

# Moving to a New City

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## SOLUTIONS

1. Type A:  $12 \times 12 \times 12 = 1728 \text{ in.}^3$ , which is  $1 \text{ ft.}^3$  (divide by 1728, or  $12 \times 12 \times 12$ )  
 Type B:  $12 \times 12 \times 18 = 2592 \text{ in.}^3$ , which is  $1.5 \text{ ft.}^3$   
 Type C:  $12 \times 18 \times 24 = 5184 \text{ in.}^3$ , which is  $3 \text{ ft.}^3$   
 Type D:  $18 \times 18 \times 24 = 7776 \text{ in.}^3$ , which is  $4.5 \text{ ft.}^3$

2. From Type A:  $1 \times 40 = 40 \text{ ft.}^3$   
 From Type B:  $1.5 \times 10 = 15 \text{ ft.}^3$   
 From Type C:  $3 \times 10 = 30 \text{ ft.}^3$   
 From Type D:  $4.5 \times 4 = 18 \text{ ft.}^3$

In total, the volume will be  $40 + 15 + 30 + 18 = 103 \text{ ft.}^3$ .

3. Van A:  $6 \times 7 \times 14 = 588 \text{ ft.}^3$   
 Van B:  $6 \times 7 \times 17 = 714 \text{ ft.}^3$   
 Van C:  $6 \times 7 \times 24 = 1008 \text{ ft.}^3$   
 Van B, the medium-size van, is the best choice, considering the contents that will need to be moved.

4.  $821 \text{ mi.}/22 \text{ mpg} = 37.3181818 \dots$ ; approximately 38 gallons of gas are required for the trip;  
 $38 \times \$2.15 = \$81.70$ , or approximately \$82.00 for gas.  
 The cost will be  $\$210.00 + \$650.00 + \$82.00 = \$942.00$ .

5. The couch is approximated by the right triangle below. We want to know if the altitude is 18 inches or less (see the red line in the graphic below). By the Pythagorean theorem,  $AC$  is 29 inches:

$$\sqrt{20^2 + 21^2}$$

Triangle  $AHB$  is similar to triangle  $ABC$  by the angle-angle criterion for similarity:

$$\frac{BH}{BC} = \frac{AB}{AC}$$

And finally,  $BH = (20 \times 21)/29$ , which is approximately 14.5 inches. The couch will fit through the doorway.

