

1. You purchase 8 gal of paint and 3 brushes for \$152.50. The next day, you purchase 6 gal of paint and 2 brushes for \$113.00. How much does each gallon of paint and each brush cost?

Let p = cost of a gallon of paint

Let b = cost of a brush

$$\begin{aligned} 2 [8p + 3b = 152.50] &\Rightarrow 16p + 6b = 305 \\ 3 [6p + 2b = 113.00] & \quad 18p + 6b = 339 \end{aligned}$$

$$\begin{array}{r} 16p + 6b = 305 \\ 18p + 6b = 339 \\ \hline \end{array}$$

$$\frac{2p}{2} = \frac{34}{2}$$

$$p = 17$$

$$6(17) + 2b = 113$$

$$\begin{array}{r} 102 + 2b = 113 \\ -102 \quad \quad -102 \\ \hline \end{array}$$

$$\frac{2b}{2} = \frac{11}{2}$$

$$b = 5.5$$

\$17/gallon of paint

\$5.50/brush

2. The local preschool ordered all new bicycles and tricycles for the new school year. Each bicycle and tricycle is shipped in its own box. Oddly, the manufacturer shipped all the wheels in a separate box. If there are 16 boxes of bicycles/tricycles total, and 45 wheels total, how many tricycles were ordered?

Let t = # of tricycles

Let b = # of bicycles

$$\begin{aligned} 2 [t + b = 16] &\Rightarrow \\ 3t + 2b = 45 & \end{aligned}$$

$$\begin{array}{r} 2t + 2b = 32 \\ 3t + 2b = 45 \\ \hline \end{array}$$

$$t = 13$$

13 Tricycles

3. Calvin mixes candy that sells for \$2.00 per pound with candy that costs \$3.60 per pound to make 50 pounds of candy selling for \$2.16 per pound. How many pounds of each kind of candy did he use in the mix?

Let $x = \#$ of lbs. of \$2/lb candy

Let $y = \#$ of lbs. of \$3.60/lb candy

$$\begin{cases} x + y = 50 \\ 2x + 3.6y = 108 \end{cases}$$

total cost of 50 lbs of candy

$$\Rightarrow \begin{array}{r} 2x + 2y = 100 \\ 2x + 3.6y = 108 \\ \hline \end{array}$$

$$\begin{array}{r} 1.6y = 8 \\ \hline 1.6 \quad 1.6 \\ y = 5 \end{array}$$

$$\begin{array}{r} x + 5 = 50 \\ -5 \quad -5 \\ \hline x = 45 \end{array}$$

45 lbs. of the \$2/lb. candy
5 lbs. of the \$3.60/lb candy

4. At an ice cream parlor, ice cream cones cost \$1.10 and sundaes cost \$2.35. One day, the receipts for a total of 172 cones and sundaes were \$294.20. How many cones were sold?

Let $c = \#$ of cones

Let $s = \#$ of sundaes

$$\begin{cases} c + s = 172 \\ 1.1c + 2.35s = 294.20 \end{cases}$$

\Rightarrow

$$\begin{array}{r} 1.1c + 1.1s = 189.2 \\ 1.1c + 2.35s = 294.20 \\ \hline \end{array}$$

$$\begin{array}{r} 1.25s = 105 \\ \hline 1.25 \quad 1.25 \\ s = 84 \end{array}$$

$$\begin{array}{r} c + 84 = 172 \\ -84 \quad -84 \\ \hline c = 88 \end{array}$$

88 cones
84 sundaes

5. Your teacher is giving you a test worth 100 points containing 40 questions. There are two-point and four-point questions on the test. How many of each type of question are on the test?

Let $x = \#$ of 2 pt. questions
 Let $y = \#$ of 4 pt. questions

$$\begin{cases} x + y = 40 \\ 2x + 4y = 100 \end{cases} \Rightarrow \begin{array}{r} 2x + 2y = 80 \\ 2x + 4y = 100 \\ \hline \end{array}$$

$$\begin{array}{r} 2y = 20 \\ \hline y = 10 \end{array}$$

$$\begin{array}{r} x + 10 = 40 \\ -10 \quad -10 \\ \hline x = 30 \end{array}$$

30 2 pt. questions
 10 4 pt. questions

6. On December 13th, versus the Washington Wizards, Shaquille O'Neal scored his season high in points, 40. His 40 points were scored all on free throws and two-point baskets. He made a total of 25 shots. How many two-point baskets did Shaq make?

