

Assignment #12: Mixed Solutions

Example: How much of a 30% solution should Kate mix with 8 gallons of a 40% solution to get a 33% solution?

Technique: We'll try a method similar to the one we used on mixed costs. In this case, the amount of some solution you have, multiplied by the strength of the solution (expressed as a percent of the total volume), gives the total amount of the pure ingredient dissolved in the solution. Here's one way to show this:

	Amount	%	Pure stuff
40% solution	8	.40	3.2
30% solution	x	.30	.3x
MIXTURE	x+8	.33	.33(x+8)

Since the total amount of pure ingredient is derived from adding up amounts contributed by each source, we can add the right-hand column to get the equation:

$$3.2 + .3x = .33(x+8)$$

Problems

1. At six o'clock, Darryl's clock malfunctions; the big hand starts running backwards! (The little hand continues to run forward as usual. The speeds of the hands are unchanged.) How long after six o'clock will the hands be together?
2. Christiane's CottageCheeseSnax™ contain only cottages (\$1.92 per lb), cheese (38¢ per lb), and snax (3¢ per lb). There is always twice as much snax as cheese. How much cheese and snax will combine with 2 lbs of cottages to make CottageCheeseSnax™ at 35¢ per lb?

3. Emma mixed some dirt (50¢ per lb) with some dust (30¢ per lb) and got a 20 lb mixture worth 38¢ per lb. How much dust did she use?
4. Benton, a coin collector, has \$6.50 in nickels, dimes, and quarters. He has twice as many nickels as dimes, and two less quarters than nickels. How many quarters does he have?
5. How many lbs of cups (10¢ per lb) should Taylor mix with 6 lbs of boards (27¢ per lb) to get cupboards selling for 18¢ per lb?
6. How much of a 40% solution should Max mix with 7 gallons of a 30% solution to get a 33% solution?
7. In the Lakers game, JJ scored three times as much as DJ. In the Pacers game, JJ scored the same as in the Lakers game, while DJ scored 10 more than he had in the Lakers game. If they had equal scores in the Pacers game, what were their scores in the Lakers game?

(L): Anna selects a positive, 3-digit integer at random. What is the probability that none of the 3 digits are prime? Express your answer as a common fraction.