1.3A Models & Applications

Learning Target:

- Use linear equations to solve problems

Example 3:

You are choosing between two long-distance telephone plans. Plan A has a monthly fee of $20 with a charge of $0.05 per minute for all long-distance calls. Plan B has a monthly fee of $5 with a charge of $0.10 per minute for all long-distance calls. For how many minutes of long-distance calls will the cost for the two plans be the same?

1. Define the variable. Let x = # of minutes of a long-distance call

2. Write equations.

$$A = 20 + 0.05x$$
$$B = 5 + 0.10x$$

3. Set up the situation.

$$A = B$$
$$20 + 0.05x = 5 + 0.10x$$

4. Solve for x.

$$20 = 5 + 0.05x$$
$$15 = 0.05x$$
$$\frac{15}{0.05} = x$$
$$300 = x$$

300 minutes (5 hours) is when both plans will cost the same, $35

Your Turn 3:

You are choosing between two long-distance telephone plans. Plan A has a monthly fee of $15 with a charge of $0.08 per minute for all long-distance calls. Plan B has a monthly fee of $3 with a charge of $0.12 per minute for all long-distance calls. For how many minutes of long-distance calls will the cost for the two plans be the same?

1. Define the variable. Let x = # of minutes of a long-distance call

2. Write equations.

$$A = 15 + 0.08x$$
$$B = 3 + 0.12x$$

3. Set up the situation.

$$A = B$$
$$15 + 0.08x = 3 + 0.12x$$

4. Solve for x.

$$15 = 3 + 0.04x$$
$$12 = 0.04x$$
$$\frac{12}{0.04} = x$$
$$300 = x$$

300 minutes (5 hours) is when both plans will cost the same, $39

Example 5:

Your grandmother needs your help. She has $50,000 to invest. Part of this money is to be invested in noninsured bonds paying 15% annual interest. The rest of this money is to be invested in a government-insured certificate of deposit paying 7% annual interest. She told you that she requires $6000 per year in extra income from both of these investments. How much money should be placed in each investment?

1. Define the variable. Let x = amount of money invested at 15%

2. Write equation. $6{,}000 = 0.15x + 0.07(50{,}000 - x)$

3. Solve for x. $6{,}000 = 0.15x + 3{,}500 - 0.07x$

$6{,}000 = 0.08x + 3{,}500$

$2{,}500 = 0.08x$

$\frac{2{,}500}{0.08} = x$

$31{,}250 = x$

$7\%\ investment = (50{,}000 - 31{,}250)$

$7\%\ investment = 18{,}750$

Grandma needs to invest $31,250 at 15% and $18,750 at 7%.

Your Turn 5:

You inherited $5000 with the stipulation that for the first year the money had to be invested in two funds paying 9% and 11 % annual interest. How much did you invest at each rate if the total interest earned for the year was $487?

1. Define the variable. Let x = amount of money invested at 11%

2. Write equation. $487 = 0.11x + 0.09(5000 - x)$

3. Solve for x. $487 = 0.11x + 450 - 0.09x$

$487 = 0.02x + 450$

$37 = 0.02x$

$\frac{37}{0.02} = x$

$1850 = x$

$11\%\ investment = (5000 - 1850)$

$9\%\ investment = 3{,}150$

You invested $1,850 at 11% and $3,150 at 9%.

1.3A

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