



Math Olympiad and Problem Solving Programs  
E120 - Honors Algebra Problem Solving  
Problem Set 23.2 - Investments

Name:

Date:

1. If we let  $x$  be the smaller amount, then the larger amount has to be  $x + 2000$ . The second sentence of the problem gives us the following equation:

$$0.085(x + 2000) = 110 + 0.095(x)$$

$$0.085x + 170 = 110 + 0.095x$$

$$60 = 0.01x$$

$$x = 6000$$

So we know the amounts of money invested were  $\boxed{\$8000 \text{ at } 8.5\% \text{ and } \$6000 \text{ at } 9.5\%}$ .

2.  $\boxed{27350, 27950}$

3.  $\boxed{12.5 \text{ miles}, 15 \text{ miles}}$

4.  $\boxed{10,200 \text{ at } 3,800}$

5.  $\boxed{1,560 \text{ plane}, 3,120 \text{ rocket}}$

6. This problem may have been graded incorrectly. If  $x$  dollars are invested at 7% then  $12800 - x$  dollars are invested at 8%. This gives us the following equation:

$$0.07x + 0.08(12800 - x) = 996$$

$$0.07x + 1024 - 0.08x = 996$$

$$1024 - 0.01x = 996$$

$$28 = 0.01x$$

$$x = 2800$$

So we know the amounts of money invested were  $\boxed{\$2800 \text{ at } 7\% \text{ and } \$10000 \text{ at } 8\%}$ .

7.  $\boxed{18000, 22000}$

8. This problem was ambiguous.

9.  $\boxed{32000, 8000}$



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10. (a) This part of the problem may have been graded incorrectly. Letting  $x$  be the present number of oil companies, we get the following equation:

$$x + \left(\frac{1}{5}x - 2\right) = 22$$

$$x + \frac{x}{5} - 2 = 22$$

$$5x + x - 10 = 110$$

$$6x = 120$$

$$x = \boxed{20}$$

- (b)  $22 - 20 = 2$  new companies saving a total of  $42 \times 2 = \boxed{84}$  million gallons of gasoline per year.
- (c) There are presently 20 companies, saving a total of  $42 \times 20 = \boxed{840}$  million gallons of gasoline per year.