$300 - 100 = 25n + 100 - 100$
$\frac{200}{25} = \frac{25n}{25}$
$8 = n$
$\Rightarrow$ 8 students can go.

16. Bryson sees this printable coupon on an amusement park Web site. Bryson pays $149 for two season passes and parking. What does the first season pass cost? What does the second season pass cost?

Adventure Mountain
Amusement Park
Buy one season pass, and get a second season pass for half price, plus pay only $ 20 for parking. No tax.

Let x = cost of a season pass

$x + \frac{1}{2}x + 20 = 149$
$1\frac{1}{2}x + 20 = 149$
$1\frac{1}{2}x + 20 - 20 = 149 - 20$
$\frac{1\frac{1}{2}x}{1\frac{1}{2}} = \frac{129}{1\frac{1}{2}}$
$x = 86$

$\Rightarrow$ 1ST season pass costs $86
$\Rightarrow$ 2ND season pass costs $43 $\left(\frac{86}{2}\right)$