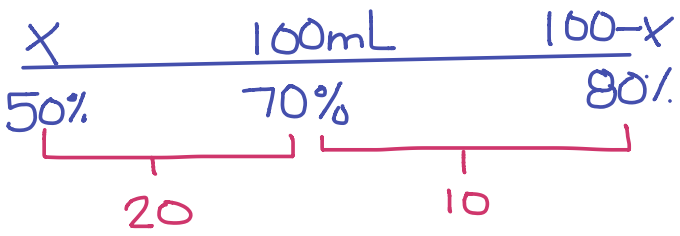
NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

1. A chemist has two solutions: a 50% methane solution and an 80% methane solution. He wants 100 mL of a 70% methane solution. How many mL of each solution does he need to mix?



$20x = 10(100-x)$
$20x = 1000-10x$
$30x = 1000$
$x = 33\frac{1}{3}$ mL of 50% sol.

$100 - x = 66\frac{2}{3}$ of 80% sol.

2. 16 pounds of cinnamon was made by combining 12 pounds of Indonesian cinnamon with costs \$19/pound with 4 pounds of Thai cinnamon which costs \$11/pound. Find the cost per pound of the new cinnamon mixture.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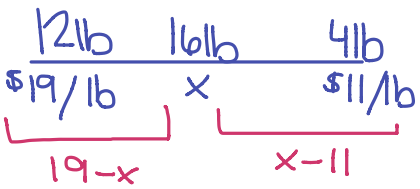

$12(19-x) = 4(x-11)$
$228-12x = 4x-44$
$228 = 16x-44$
$184 = 16x$

$x = \$11.50$ for new cinnamon mixture

3. Emily mixed together 9 gallons of Brand A fruit drink and 8 gallons of Brand B fruit drink which contains 48% fruit juice. Find the percent of fruit juice in Brand A if the mixture contained 30% fruit juice.


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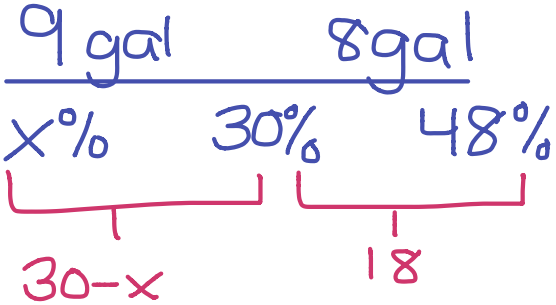

$9(30-x) = 8(18)$
$270-9x = 144$
$126 = 9x$
$14 = x$

14% fruitjuice is in Brand A fruit drink.

4. How many mg of a metal containing 45% nickel must be combined with a 6 mg of pure nickel (100%) to form an alloy containing 78% nickel?

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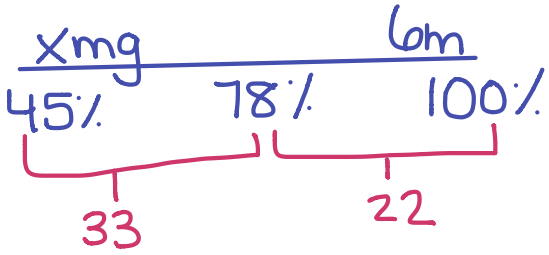

$33x = 6 \cdot 22$
$33x = 132$
$x = 4$

4mg of 45% nickel metal is needed.

5. Seven kg of soybean oil which costs \$4/kg were combined with 14 kg of canola oil which costs \$1/kg. Find the cost per kg of the mixture.


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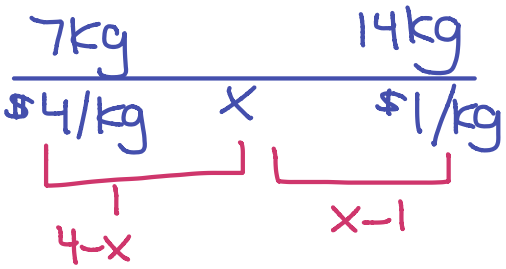
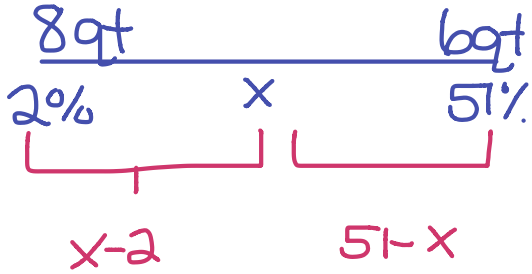


