Mathematics 10D

1.7 – Solving Word Problems

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Write a linear equation to represent each of the following situations: $y = mx + b$

1. A car rental company charges $50 to rent a car and $0.10 per km.

Let: C = cost of renting

k = km driven

$C = 50 + 0.1k$

2. Every week, Steve earns 5% commission of his sales and $200.

let: e = earning for week

S = sales

$e = 0.05s + 200$

3. Melanie buys new shirts and new "pants", totalling 12 new items.

Let: s = shirts

p = pants

$S + p = 12$

1. Henry has 21 nickels and dimes in his change bowl at home totalling $1.50. How many of each coin does he have?

Let: n = number of nickels

d = number of dimes

Bowl: $n + d = 21 \Rightarrow n = 21 - d$

Value: $0.05n + 0.1d = 1.50$

∴ Henry has 9 dimes and 12 nickels

Solution:

$$0.05(21-d) + 0.1d = 1.50$$

$$1.05 - 0.05d + 0.1d = 1.50$$ (−1.05)

$$0.05d = 0.45$$

$$d = 9$$

$$n = 12$$

2. Lisa works hard in the summer and decides to invest $1000. She puts some of it in a conservative fund which earned 2% interest at the end of the year. She put the rest in a risky fund which ended up earning 11% at the end of the year. At the end of the year, she earned a total of $83. How much did she put into each account?

Let: x = conservative fund
y = risky fund

Accounts: $x + y = 1000 \Rightarrow y = 1000 - x$

Interest $0.02x + 0.11y = 83$

Solution:

$$0.02x + 0.11(1000 - x) = 83$$
$$0.02x + 110 - 0.11x = 83 \quad -110 \quad -110$$
$$0.09x = -27$$
$$x = 300$$

∴ Lisa put $300 into the conservative fund and $700 in the risky fund.

3. Jack and Jill are selling pies for a school fundraiser. Customers can buy pumpkin pies and rhubarb pies. Jack sold 17 pumpkin pies and 7 rhubarb pies for a total of $395. Jill sold 16 pumpkin pies and 5 rhubarb pies for a total of $340. What is the cost each of one pumpkin pie and one rhubarb pie?

Let: x = cost of a pumpkin pie

y = cost of a rhubarb pie

Jack: $5(17x + 7y = 395)$

Jill: $7(16x + 5y = 340)$

Solution:

$$85x + 35y = 1975$$
$$-(112x + 35y = 2380)$$
$$-27x = -405$$
$$x = 15$$

y: $17(15) + 7y = 395$

$-255 \qquad -255$

$$7y = 140$$
$$y = 20.$$

∴ the pumpkin costs $15 and the rhubarb costs $20

4. Eugene's Premium Coffee Blend which costs $5.75/oz is made by combining arabica coffee beans which cost $8.75/oz with robusta coffee beans which cost $5.25/oz. Find the number of oz of arabica coffee beans and robusta coffee beans required to make 14 oz of Eugene's Premium Coffee Blend.

Mixture

Let: x = arabica beans - oz

y = robusta beans - oz

Weight: $x + y = 14 \Rightarrow x = 14 - y$

oz

Cost: $8.75x + 5.25y = \cancel{5.75(14)}\ 80.50$

Solution: $8.75(14 - y) + 5.25y = 80.50$

$122.5 - 8.75y + 5.25y = 80.50$

$-3.5y = -42$

$y = 12$

∴ Eugene needs 2oz of arabia and 12 oz of robusta.