Math 1 **3.6 Applications of Linear Systems (D2)** Unit 3 Day 6

*SWBAT translate a break-even and mixture word problem into a system of linear equations and solve.*

**Finding a Break-Even Point**

**Step 1:** Read the problem

**Step 2:** Underline or highlight the question

**Step 3:** Define the variables (they are found in the question)

**Step 4:** Reread the problem and write the equations (one cost, one profit)

**Step 5:** Set the equations equal to each other and solve!

1. A fashion designer makes and sells hats. The material for each hat costs $5.50. The hats sell for $12.50 each. The designer spends $1400 on advertising. How many hats must the designer sell to break even?

 **Set Up: Equations:**

Let \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Let \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SOLVE:

1. A puzzle expert wrote a new Sudoku puzzle book. His initial costs are $864. Binding and packaging each book cost $0.80. The price of the book is $2. How many copies must be sold to break even?

 **Set Up: Equations:**

Let \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Let \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SOLVE:

**Solving a Mixture Problem**

|  |  |  |
| --- | --- | --- |
|  | **Percent** | **Amt** |
| **Mixture A** |  |  |
| **Mixture B** |  |  |
| **Total** |  |  |

 **Step 1:** Read the problem

 **Step 2:** Underline or highlight the question

 **Step 3:** Define one variable based on the percentage of which is being asked

 **Step 4:** Set up a table like the one to the right

 **Step 5:** Solve for x!

1. John is making punch. How many cups of 50% juice should he add to a drink that contains 10% juice if he wants to make 15 cups of punch containing 20% juice? (How many cups of each drink)

 **Set Up: Table:**

|  |  |  |
| --- | --- | --- |
|  | **Percent** | **Amt** |
| **Mixture A** |  |  |
| **Mixture B** |  |  |
| **Total** |  |  |

Let \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. You combine a 10% saltwater mixture with a 40% saltwater mixture to create 6 gallons of a 30% saltwater solution. How many gallons of each mixture did you use?

 **Set Up: Table:**

|  |  |  |
| --- | --- | --- |
|  | **Percent** | **Amt** |
| **Mixture A** |  |  |
| **Mixture B** |  |  |
| **Total** |  |  |

Let \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Margaret is making fruit punch. She has juice drink that contains 25% orange juice. How much pure orange juice will she need to combine with the drink to make 17 quarts of a drink that is 60% orange juice?

 **Set Up: Table:**

|  |  |  |
| --- | --- | --- |
|  | **Percent** | **Amt** |
| **Mixture A** |  |  |
| **Mixture B** |  |  |
| **Total** |  |  |

Let \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. How much of a 90% solution of acid should be added to a 60% acid solution to create a 5-liter solution that contains 70% acid?

 **Set Up: Table:**

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| --- | --- | --- |
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|  |  |  |
|  |  |  |
|  |  |  |

Let \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. One antifreeze solution is 20% alcohol. Another anti-freeze solution is 12% alcohol. How many liters of each solution should be combined to make 15 liters of antifreeze solution that is 18% alcohol?

 **Set Up: Table:**

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Let \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_