$7(4-x) = 14(x-1)$
$28-7x = 14x-14$
$42 = 21x$
$2 = x$

mixture is \$2/kg

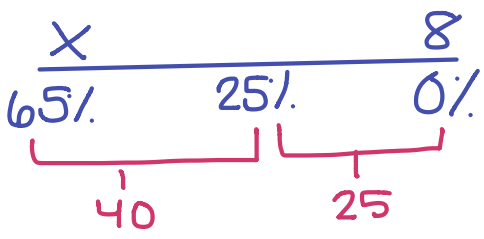
6. A sugar solution was made by mixing 8 quarts of a 2% sugar solution and 6 quarts of a 51% sugar solution. Find the concentration of the new mixture.



$8(x-2) = 6(51-x)$
$8x-16 = 306-6x$
$14x = 322$
$x = 23\%$

23% sugar solution in the mixture

7. How many gallons of a 65% saline solution must be mixed with 8 gallons of pure water (0%) to make a 25% solution?



$40x = 8 \cdot 25$
$40x = 200$
$x = 5$

5 gallons of 65% saline solution needed

8. One ounce of walnuts was mixed with 4 ounces of peanuts which cost \$4 per ounce to make mixed nuts which cost \$5 per ounce. What is the price per ounce of walnuts?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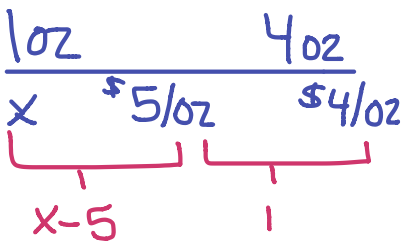

$1(x-5) = 4 \cdot 1$
$x - 5 = 4$
$x = 9$

One ounce of walnuts is \$9/oz

9. Heather wants to make a 36% acid solution. She has already poured 3 fluid ounces of a 72% acid solution into a beaker. How many fluid ounces of a 9% acid solution must she add to this to create the desired mixture?


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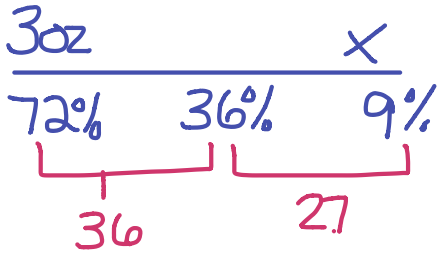

$3 \cdot 36 = 27x$
$108 = 27x$
$4 = x$

4oz of 90% solution are needed

10. To build the garden of your dreams, you need 10 ft^3 of soil containing 17% clay. You have two types of soil you can combine to achieve this: soil with 35% clay and soil with 10% clay. How much of each soil should you use?

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x | 10ft³ | 10−x

35% | 17% | 10%

18 | 7

$18x = 7(10-x)$

$18x = 70-7x$

$25x = 70$

$x = 2.8$

2.8 ft^3 of 35% clay soil and 7.2 ft^3 of 10% clay solution is needed.

11. Bronze which costs \$9.10/kg is made by combining copper which costs \$8.90/kg with tin which costs \$9.50/kg. Find the number of kg of copper and tin required to make 15.3 kg of bronze.

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copper | bronze | tin

x | 15.3kg | (15.3−x)

\$8.90/kg | \$9.10/kg | \$9.50/kg

0.2 | 0.4

$0.2x = 0.4(15.3-x)$

$0.2x = 6.12-0.4x$

$0.6x = 6.12$

$x = 10.2$

10.2 kg of copper and 5.1 kg of tin are needed

12. Steven added 25 mL of pure water to 125 mL of a 20% salt solution. What is the salt concentration of the new solution?

25mL | 125mL

0% | x | 20%

x−0 | 20−x

$25x = 125(20-x)$

$25x = 2500-125x$

$150x = 2500$

$x = 16\frac{2}{3}\%$ salt concentration