

11-18-19

I love pizza and root beer! Fat Dog is where I go for my pizza/root beer fix. One day I order 5 slices of pizza and 3 cans of root beer and it costs \$22.50. Hey, don't judge, I was hungry! A week after that large meal I go back and have a snack of 3 slices of pizza and 2 cans of root beer which costs me \$13.85. The question is... How much does one slice of pizza cost and how much does one root beer cost?

Agenda

More Story Problems :)

I love pizza and root beer! Fat Dog is where I go for my pizza/root beer fix. One day I order 5 slices of pizza and 3 cans of root beer and it costs \$22.50. Hey, don't judge. I was hungry! A week after that large meal I go back and have a snack of 3 slices of pizza and 2 cans of root beer which costs me \$13.85. The question is... How much does one slice of pizza cost and how much does one root beer cost?

$x$ : pizza  $y$ : rootbeer

$$\begin{array}{l} 2(5x + 3y = 22.50) \longrightarrow 10x + 6y = 45 \\ -3(3x + 2y = 13.85) \longrightarrow -9x - 6y = -41.55 \\ \hline \end{array}$$

$$x = 3.45$$

check:

$$\begin{array}{l} 3(3.45) + 2(1.75) = 13.85 \\ 10.35 + 3.5 = 13.85 \\ 13.85 = 13.85 \checkmark \end{array}$$

$$\begin{array}{l} 5(3.45) + 3y = 22.50 \\ 17.25 + 3y = 22.50 \\ -17.25 \quad -17.25 \\ \hline \end{array}$$

A slice of pizza costs \$3.45 and root beer costs \$1.75.

$$\begin{array}{l} 3y = 5.25 \\ \frac{3y}{3} = \frac{5.25}{3} \\ y = 1.75 \end{array}$$

### Substitution

Lulu tells her little brother, Jack, that she is holding 20 coins, all of which are either dimes or quarters. They have a value of \$4.10. She says she will give him the coins if he can tell her how many of each she is holding. Solve this problem for Jack.

$x$ : dimes     $y$ : quarters

$$\begin{array}{r} .1x + .25y = 4.10 \\ x + y = 20 \\ \underline{-y \quad -y} \\ x = -y + 20 \end{array}$$

Lulu had 6 dimes and 14 quarters.

$$\begin{array}{r} .1(-y + 20) + .25y = 4.10 \\ -.1y + 2 + .25y = 4.10 \\ .15y + 2 = 4.10 \\ \underline{-2 \quad -2} \\ .15y = 2.10 \\ \underline{.15 \quad .15} \\ y = 14 \\ x + 14 = 20 \\ \underline{-14 \quad -14} \\ x = 6 \end{array}$$

### Elimination

Lulu tells her little brother, Jack, that she is holding 20 coins, all of which are either dimes or quarters. They have a value of \$4.10. She says she will give him the coins if he can tell her how many of each she is holding. Solve this problem for Jack.

$x$ : dimes     $y$ : quarters

$$\begin{array}{r} -.1(x + y = 20) \longrightarrow \cancel{-.1x} - .1y = -2 \\ .1x + .25y = 4.10 \longrightarrow \underline{.1x + .25y = 4.10} \\ \hline .15y = 2.10 \\ \underline{.15 \quad .15} \\ y = 14 \\ x + 14 = 20 \\ \underline{-14 \quad -14} \\ x = 6 \end{array}$$

check:

$$\begin{array}{l} .1(6) + .25(14) = 4.10 \\ .6 + 3.5 = 4.10 \\ 4.10 = 4.10 \checkmark \end{array}$$

Lulu had 6 dimes and 14 quarters.

At a grocery store, a customer pays a total of \$11.10 for 1.6 pounds of chicken and 2 pounds of fish. Another customer pays a total of \$12.15 for 2.4 pounds of chicken and 1.8 pounds of fish. How much does a pound of chicken cost? How much does a pound of fish cost?

$x$ : chicken    $y$ : fish

$$\begin{aligned} 2.4(1.6x + 2y = 11.10) &\rightarrow 3.84x + 4.8y = 26.64 \\ 1.6(2.4x + 1.8y = 12.15) &\rightarrow -3.84x - 2.88y = -19.44 \end{aligned}$$

$$\begin{array}{r} 1.92y = 7.2 \\ \hline 1.92 \quad 1.92 \\ \hline y = 3.75 \end{array}$$

Chicken costs \$2.25 per pound and Fish costs \$3.75 per pound.

$$\begin{aligned} 1.6x + 2(3.75) &= 11.10 \\ 1.6x + 7.5 &= 11.10 \\ -7.5 \quad -7.5 & \\ \hline 1.6x &= 3.6 \\ \hline 1.6 \quad 1.6 & \\ \hline x &= 2.25 \end{aligned}$$