Master 1.23 **Unit 1 - Test Review Sample Answers**
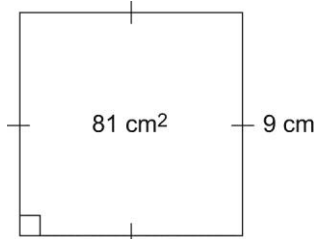
Unit Test – Master 1.22

1.

A square with side length 9 units has area 81 square units. So, 81 is a perfect square.

2. Yes, the number is a perfect square since it has an odd number of factors.

3. I let the given length be the length of the hypotenuse of a right triangle.
The area of the square on the hypotenuse is:
$(\sqrt{41})^2 = 41$
The sum of the areas of the squares on the legs must be 41.
So, I found two whole numbers that have a sum of 41 and that are both perfect squares: 16 and 25
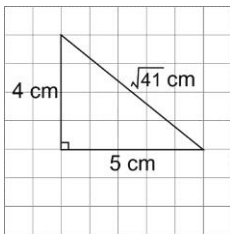The areas of the squares are:
16 cm^2 and 25 cm^2
The lengths of the legs are: 4 cm and 5 cm
I drew a right triangle with legs of length 4 cm and 5 cm.

The hypotenuse has length $\sqrt{41}$ cm.

4. **a)** $\sqrt{29}$ cm, or about 5.4 cm

   b) $\sqrt{65}$ cm, or about 8.1 cm

5. $\sqrt{137}$ cm, or about 11.7 cm

6. **a)** 169   **b)** 10   **c)** 42

7. **a)** False. 19 is not between $10^2 = 100$ and $11^2 = 121$.

   b) True. $\sqrt{7} \times \sqrt{7} = (\sqrt{7})^2$, which equals 7 since squaring and taking a square root are inverse operations.

   c) False. All the numbers in a Pythagorean triple are whole numbers.

8. **a)** Does $7^2 + 7^2 = 10^2$?
   L.S. $= 7^2 + 7^2 = 49 + 49 = 98$
   R.S. $= 10^2 = 100$
   No, $98 \neq 100$
   So, the triangle is not a right triangle.

   b) The longest side is $\sqrt{185}$ cm since $8^2 = 64$, $11^2 = 121$, and $(\sqrt{185})^2 = 185$.
   Does $8^2 + 11^2 = (\sqrt{185})^2$?
   L.S. $= 8^2 + 11^2 = 64 + 121 = 185$
   R.S. $= (\sqrt{185})^2 = 185$
   Yes, $185 = 185$.
   So, the triangle is a right triangle.

9. **a)** $\$45 \times 1100 = \$49\ 500$
   b) Use the Pythagorean Theorem to find the length of the longer rural road.
   $$1100^2 = 200^2 + d^2$$
   $$1\ 210\ 000 = 40\ 000 + d^2$$
   $$d^2 = 1\ 170\ 000$$
   $$d = \sqrt{1\ 170\ 000}$$
   The cost of running the water pipe along the rural roads is:
   $(200 + \sqrt{1\ 170\ 000}) \times \$30 \doteq \$38\ 450$
   Students' answers will vary if they use a decimal value of d.

   c) Answers will vary. For example: Running the water pipe along the rural roads is a better option: it costs less.