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4.7 Modeling: Applying unit conversions to real world situations

The following questions concern Kevin's college dorm room, which he shares with a roommate.

1. Kevin's room is 12 feet wide by 8 feet long.
 - (a) If he wants to install carpet tiles that are 1 foot by 1 foot, how many tiles will he need?
 - (b) Carpet tiles are sold in boxes of 20 tiles. How many boxes should Kevin buy?
 - (c) It takes about 15 minutes to put down one box of tiles, plus 10 minutes to clean up. About how long will it take Kevin to complete the job?
 - (d) If Kevin's roommate helps him with the job, how long will it take them?
(What did you assume to get to this answer?)

2. Kevin wants to paint the walls (and ceiling). His walls are $7\frac{1}{2}$ feet high.
- (a) A 1 gallon can of paint covers 100 square feet of wall. How many cans of paint will he need?
 - (b) If each can of paint costs \$10, how much will it cost him to paint his room?
 - (c) If it takes Kevin 45 minutes to apply each can of paint, how long will it take him to paint his room?
 - (d) If Kevin invites 2 friends to help him with the job, how long will it take them?
 - (e) Kevin's air conditioner can reduce the temperature of 2500 cubic feet of air by one degree every 20 minutes. How long will it take to reduce the temperature of his room from 77 degrees to 70 degrees?

Name:

3. Marcela owns a factory that makes cement blocks. Each block is an exact cube, with each side 2 feet across, and weighs 18 lbs. After the blocks are produced, she needs to store them in a warehouse until they are delivered to her clients.

(a) She stores them in a warehouse that is 50 feet across and 120 feet long. How many blocks will cover the floor?

(b) If the warehouse is 25 feet high, how many blocks can it hold?

(c) Her old warehouse was 20% smaller in all dimensions:
What were its dimensions?

How many blocks could she store there?

4. Kevin's room at home is 25% longer and 25% wider than his college dorm room.

(a) How many carpet tiles would cover his bedroom floor at home?

Are 25% more tiles required? Why or why not.

(b) How many gallons of paint would he need to paint that room?

(c) With the same air conditioner, how long would it take to reduce the temperature of the room at home by 7 degrees?