Success Center
Directed Learning Activity (DLA)

Word Problems
(Coins)

M105.1
Directed Learning Activity – Word Problems: Coins

Description: In this Directed Learning Activity (DLA), you will learn about word problems related to coins.

Prior Knowledge: In order to complete this DLA, you will need to know how to solve a linear equation.

Solve for $x$: 
\[
4x + 650 - 5x = 562 \\
-x + 650 = 562 \\
-x = -88 \\
x = 88
\]

Materials: A scientific calculator may be needed.

Directions: Please read the examples and answer the questions that follow carefully – and in order. Please do not skip ahead. If you have a question, please ask for help.

After reading the problem, spend some time thinking about what is being presented. After you feel you understand the problem, try to answer the practice questions. The questions are sequential, and the answers you obtain in one set may be used in subsequent questions.

When you are finished, review the DLA with a tutor. Don’t worry, you are not being graded. This is a learning activity, and you are not expected to know everything.

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Coin Problems

Part One: Introducing Coin Problems

Problem 1: Miguel has a Monchichi bank that contains quarters, dimes, nickels, and pennies.

(a) If Miguel has 10 quarters in his bank, then what is the value of his quarters in cents?

(b) If Miguel has 7 pennies in his bank, then what is the value of his pennies in cents?

(c) If Miguel has $x$ nickels in his bank, then what is the value of his nickels in terms of $x$?

If Miguel has $x$ nickels, then the value of his nickels would be:

<table>
<thead>
<tr>
<th>Coin value</th>
<th>Number of coins</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 cents</td>
<td>$x$</td>
</tr>
</tbody>
</table>

$= 5x$ cents.

(d) If Miguel has $2x$ dimes in his bank, then what is the value of his dimes in terms of $x$?

<table>
<thead>
<tr>
<th>Coin value</th>
<th>Number of coins</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$2x$</td>
</tr>
</tbody>
</table>

Answers: a) 250 cents b) 7 cents d) 20$x$
Problem 2: Sally has a My Little Pony bank that says “neigh, neigh, my little ponyyyyy.” The bank contains only dimes and pennies.

(a) If the bank contains 25 dimes and 15 pennies, then what is the total value of the coins?

(b) If the bank contains 7 dimes and 50 pennies, then what is the total value of the coins?

(c) If the bank contains 11 dimes and $x$ pennies, then what is the total value of the coins in terms of $x$?

(d) If the bank contains $x$ dimes and 15 pennies, then the total value of a bank in terms of $x$ looks like this:

\[
\begin{array}{c|c} \text{Coin value} & \text{Number of coins} \\ \hline 1 \text{ cent} & 15 \\ 10 \text{ cents} & x \\ \end{array}
\]

\[
1(15) + 10(x) = \text{Total value in terms of } x \text{ is } 15+10x \text{ cents.}
\]

(e) If the total value of the coins in the bank is 75 cents, then the table looks like this:

\[
\begin{array}{c|c} \text{Coin value} & \text{Number of coins} & \text{Total Value} \\ \hline 1 \text{ cent} & 15 & 75 \text{ cents} \\ 10 \text{ cents} & x & \end{array}
\]

(f) How many dimes are there in the bank that contains 15 pennies and has a total value of 75 cents? The equation looks like this:

\[
1(15) + 10(x) = 75
\]

\[
15 + 10x = 75
\]

\[
10x = 60
\]

\[
x = 6 \text{ dimes}
\]

Checking the answer: 15 pennies + 6 dimes = 15(1) + 6(10) = 15 + 60 = 75 cents
My Little Pony bank contained (only dimes and pennies):

(g) Suppose the bank contains 30 coins, and 11 of those coins are dimes, how many pennies are there?

(h) Suppose the bank contains 45 coins, and 15 of those coins are pennies, how many dimes are there?

In \(d\) and \(e\), we used subtraction to find the number of coins in terms of \(x\).
Suppose the bank contains 20 coins, and \(x\) of those coins are pennies, then the number of dimes would be \(20 - x\).

\[
\begin{align*}
\text{The bank contains} & = 20 \text{ coins} \\
\text{The number of pennies} & = x \\
\text{The number of dimes} & = 20 - x.
\end{align*}
\]

(i) Suppose the bank contains 45 coins, and \(x\) of those coins are pennies. How many dimes are there in terms of \(x\)? Fill in the shaded regions.

\[
\begin{align*}
\text{The bank contains} & = \\
\text{The number of pennies} & = x \\
\text{The number of dimes} & =
\end{align*}
\]

(j) Suppose the bank contains 27 coins, and \(x\) of those coins are dimes. How many pennies are there in terms of \(x\)? Fill in the shaded regions.

