

For Question 9, write an equation. Then solve the equation.

9. 20 less than 5 times a number is the product of 3 more than the number and 7. What is the number?

XXXXXXXXXXXXXXXXXXXX
 $5x - 20 = 3(x + 7)$
~~XXXXXXXXXXXXXXXXXXXX~~
 ~~$5x - 20 = 3x + 21$~~
~~XXXXXXXXXXXXXXXXXXXX~~
 ~~$2x - 20 = 21$~~
~~XXXXXXXXXXXXXXXXXXXX~~
 ~~$2x = 41$~~
~~XXXXXXXXXXXXXXXXXXXX~~
 ~~$x = 20.5$~~

9. $x = 20.5$

$5x - 20 = (3 + x) 7$
 $5x - 20 = 21 + 7x$
 $-41 = 2x$
 $x = 20.5$

10. Evaluate $\frac{1}{2} |9x - g| + r$ if $g = 3$, $r = 2$, and $x = -2$

$\frac{1}{2} |9(-2) - 3| + 2$
 $\frac{1}{2} |-18 - 3| + 2$
 $\frac{1}{2} |-21| + 2$
 $\frac{1}{2} (21) + 2$
 $10.5 + 2 = 12.5$

10. 12.5

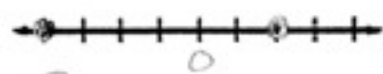
For Questions 11 & 12, solve each equation. Then graph the solution set.

11. $|2x + 2| = 6$

$2x + 2 = 6$
 $2x = 4$
 $x = 2$

$2x + 2 = -6$
 $2x = -8$
 $x = -4$

11. $\{-4, 2\}$



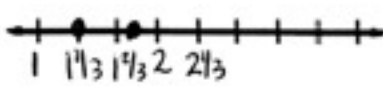
$\{-4, 2\}$

12. $4 \left| \frac{3}{9} - 2 \right| = 1$

$4 \left| \frac{3}{9} - 2 \right| = 1$
 $\frac{3}{9} - 2 = \frac{1}{4}$
 $9 \left(\frac{3}{9} \right) = \left(2 \frac{1}{4} \right) 9$
 $3 = 2.25 \cdot 9$
 $\frac{3}{2.25} = \frac{2.25 \cdot 9}{2.25}$
 $1 \frac{1}{3} = 9$

$4 \left| \frac{3}{9} - 2 \right| = -1$
 $\frac{3}{9} - 2 = -\frac{1}{4}$
 $9 \left(\frac{3}{9} \right) = (1.75) 9$
 $3 = 1.75 \cdot 9$
 $\frac{3}{1.75} = \frac{1.75 \cdot 9}{1.75}$
 $9 \approx 1.71$

12. $\{1 \frac{1}{3}, 1.71\}$



13. In order to save for college you invested money into the stock market. In the first year, your stock increases 30%. You paid your stockbroker \$250. Then you lost \$320 when the market fell, but it came back up and your remaining investment tripled. Your investment is now worth \$2,200. How much was your original investment? Define a variable, write an equation, and solve.

$x = \text{original amount invested}$
 $3(1.3x - 250 - 320) = 2,200 \rightarrow$

13. $\$1,002.56$
 $3(1.3x - 570) = 2200$
 $3.9x - 1710 = 2200$
 $\quad +1710 \quad +1710$
 $3.9x = 3910$
 $x = 1002.56$

14. Solve the proportion: $\frac{g-4}{g+2} = \left(\frac{6}{13}\right)g+2$

$g-4 = \frac{6}{13}(g+2) \rightarrow g-4 = \frac{6}{13}g + \frac{12}{13}$
change to like denominators

14. ~~XXXXXX~~ $g = 9 \frac{1}{7}$

$\frac{13}{13}g - \frac{52}{13} = \frac{6}{13}g + \frac{12}{13}$
 $\frac{7}{13}g - \frac{52}{13} = \frac{12}{13}$
 $\frac{7}{13}g = \frac{64}{13}$

For Questions 15 and 16 solve for the given variable.

