

$$\begin{array}{rcl} \text{Total invested:} & x + y = 20,000 & \times -5 & -5x - 5y = -100,000 \\ \text{Interest earned:} & 0.05x + 0.08y = 1180 & \times 100 \Rightarrow & \frac{5x + 8y = 118,000}{3y = 18,000} & \Leftrightarrow y = 6,000 \end{array}$$

So  $x + 6,000 = 20,000 \Leftrightarrow x = 14,000$ . She invests \$14,000 at 5% and \$6,000 at 8%.

46. Let  $x$  be the length of time John drives and  $y$  be the length of time Mary drives. Then  $y = x + 0.25$ , so  $-x + y = 0.25$ , and multiplying by 40, we get  $-40x + 40y = 10$ . Comparing the distances, we get  $60x = 40y + 35$ , or  $60x - 40y = 35$ . This gives the system  $\begin{cases} -40x + 40y = 10 \\ 60x - 40y = 35 \end{cases}$ . Subtracting,

$$\text{we get } -40x + 40y = 10$$

$$\quad \quad \quad \frac{60x - 40y = 35}{20x} = 45 \quad \Leftrightarrow \quad x = 2.25.$$

So  $y = 2.25 + 0.25 = 2.5$ . Thus, John travels for  $2\frac{1}{4}$  hours and Mary travels for  $2\frac{1}{2}$  hours.

48. First, let us find the intersection point of the two lines. The  $y$ -coordinate of the intersection point is the height of the triangle. We have

$$y = 2x - 4$$

$$2y = 4x - 8$$

$$y = -4x + 20 \quad \text{Adding 2 times the first equation to the second equation gives } y = -4x + 20$$

$$\frac{3y = 12}{y = 4}$$

So the triangle has height 4. Furthermore,  $y = 2x - 4$  intersects the  $x$ -axis at  $x = 2$ , and  $y = -4x + 20$  intersects the  $x$ -axis at  $x = 5$ . Thus the base has length  $5 - 2 = 3$ . Therefore, the area of the triangle is  $A = \frac{1}{2} \cdot \text{base} \cdot \text{height} = \frac{1}{2} \cdot 3 \cdot 4 = 6$  square units.