Chapter 3 Practice Test

Chapter 3 Practice Test Page 114 Question 1

D The number 100 is a perfect square because it has an even number of each prime factor: $100 = 2 \times 2 \times 5 \times 5$.

Chapter 3 Practice Test Page 114 Question 2

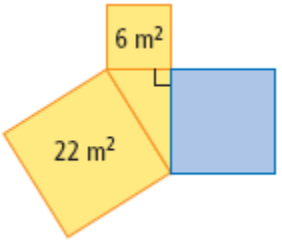
B The side length of the square will be $\sqrt{81}$ or 9 mm.

Chapter 3 Practice Test Page 114 Question 3

D $7 \times 7 = 49$; The area of the square is 49 cm^2.

Chapter 3 Practice Test Page 114 Question 4

C $22 - 6 = 16$; The area of the blue square is 16 m^2



Chapter 3 Practice Test Page 114 Question 5

A The number 51 is between the perfect squares 49 and 64. Since 51 is closer to 49, then $\sqrt{51}$ is closer to $\sqrt{49}$. Since $\sqrt{49}$ is 7 then $\sqrt{51}$ is closer to 7.

Chapter 3 Practice Test Page 114 Question 6

The variable that represents the hypotenuse is c in the Pythagorean relationship $c^2 = a^2 + b^2$.

Chapter 3 Practice Test Page 114 Question 7

Find the side length of the square:

$\sqrt{53} \approx 7.3$

The side length of the square is 7.3 cm.

Chapter 3 Practice Test Page 114 Question 8

a) Find the length of the hypotenuse, h:

$h^2 = 3^2 + 7^2$
$h^2 = 9 + 49$
$h^2 = 58$
$h = \sqrt{58}$
$h \approx 7.6158$

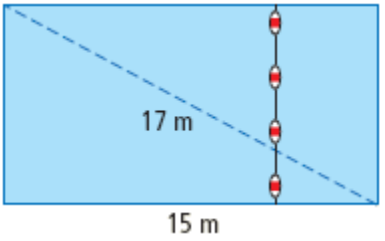
The length of the hypotenuse is 7.6 cm.

b) Answers will vary. Example: Since 58 is not a perfect square, when the calculator displays the square root of 58, it can show only part of the decimal portion of the answer, so it is an approximation. When you round the answer, it is also an approximation because you are expressing the answer only to a certain decimal place.

Chapter 3 Practice Test Page 114 Question 9

The float line will be equivalent to the width of the pool, *w:*

$w^2 + 15^2 = 17^2$
$w^2 + 225 = 289$
$w^2 = 64$
$w = \sqrt{64}$
$w = 8$



The length of the float line is 8 m.

Chapter 3 Practice Test Page 114 Question 10

a) Determine the range of possible values by squaring 7 and 8:

$7^2 = 49$
$8^2 = 64$

Any values between 49 and 64 would be correct, including the boundary values of 49 and 64. For example, 50 is a whole number that has its square root between 7 and 8.

b) A total of 14 numbers have a square root between 7 and 8: 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, and 63.

Chapter 3 Practice Test Page 115 Question 11

Check whether the squared values of the two shorter sides has a sum equal to the square of the largest side:

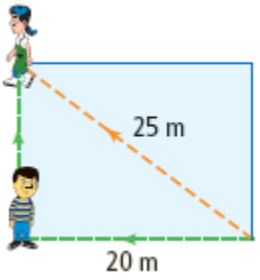
$14^2 + 48^2 = 50^2$

$196 + 2304 = 2500$

Yes, the triangle is a right triangle because the sum of the squares of the two shorter sides equals the square of the long side.

Chapter 3 Practice Test Page 115 Question 12

Use the Pythagorean relationship to determine the distance, d, that Han must travel:



$d^2 + 20^2 = 25^2$

$d^2 + 400 = 625$

$d^2 = 225$

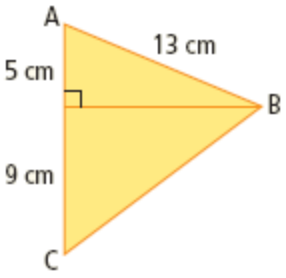
$d = \sqrt{225}$

$d = 15$

Han must travel 15 m to meet up with Josie.

Chapter 3 Practice Test Page 115 Question 13

To find the perimeter of ΔABC, first find the height, h, of the triangle using the Pythagorean relationship in ΔABD:



$h^2 + 5^2 = 13^2$

$h^2 + 25 = 169$

$h^2 = 144$

$h = 12$

The height of the triangle is 12 cm.

Second, find the length of BC using the right triangle ΔBDC:

$BC^2 = 9^2 + 12^2$

$BC^2 = 81 + 144$

$BC = \sqrt{225}$

$BC = 15$

The length of BC is 15 cm.

Finally, determine the perimeter of ΔABC:

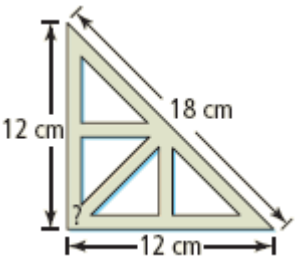
$5 + 9 + 13 + 15 = 42$

The perimeter of ΔABC is 42 cm.

Chapter 3 Practice Test Page 115 Question 14

Apply the Pythagorean relationship to determine whether the carpenter's square is a right triangle:

$$12^2 + 12^2 = 18^2$$
$$144 + 144 = 324$$
$$288 \neq 324$$



The carpenter's square shown is not a right triangle. