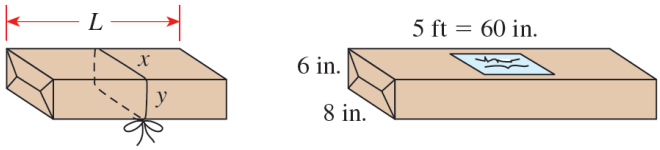
Exercise 87

Mailing a Package The post office will accept only packages for which the length plus the "girth" (distance around) is no more than 108 in. Thus for the package in the figure, we must have

$$L + 2(x + y) \leq 108$$

(a) Will the post office accept a package that is 6 in. wide, 8 in. deep, and 5 ft long? What about a package that measures 2 ft by 2 ft by 4 ft?

(b) What is the greatest acceptable length for a package that has a square base measuring 9 in. by 9 in.?



Solution

For a package that is 6 inches wide and 8 inches deep and 5 feet long, $y = 6$ and $x = 8$ and $L = 60$.

$$L + 2(x + y) = 60 + 2(8 + 6) = 88 \leq 108$$

The post office will accept this package. For a package that is 2 feet by 2 feet by 4 feet, $x = 24$ and $y = 24$ and $L = 48$.

$$L + 2(x + y) = 48 + 2(24 + 24) = 144 > 108$$

The post office will not accept this package. For a package that has a square base measuring 9 inches by 9 inches, $x = 9$ and $y = 9$. To find the largest length, set

$$L + 2(9 + 9) = 108$$

and solve for L.

$$L = 72$$

The greatest acceptable length is 72 inches.