1.(1 pt)
The difference of two positive numbers is 4 and the sum of their squares is 40. Find the numbers.
The bigger number is ___ , and the smaller number is ___ .

2.(1 pt) The perimeter of a rectangle is 22, and its diagonal is $\sqrt{101}$. Find its dimensions and area.
Longer side: ___
Shorter side: ___
Area: ___

3.(1 pt) The length of a rectangular garden is 7 feet longer than its width. If the garden's perimeter is 206 feet, what is the area of the garden in square feet?

4.(1 pt) A student has scores of 58.25, 58.25, and 62 on his first three tests. He needs an average of at least 60 to earn a grade of D. What is the minimum score that the student needs on the fourth test to ensure a D? ___
Note: The answer need not be an integer.

5.(1 pt) A cash register contains only five dollar and ten dollar bills. It contains twice as many five's as ten's and the total amount of money in the cash register is 540 dollars. How many ten's are in the cash register?

6.(1 pt) At 3:00 PM a man 145 cm tall casts a shadow 132 cm long. At the same time, a tall building nearby casts a shadow 175 m long. How tall is the building? ___
Give your answer in meters. (You may need the fact that 100 cm = 1 m.)

7.(1 pt) A factory is to be built on a lot measuring 180 ft by 240 ft. A local building code specifies that a lawn of uniform width and equal in area to the factory must surround the factory.
What must the width of the lawn be? ___
If the dimensions of the factory are A ft by B ft with $A < B$, then $A =$ ___ and $B =$ ___

8.(1 pt) After robbing a bank in Dodge City, a robber gallops off at 14 mi/h. 30 minutes later, the marshall leaves to pursue the robber at 16 mi/h. How long (in hours) does it take the marshall to catch up to the robber?

9.(1 pt) Two cyclists, 72 miles apart, start riding toward each other at the same time. One cycles 2 times as fast as the other. If they meet 3 hours later, what is the speed (in mi/h) of the faster cyclist?

10.(1 pt) (12 points)
What quantity of 70 per cent acid solution must be mixed with a 20 solution to produce 300 mL of a 50 per cent solution?

11.(1 pt) The radiator in a car is filled with a solution of 70 per cent antifreeze and 30 per cent water. The manufacturer of the antifreeze suggests that for summer driving, optimal cooling of the engine is obtained with only 50 per cent antifreeze. If the capacity of the raditor is 3.9 liters, how much coolant (in liters) must be drained and replaced with pure water to reduce the antifreeze concentration to 50 per cent?

12.(1 pt) A Norman window has the shape of a rectangle surmounted by a semicircle. If the perimeter of the window is 38.900 ft. give the area A of the window in square feet when the width is 7.500 ft. Give the answer to two decimal places.

13.(1 pt) A Norman window has the shape of a rectangle surmounted by a semicircle. The perimeter is 20.000 ft. Order the widths listed below according to the area of the corresponding Norman window from the lowest area (1) to highest area (5).

You will need to enter the numbers 1 through 5 in the entry blanks below.

___ 1. Width = 5.600 ft.
___ 2. Width = 4.400 ft.
___ 3. Width = 3.000 ft.
___ 4. Width = 3.400 ft.
___ 5. Width = 6.400 ft.

Remark: To be able to order the sizes of the windows you are going to have to calculate the area for all five windows from knowing their widths. Since there are several calculations it will save time to figure out and simplify a formula which calculates the area from the width and the perimeter. This is in contrast to the previous problem where, with only one calculation to make, it wasn't necessarily worth the effort to find a general formula. You can use that example to check your formula however.

I do this very frequently when I am doing research and solving problems. Work out a special case first. THEN work out a formula for the general case and use the solution to the special case to check the formula.

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