\[
\begin{align*}
\text{The bank contains} & = \\
\text{The number of dimes} & = x \\
\text{The number of pennies} & =
\end{align*}
\]

(k) Suppose the bank contains 18 coins, and \(x\) of those coins are dimes. How many pennies are there in terms of \(x\)? Fill in the shaded regions and table.

\[
\begin{align*}
\text{The bank contains} & = \\
\text{The number of dimes} & = x \\
\text{The number of pennies} & =
\end{align*}
\]

<table>
<thead>
<tr>
<th>Amount from pennies</th>
<th>Amount from dimes</th>
</tr>
</thead>
</table>
| \[
\begin{align*}
\text{Coin value} & \quad \text{Number of coins} \\
\text{Coin value} & \quad \text{Number of coins}
\end{align*}
\]| \[
\begin{align*}
\text{Coin value} & \quad \text{Number of coins}
\end{align*}
\]| \[
\begin{align*}
\text{Amount} & = 
\end{align*}
\]| 

The total value of the bank in terms of \(x\) is:
Part Two: Practicing Coin Problems

Problem 3: Mary has a jar in her office that contains 40 coins. Some are quarters, and the rest are dimes. If the total value of the coins is $6.25, how many of each denomination does she have?

(a) Mary’s jar contains 40 coins, and \( x \) of those coins are quarters. How many dimes are there in terms of \( x \)?

The number of quarters = \( x \)

The number of dimes = __________

(b) The value of the quarters in terms of \( x \) is?

(c) The value of the dimes in terms of \( x \) is?

Our filled-in table looks like this:

<table>
<thead>
<tr>
<th>Coin value</th>
<th>Number of coins</th>
<th>Coin value</th>
<th>Number of coins</th>
<th>Total Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>( x )</td>
<td>10</td>
<td>( 40 - x )</td>
<td>625 cents</td>
</tr>
</tbody>
</table>

\[
25x + 10(40 - x) = 625 \\
25x + 400 - 10x = 625 \\
15x + 400 = 625 \\
15x = 225 \\
x = 15
\]

Since \( x \) represents the number of quarters, we have 15 quarters. Because \( 40 - x \) represents the number of dimes, we have \( 40 - 15 = 25 \) dimes.

Checking the answer: 15 quarters + 25 dimes = 15(25) + 25(10) = 375 + 250 = 625 cents
Problem 4: While searching the couch for his Green Lantern power ring, Hal found some nickels and quarters. He found twice as many nickels as quarters. If he found $1.40 in total, then how many nickels and how many quarters did he find?

(a) Fill in the shaded region. Hint: He found twice as many nickels as quarters.

The number of quarters = \( x \)

The number of nickels = 

(b) Fill in the table.

<table>
<thead>
<tr>
<th>Coin value</th>
<th>Number of coins</th>
<th>Coin value</th>
<th>Number of coins</th>
<th>Total Value</th>
</tr>
</thead>
</table>

(c) Form an equation and solve.

(d) Check your answer.
Problem 5: A bank teller cashed a check for $200 using twenty-dollar bills and ten-dollar bills. In all, 12 bills were handed to the customer. Find the number of twenty-dollar bills and the number of ten-dollar bills.

(a) Fill in the shaded region. Hint: There are 12 bills.

The number of twenties = $x$

The number of tens = 

(b) Fill in the table.

<table>
<thead>
<tr>
<th>Amount from twenties</th>
<th>+</th>
<th>Amount from tens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dollar value</td>
<td>Number of bills</td>
<td>Dollar value</td>
</tr>
</tbody>
</table>

(c) Form an equation and solve.

(d) Check your answer.
Part Three: Reflection

a) Name one thing that you understand better about coin problems as a result of completing this activity.

b) Name one thing that you still do not understand about coin problems.

c) Can you think of a way to apply what you have learned about coin problems in your real life?

d) Do you feel more or less confident about solving coin problems?

STOP. Please go over your work with a tutor at this time.
PRINT STUDENT NAME

STUDENT #

For Follow-Up:

________ The student completed the entire activity.

________ The student attempted to answer every question.

________ The student demonstrated an understanding of the process of solving coin problems during the discussion of his/her work.

Additional Comments:

_________________________________________________________________________________

_________________________________________________________________________________

_________________________________________________________________________________

PRINT INSTRUCTOR/TUTOR NAME

DATE

INSTRUCTOR/TUTOR SIGNATURE

STUDENT – DO NOT FORGET TO TURN THIS SHEET IN AT THE FRONT DESK!

You may not get credit for completing this DLA if you fail to leave this sheet with the front desk receptionist.