Solutions

Page 214 #s 1ab, 2bc, 3cd,
4ad, 6cfi, 8, 11a, 12, 13a, 14a

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1. Solve each equation (find the value of the variable).

a) $3x = 4 + 2x$ b) $2x = x + 12$

$3x - 2x = 4 + 2x - 2x$

$x = 4$

$2x - x = x + 12 - x$

$x = 12$

2. Solve each equation.

　　　　b) $8x = 5x + 24$　　　　c) $7t = -10 + 2t$

$$8x - 5x = 5x + 24 - 5x$$

$$\frac{3x}{3} = \frac{24}{3}$$

$$x = 8$$

$$7t - 2t = -10 + 2t - 2t$$

$$\frac{5t}{5} = \frac{-10}{5}$$

$$t = -2$$

3. Solve each equation.

　　　　c) $-5x = -28 + 2x$　　　　d) $-9u = -u - 40$

$$-5x - 2x = -28 + 2x - 2x$$

$$\frac{-7x}{-7} = \frac{-28}{-7}$$

$$x = 4$$

$$-9u + u = -u - 40 + u$$

$$\frac{-8u}{-8} = \frac{-40}{-8}$$

$$u = 5$$

4. Solve each equation.

a) $9x - 7 = 8x$

d) $4 - y = 4$

$9x - 7 - 9x = 8x - 9x$

$$\frac{-7}{-1} = \frac{-x}{-1}$$

$7 = x$

$4 - y - 4 = 4 - 4$

$-y = 0$

$$\frac{-y}{-1} = \frac{0}{-1}$$

$y = 0$

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6. Solve each equation and check your answer.

c) $6.2y + 9.6 = 1.8y - 12.4$

$6.2y + 9.6 - 1.8y = 1.8y - 12.4 - 1.8y$

$4.4y + 9.6 = -12.4$

$4.4y + 9.6 - 9.6 = -12.4 - 9.6$

$$\frac{4.4y}{4.4} = \frac{-22}{4.4}$$

$y = -5$

Check

$6.2(-5) + 9.6 = 1.8(-5) - 12.4$

$-31 + 9.6 = -9 - 12.4$

$-21.4 = -21.4$ ✓

6. Solve each equation and check your answer.

f) $-8-45b=-51b-38$

$-8-45b+51b=-51b-38+51b$

$-8+6b=-38$

$-8+6b+8=-38+8$

$\dfrac{6b}{6}=\dfrac{-30}{6}$

$b=-5$

Check

$-8-45(-5)=-51(-5)-38$

$-8-(-225)=255-38$

$217=217 \checkmark$

6. Solve each equation and check your answer.

i) $17-t=-14+3t$

$17-t+t=-14+3t+t$

$17=-14+4t$

$17+14=-14+4t+14$

$\dfrac{31}{4}=\dfrac{4t}{4}$

$7.75=t$

Check

$17-(7.75)=-14+3(7.75)$

$9.25=-14+23.25$

$9.25=9.25 \checkmark$

8. Doubling a number and decreasing the result by 22 gives the same result as quadrupling the number and increasing the result by 15.

    a) Create an equation that could be used to find the number.

    b) Use your equation to find the number.

a) Let n = the number

$$\Rightarrow 2n - 22 = 4n + 15$$

b) $2n - 22 - 2n = 4n + 15 - 2n$

$$-22 = 2n + 15$$

$$-22 - 15 = 2n + 15 - 15$$

$$\frac{-37}{2} = \frac{2n}{2}$$

$$-18.5 = n$$

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11. Solve each equation and express your answer as a fraction in lowest terms.

    a) $23x - 17 = 11x - 8$

$$23x - 17 - 11x = 11x - 8 - 11x$$
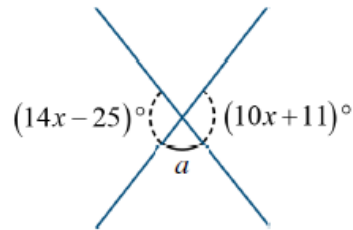
$$12x - 17 = -8$$

$$12x - 17 + 17 = -8 + 17$$

$$\frac{12x}{12} = \frac{9}{12}$$

$$x = \frac{9}{12}$$

$$x = \frac{3}{4}$$

12. Consider the diagram on the right.

a) Determine the value of x.

b) Determine the measure of angle a.

$(14x-25)^\circ$ $(10x+11)^\circ$

a

a) vertically opposite angles are equal

$$\Rightarrow 14x - 25 = 10x + 11$$
$$14x - 25 - 10x = 10x + 11 - 10x$$
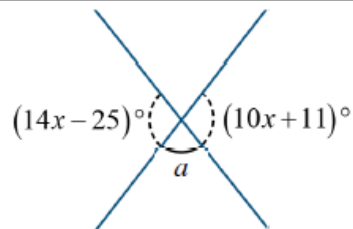$$4x - 25 = 11$$
$$4x - 25 + 25 = 11 + 25$$
$$\frac{4x}{4} = \frac{36}{4}$$
$$x = 9$$

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12. Consider the diagram on the right.

a) Determine the value of x.

b) Determine the measure of angle a.

$(14x-25)^\circ$ $(10x+11)^\circ$

a

b) angles on a straight line total 180°

$$\Rightarrow 14x - 25 + a = 180$$

Sub in $x = 9$

$$\Rightarrow 14(9) + a = 180$$
$$126 + a = 180$$
$$126 + a - 126 = 180 - 126$$
$$a = 54^\circ$$

13. Solve, if possible.

a) $4x^2 = 3x^2 + 16$

$$4x^2 - 3x^2 = 3x^2 + 16 - 3x^2$$

$$x^2 = 16$$

$$\sqrt{x^2} = \sqrt{16}$$

$$x = 4 \quad (or -4)$$

when you take a
square root, the
answer can also be
negative $\left[(-4)^2 = 16\right]$

14. Solve, if possible.

a) $y - 14 + 2y = -15 + 3y - 6$

$$3y - 14 = 3y - 21$$

$$3y - 14 - 3y = 3y - 21 - 3y$$

$$0y - 14 = -21$$

$$-14 = -21$$

$$?$$

$$\Rightarrow \text{There is no solution.}$$