

**Lesson 2.7.2: Solving Systems of Linear Equations by Substitution and Elimination****Georgia Standards of Excellence**

MGSE9–12.A.REI.5

MGSE9–12.A.REI.6

**Warm-Up 2.7.2 Debrief**

1. The district estimates the number of copies made each year is 515,000. Based on this estimation, which machine would you recommend? Justify your choice with clear mathematics.

The total cost for each copier can be determined using equations. Let  $C$  represent the operating cost and  $p$  represent the number of pages copied.

$$\text{Copier 1: } C = 20,000 + 0.02p$$

$$\text{Copier 2: } C = 17,500 + 0.025p$$

Substitute 515,000 for the number of copies,  $p$ , to determine the cost for each copier.

$$\text{Copier 1: } C = 20,000 + 0.02(515,000) = 30,300$$

$$\text{Copier 2: } C = 17,500 + 0.025(515,000) = 30,375$$

Copier 1 costs \$30,300 for 515,000 copies.

Copier 2 costs \$30,375 for 515,000 copies.

Copier 1 would be the best copier for this district because it is cheaper at the estimated number of pages. The advantage becomes even greater with each year of use.

2. The superintendent of the district has decided that all forms will be distributed electronically. This will decrease the number of copies made in the district by 6%. Based on this information, does this change your recommendation? Justify your choice with clear mathematics.

It was estimated that the district would make 515,000 copies.

## UNIT 2 • REASONING WITH LINEAR EQUATIONS AND INEQUALITIES

### Lesson 7: Systems of Linear Equations

#### Instruction

Calculate the number of copies if the amount is decreased by 6%.

$$\begin{aligned} & 515,000 - 0.06(515,000) \\ &= 515,000(1 - 0.06) \\ &= 515,000(0.94) \\ &= 484,100 \end{aligned}$$

If 6% fewer copies were made, the district would make 484,100 copies.

Use the same equations from question 1 to determine the cost for 484,100 copies.

$$\text{Copier 1: } C = 20,000 + 0.02(484,100) = 29,682$$

$$\text{Copier 2: } C = 17,500 + 0.025(484,100) = 29,602.50$$

Copier 1 costs \$29,682 for 484,100 copies.

Copier 2 costs \$29,602.50 for 484,100 copies.

With the reduced number of copies, Copier 2 would be less expensive during the first year of use. However, after the first year, Copier 1 is less expensive because of the cheaper cost per page.

#### Connection to the Lesson

- Students will be asked to take a scenario like this a step further and determine at which point the equations are equal.
- Students will be asked to solve a system of equations using various methods and will be asked to justify their thinking.