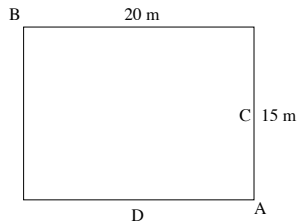


UCSC PIE
Worksheet 1
May 11, 2009

1. A new car has a sticker price of \$25,000. A customer is offered a financing plan, under which he will pay \$5,000 per year, starting with an immediate payment of \$5,000, every year until the car has been paid off. Under the plan, the customer will pay 5% interest on the unpaid balance.
 - (a) At the end of the first year, just before the customer makes his second payment, how much will he owe?
 - (b) How much will the customer owe at the end of the third year, just before he makes his fourth payment?
 - (c) How many years will it take until he has paid off the car completely?
 - (d) When he has paid off the car, how much more money will he have spent than he would if he had just paid the entire cost of the car up front?
2. XYZ corporation stock has a share price of $62\frac{4}{8}$, meaning that each share costs $\$62\frac{4}{8}$.
 - (a) An investor owns 195 shares of XYZ. How much is that worth?
 - (b) XYZ corporation declares a 3 – 2 stock split, meaning that it will give each investor 3 shares for each 2 shares he currently owns, and the price per share will decrease by $\frac{2}{3}$. How many shares will the investor get after the stock split?
 - (c) How much will each share be worth, to the nearest cent?
 - (d) In one day of trading after the split, the stock price rises 5%. Now how much is each share worth?
3. An office building has a floor that is 15 meters by 20 meters, as shown below. A company plans to put in a wireless network, using a wireless base station with a range of 21 meters.



- (a) If the base station is placed in the corner at position A, will it have enough range to reach the manager's office in the far corner at position B?
 - (b) Will it have enough range if it is placed in the middle of the wall at position C? At position D?
 - (c) What is the maximum area that can be covered by the base station?
 - (d) Will it have enough range if it is placed at position D, but three floors up, 10 meters above position D on this floor?
 - (e) What is the maximum volume that can be covered by the base station?
4. A 12-volt battery has a 2% tolerance. That means that the voltage is guaranteed to be within 2% of the stated value of 12 volts.
 - (a) What is the largest amount (in volts) by which the voltage could differ from 12 volts?
 - (b) If V is the voltage, fill in the blank: $|V - 12 \text{ volts}| < \underline{\hspace{1cm}}$.
 - (c) What fraction could the voltage be off by? Write your answer in lowest terms.

- (d) The rule for computing the power output of a battery is to square the voltage of the battery and divide by the resistance of the circuit to which it is attached. If a battery that is exactly 12 volts is attached to a circuit with a resistance of 100 ohms, what is the power output? (Your answer will be in watts.)
- (e) What is the possible range of power outputs for a circuit with 100 ohms of resistance using the battery with the 2% tolerance.