15. $-7x + 2 = 3x - 12$

$-7x = 3x - 14$
 $-10x = -14$
 $x = 1.4$

~~XXXXXX~~ $g = 64/7$
~~XXXXXX~~ $g = 9 \frac{1}{7}$

16. $2(g-3) + 5 = 5(2+g) - 2(g-3)$

$2g - 6 + 5 = 10 + 5g - 2g + 6 \rightarrow -17 = g$
 $2g - 1 = 16 + 3g$
 $-1 = 16 + g$

16. $g = -17$

17. Solve $b + kg = a$ for k .

$\frac{kg}{g} = \frac{a-b}{g} \quad k = \frac{a-b}{g}$

17. $k = \frac{a-b}{g}$

18. Solve $\left(\frac{5g+r}{t}\right) = a$ for r .

$\frac{5g+r}{t} = a$
 $5g+r = at$
 $\quad -5g \quad -5g$
 $r = at - 5g$

18. $r = at - 5g$

19. Margo has 40 milliliters of 25% solution. How many milliliters of 60% solution should she add to obtain the required 30% solution?

25%	40	10
60%	x	.6x
30%	40+x	.3(40+x)

$$10 + .6x = .3(40+x)$$

$$10 + .6x = 12 + .3x$$

$$10 + .3x = 12$$

$$.3x = 2$$

$$x = 6\frac{2}{3}$$

19. $x = 6\frac{2}{3}$ ml of 60% solution

20. Sarah invested \$8,000 for one year part at 14% annual interest, and the rest at 11% annual interest. Her total interest for the year was \$923. How much money did she invest at 14%?

$$.14x + .11(8000 - x) = 923$$

$$.14x + 880 - .11x = 923$$

$$.03x + 880 = 923$$

$$.03x = 43$$

$$x = 1,433.33$$

$$8000 - 1433.33 = 6566.67$$

20. $\$6,566.67$

21. A passenger train leaves the train station traveling at 82 miles per hour. 40 minutes before the passenger train a freight train had left the same station traveling at 59 miles per hour in the same direction (on a parallel track). How long will it take the passenger train to catch the freight train?

Train A = Train B

$$82t = 59(t + \frac{2}{3})$$

$$82t = 59t + \frac{118}{3}$$

$$\frac{82t}{23} = \frac{118}{3}$$

$$t \approx 1.71 \text{ hours}$$

OR

$$82(t - \frac{2}{3}) = 59t$$

$$82t - \frac{164}{3} = 59t$$

$$\frac{(-164)}{3} = -23t$$

$$-23 = -23$$

$t \approx 2.38$
+ this + is for the freight
 \downarrow
 $2.38 - \frac{2}{3} \approx 1.71$

22a. 2.8 mph

22. Johnny walks at an average speed of 4.11 feet per second.

a) What would his speed be in miles per hour? Use Dimensional Analysis to show your work.

$1 \text{ ft} = 5,280 \text{ ft}$
 $60 \text{ sec} = 1 \text{ min}$
 $60 \text{ min} = 1 \text{ hr}$

$$\frac{4.11 \text{ ft}}{1 \text{ sec}} \times \frac{1 \text{ mi}}{5280 \text{ ft}} \times \frac{60 \text{ sec}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ hr}} = \frac{14796 \text{ mi}}{5280 \text{ hour}} = 2.8$$

b) How many minutes will it take him to run 2 miles?

$$\frac{4.11 \text{ ft}}{1 \text{ sec}} \times \frac{1 \text{ mi}}{5280 \text{ ft}} \times \frac{60 \text{ sec}}{1 \text{ min}} = \frac{246.6 \text{ mi}}{5280 \text{ min}} = .047 \text{ min}$$

1 mile \div .047 = 21.3 min for 1 mile $21.3 \times 2 =$

22b. 42.6 min