

## VERBAL PROBLEMS USING FORMULAE AND SYSTEMS OF EQUATIONS

### SYSTEMS OF EQUATIONS

1.  $6x - 8y = 34$   
 $y = 3x - 2$

$x = -1, y = -5$

2.  $3x + 2y = 20$   
 $x + y = 8$

$x = 4, y = 4$

3.  $-3y + 5x = 7$   
 $-18y + 30x = 42$

$x = \text{all reals}, y = \text{all reals}$

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Answer each of the following.

4. How many liters of a 25% solution of a drug must be mixed with a 55% solution of the drug to produce 50 liters of a 46% solution of this drug? **15 liters of 25% solution**  
**35 liters of 55% solutions**

6. The hot water faucet in a tub fills the tub in 20 minutes. The cold water faucet fills the tub in 15 minutes. How long will it take to fill the tub if both faucets are open?  
**Approximately 8.57 minutes**

8. A hospital laboratory needs a 10% dextrose solution. However only 5% and 20% solutions are in stock. How much of the 20% dextrose solution should be mixed with 200 fl oz of the 5% solution to get a 10% solution?  
**100 fl. Oz. of 20% solution**

10. A cabinet maker earns \$10 more per hour than his apprentice. For a 40-hour week, their combined earnings were \$1280. How much does each earn? **\$21 and \$11**

12. A cleaning solution contains 4% ammonia. A second solution contains 8% ammonia. How many ounces of each should be mixed to give 20 ounces of a 5% solution?  
**15 ounces of 4% sol. & 5 ounces of 8% sol.**

13. The coins in the bank have a value of \$5.94 and consists of pennies and nickels. There are 358 coins. How many of each coin are in the bank?  
**299 pennies and 59 nickels**

15. In the total cost formula  $T$  is total cost,  $F$  is flat fee,  $Q$  is amount per service and  $V$  is the number of services. Find  $Q$  when  $T$  is 78,  $F$  is 10 and  $V$  is 4.  
**Q=17**

16. Given  $C = \frac{5}{9}(F - 32)$ , where  $C$  is the temperature in degrees Celsius and  $F$  is the temperature in degrees Fahrenheit, find  $D$  when  $C$  is 78 degrees. **F=172.4°F**

5. A hospital laboratory needs a 28% hydrogen chloride solution, but only 15% and 35% HCl solutions are in stock. How much of the 35% solution should be mixed with 100 fl oz of the 15% solution to get a 28% solution?  
 **$\frac{1300}{7}$  fl. Oz. of 35% solution**

7. A pharmacist needs to fill an order for a 4% lidocaine topical solution. However, only 2% and 9% concentrations are in stock. How much of the 9% concentration should be mixed with 150g of the 2% concentration to get a 4% concentration?  
**60 grams of 9% concentration**

9. Ochoa Oats has 25% oat bran. Octagon Oats has 65% oat bran. Three times as much Octagon oats as Ochoa Oats were mixed to give 32 ounces of oats. What is the percent of oat bran in this new mixture?  
**35%**

14. Given  $L = V(D_a - D_h)$ , where  $L$  is the lifting capacity of a blimp,  $V$  is the volume of the blimp,  $D_a$  is the density of air and  $D_h$  is the density of helium, find the lifting capacity of a blimp 200 feet in diameter when  $V = 4,188,800$  cubic feet,  $D_a$  is 0.0763 pounds per cubic foot, and the density of helium is 0.0106 pound per cubic feet rounded to the nearest whole number.  
**Lifting Capacity  $\approx$  2,752, 094 units**