Let $x = \#$ of free throws
 Let $y = \#$ of 2-pointers

$$\begin{array}{r} x + y = 25 \\ x + 2y = 40 \\ \hline y = 15 \end{array}$$

$$\begin{array}{r} x + 15 = 25 \\ -15 \quad -15 \\ \hline x = 10 \end{array}$$

10 free throws
 15 2 point baskets

7. Quentin was challenged to a half-court shooting competition. For every half-court shot that he makes, he will earn 20 points. For each half-court shot he misses, he will lose 5 points. After 20 half-court shots, Quentin has zero points. How many half-court shots did he make?

Let $x = \#$ of shots made

Let $y = \#$ of shots missed

$$20 [x + y = 20]$$

$$20x - 5y = 0$$

\Rightarrow

$$20x + 20y = 400$$

$$20x - 5y = 0$$

$$\frac{25y}{25} = \frac{400}{25}$$

$$y = 16$$

$$x + 16 = 20$$

$$\frac{-16 \quad -16}{x = 4}$$

4 shots made
16 shots missed

8. A Honda dealership sells both motorcycles and cars. There are a total of 200 vehicles on the dealership's lot. The detailer cleaned all the wheels of all the vehicles, which totaled 698 wheels. How many motorcycles are there on the lot?

Let $c = \#$ of cars

Let $m = \#$ of motorcycles

$$4 [c + m = 200]$$

$$4c + 2m = 698$$

\Rightarrow

$$4c + 4m = 800$$

$$4c + 2m = 698$$

$$\frac{2m}{2} = \frac{102}{2}$$

$$m = 51$$

51 motorcycles

9. Last Tuesday, Regal Cinemas sold a total of 8500 movie tickets. Proceeds totaled \$64,600. Tickets can be bought in one of 3 ways: a matinee admission costs \$5, student admission is \$6 all day, and regular admissions are \$8.50. How many of each type of ticket was sold if twice as many student tickets were sold as matinee tickets?

Let m = # of matinee tickets
 Let s = # of student tickets
 Let r = # of regular tickets

$$\begin{cases} m + s + r = 8500 \\ 5m + 6s + 8.5r = 64,600 \end{cases}$$

We also know:
 $2m = s$

$$\begin{aligned} m + 2m + r &= 8500 \\ 5m + 6(2m) + 8.5r &= 64,600 \end{aligned}$$

$$\begin{aligned} 2.5 [3m + r = 8500] \\ 17m + 8.5r = 64,600 \end{aligned}$$

$$\Rightarrow \begin{aligned} 25.5m + 8.5r &= 72,250 \\ 17m + 8.5r &= 64,600 \end{aligned}$$

$$\begin{array}{r} \underline{8.5m = 7650} \\ 8.5 \quad \quad 8.5 \end{array}$$

$$m = 900$$

$$s = 2(900)$$

$$s = 1800$$

$$900 + 1800 + r = 8500$$

$$\begin{array}{r} -2700 \quad -2700 \\ \hline r = 5800 \end{array}$$

900 matinee tickets
 1800 student tickets
 5800 regular tickets

10. Billy's Restaurant ordered 200 flowers for Mother's Day. They ordered carnations at \$1.50 each, roses at \$5.75 each, and daisies at \$2.60 each. They ordered mostly carnations, and 20 fewer roses than daisies. The total order came to \$589.50. How many of each type of flower was ordered?

Let c = # of carnations

Let r = # of roses

Let d = # of daisies

$$\begin{cases} c + r + d = 200 \\ 1.5c + 5.75r + 2.6d = 589.5 \end{cases}$$

We also know: $d = r + 20$

$$\begin{cases} c + r + (r + 20) = 200 \\ 1.5c + 5.75r + 2.6(r + 20) = 589.5 \end{cases}$$

$$\begin{aligned} 1.5[c + 2r + 20] &= 200 & \Rightarrow & 1.5c + 3r + 30 = 300 \\ 1.5c + 8.35r + 52 &= 589.5 & & 1.5c + 8.35r + 52 = 589.5 \\ \hline & & & 5.35r + 22 = 289.5 \\ & & & \quad -22 \quad -22 \\ \hline & & & 5.35r = 267.5 \\ & & & \underline{5.35} \quad \underline{5.35} \\ & & & r = 50 \end{aligned}$$

80 carnations
50 roses
70 daisies

$$\begin{aligned} d &= 50 + 20 \\ d &= 70 \end{aligned}$$

$$\begin{aligned} c + 50 + 70 &= 200 \\ c + 120 &= 200 \\ -120 & -120 \\ \hline c &= 80 \end{aligned}$$