

Solutions

Page 134 #s 1, 2, 4, 6, 7, 10, 14, 15

1. State the operations, in order, that could be applied to both sides of the equation to solve for the unknown.

a) $2x+1=7$ b) $9r-5=22$ c) $-2x+10=30$ d) $-5=-3y-11$ e) $13+8x=37$

-1 $+5$ -10 $+11$ -13
 $\div \text{ by } 2$ $\div \text{ by } 9$ $\div \text{ by } -2$ $\div \text{ by } -3$ $\div \text{ by } 8$

Use "SAMDEB" to help us to solve in the correct order.

SA \rightarrow any subtracting or adding outside of brackets

MD \rightarrow any multiplying or dividing outside of brackets

E \rightarrow any exponents outside of brackets

B \rightarrow start SAMDEB again, but now for inside the brackets.

2. Solve each equation in question #1 (find the value of the variable) and check each answer.

a) $2x+1=7$

c) $-2x+10=30$

e) $13+8x=37$

$$2x+1-1=7-1 \quad -2x+10-10=30-10$$

$$\frac{2x}{2} = \frac{6}{2}$$

$$x = 3$$

$$\frac{-2x}{-2} = \frac{20}{-2}$$

$$x = -10$$

$$13+8x-13=37-13$$

$$\frac{8x}{8} = \frac{24}{8}$$

$$x = 3$$

2. Solve each equation in question #1 (find the value of the variable) and check each answer.

b) $9t-5=22$

d) $-5=-3y-11$

$$9t-5+5=22+5$$

$$\frac{9t}{9} = \frac{27}{9}$$

$$t = 3$$

$$-5+11=-3y-11+11$$

$$\frac{6}{-3} = \frac{-3y}{-3}$$

$$-2 = y$$

4. Solve.

a) $5x+8=23$

b) $-6x-4=8$

c) $26=3y+5$

d) $-52=-2t+12$

$$5x+8-8=23-8$$

$$26-5=3y+5-5$$

$$\frac{5x}{5} = \frac{15}{5}$$

$$\frac{21}{3} = \frac{3y}{3}$$

$$x=3$$

$$7=y$$

$$-6x-4+4=8+4$$

$$-52-12=-2t+12-12$$

$$\frac{-6x}{-6} = \frac{12}{-6}$$

$$\frac{-64}{-2} = \frac{-2t}{-2}$$

$$x=-2$$

$$32=t$$

4. Solve.

e) $31+7m=143$

f) $50=8-6x$

g) $18p-(-22)=22$

h) $57=-x-22$

$$31+7m-31=143-31$$

$$18p-(-22)+(-22)=22+(-22)$$

$$\frac{7m}{7} = \frac{112}{7}$$

$$\frac{18p}{18} = \frac{0}{18}$$

$$m=16$$

$$p=0$$

$$50-8=8-6x-8$$

$$57+22=-x-22+22$$

$$\frac{42}{-6} = \frac{-6x}{-6}$$

$$\frac{79}{-1} = \frac{-x}{-1}$$

$$-7=x$$

$$-79=x$$

6. A number, n , is tripled and then decreased by 40. The resulting value is 146.

a) Write an equation that could be used to determine the value of n .

b) Solve your equation to determine the value of n .

$$\begin{aligned} \text{a) Triple } n &\rightarrow 3n \\ \text{Decrease this by 40} &\rightarrow 3n - 40 \\ \Rightarrow 3n - 40 &= 146 \end{aligned}$$

$$\begin{aligned} \text{b) } 3n - 40 + 40 &= 146 + 40 \\ 3n &= 186 \\ \frac{3n}{3} &= \frac{186}{3} \\ n &= 62 \end{aligned}$$

7. If $6a - 4 = 14$ and $22 = -14 - 3b$, determine the value of $5a - 2b$.

$$6a - 4 = 14$$

$$22 = -14 - 3b$$

$$6a - 4 + 4 = 14 + 4$$

$$22 + 14 = -14 - 3b + 14$$

$$\frac{6a}{6} = \frac{18}{6}$$

$$\frac{36}{-3} = \frac{-3b}{-3}$$

$$a = 3$$

$$-12 = b$$

$$\begin{aligned} \Rightarrow 5a - 2b \\ &= 5(3) - 2(-12) \\ &= 15 - (-24) \\ &= 15 + 24 \\ &= 39 \end{aligned}$$

10. Solve.

a) $2.5x - 4.1 = 3.9$

b) $-8.6 - 3.2y = -29.4$

c) $13.6 - 18.3 = 15.6x - 4.7 + 20.8x$

$$2.5x - 4.1 + 4.1 = 3.9 + 4.1$$

$$\frac{2.5x}{2.5} = \frac{8}{2.5}$$

$$x = 3.2$$

Collect like terms

$$\Rightarrow -4.7 = 36.4x - 4.7$$

$$-4.7 + 4.7 = 36.4x - 4.7 + 4.7$$

$$\frac{0}{36.4} = \frac{36.4x}{36.4}$$

$$0 = x$$

$$-8.6 - 3.2y + 8.6 = -29.4 + 8.6$$

$$\frac{-3.2y}{-3.2} = \frac{-20.8}{-3.2}$$

$$y = 6.5$$

14. A helicopter starts at an altitude of 5500 feet and descends at a rate of 600 ft/min. Write and solve an equation to determine how long it takes for the helicopter to reach an altitude of 250 feet.



$$\text{Initial value} = 5500$$

$$\text{Rate of change} = -550$$

$$\Rightarrow A = 5500 - 550t$$

where A is the altitude in feet and t is the time in mins.

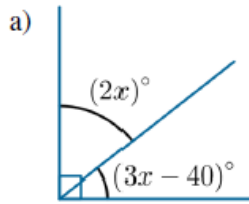
$$\text{Solve for } A = 250$$

$$\Rightarrow 250 = 5500 - 550t$$

$$250 - 5500 = 5500 - 550t - 5500$$

$$\frac{-5250}{-550} = \frac{-550t}{-550} \Rightarrow t = 9.54 \text{ mins}$$

15. For each diagram, write an equation that can be used to determine the value of x and then use your equation to find the value of x .



$$2x + (3x - 40) = 90$$

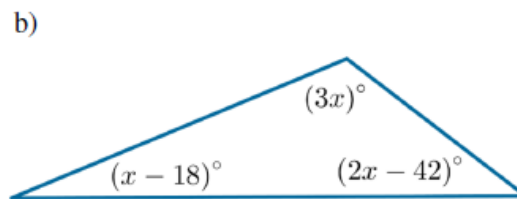
$$2x + 3x - 40 = 90$$

$$5x - 40 = 90$$

$$5x - 40 + 40 = 90 + 40$$

$$\frac{5x}{5} = \frac{130}{5}$$

$$x = 26$$



$$3x + (2x - 42) + (x - 18) = 180$$

$$3x + 2x - 42 + x - 18 = 180$$

$$6x - 60 = 180$$

$$6x - 60 + 60 = 180 + 60$$

$$\frac{6x}{6} = \frac{240}{6}$$

$$x = 40$$