



### EXAMPLE 3 TAKS PRACTICE: Multiple Choice

To raise money for new football uniforms, your school sells silk-screened T-shirts. Short sleeve T-shirts cost the school \$8 each and are sold for \$11 each. Long sleeve T-shirts cost the school \$10 each and are sold for \$16 each. The school spends a total of \$3900 on T-shirts and sells all of them for \$5925. How many of the short sleeve T-shirts are sold?

- (A) 75                      (B) 150                      (C) 175                      (D) 250

#### Solution

**STEP 1** Write verbal models for this situation.

#### Equation 1

Short sleeve cost (dollars/shirt)	•	Short sleeve shirts (shirts)	+	Long sleeve cost (dollars/shirt)	•	Long sleeve shirts (shirts)	=	Total cost (dollars)
↓		↓		↓		↓		↓
8	•	x	+	10	•	y	=	3900

#### Equation 2

Short sleeve selling price (dollars/shirt)	•	Short sleeve shirts (shirts)	+	Long sleeve selling price (dollars/shirt)	•	Long sleeve shirts (shirts)	=	Total revenue (dollars)
↓		↓		↓		↓		↓
11	•	x	+	16	•	y	=	5925

**STEP 2** Write a system of equations.

Equation 1	$8x + 10y = 3900$	Total cost for all T-shirts
Equation 2	$11x + 16y = 5925$	Total revenue from T-shirts sold

**STEP 3** Solve the system using the elimination method.

Multiply Equation 1 by  $-11$  and Equation 2 by  $8$  so that the coefficients of  $x$  differ only in sign.

$8x + 10y = 3900$	$\times -11$ →	$-88x - 110y = -42,900$
$11x + 16y = 5925$	$\times 8$ →	$88x + 128y = 47,400$

Add the revised equations and solve for $y$ .	$18y = 4500$
	$y = 250$

Substitute the value of  $y$  into one of the original equations and solve for  $x$ .

$8x + 10y = 3900$	Write Equation 1.
$8x + 10(250) = 3900$	Substitute 250 for $y$ .
$8x + 2500 = 3900$	Simplify.
$x = 175$	Solve for $x$ .

The school sold 175 short sleeve T-shirts and 250 long sleeve T-shirts.

► The correct answer is C. (A) (B) (C) (D)

#### AVOID ERRORS

Choice D gives the number of *long* sleeve T-shirts, but the question asks for the number of *short* sleeve T-shirts. So you still need to solve for  $x$  in Step 3.