J8 p. 47 Answers

■ p. 47

[3]

Let $x =$ the number of items made per day.

Then

$$8 \text{ days} \cdot x \frac{\text{items}}{\text{day}} = \text{the number of items made in 8 days,}$$

$$10 \text{ days} \cdot x \frac{\text{items}}{\text{day}} = \text{the number of items made in 10 days,}$$

$$21 \text{ days} \cdot x \frac{\text{items}}{\text{day}} = \text{the number of items made in 21 days,}$$

$$10 \text{ days} \cdot x \frac{\text{items}}{\text{day}} = \text{the number of items made in 10 days.}$$

and

$$8 \text{ days} \cdot x \frac{\text{items}}{\text{day}} + 100 \text{ items} = \text{goal} \tag{1}$$

$$10 \text{ days} \cdot x \frac{\text{items}}{\text{day}} < \frac{\text{goal}}{2} \tag{2}$$

$$21 \text{ days} \cdot x \frac{\text{items}}{\text{day}} > \text{goal} \tag{3}$$

(1) and (2)

$$10 \text{ days} \cdot x \frac{\text{items}}{\text{day}} < \frac{1}{2}\left(8 \text{ days} \cdot x \frac{\text{items}}{\text{day}} + 100 \text{ items}\right)$$

(1) and (3)

$$21 \text{ days} \cdot x \frac{\text{items}}{\text{day}} > 8 \text{ days} \cdot x \frac{\text{items}}{\text{day}} + 100 \text{ items}$$

So, we wish to solve,

$$10\,x < \frac{8\,x+100}{2} \text{ and } 21\,x > 8\,x + 100.$$

After solving, we discover that $\frac{100}{13} < x < \frac{25}{3}$ which is $7\frac{9}{13} < x < 8\frac{1}{3}$.

Therefore the shop made 8 items per day.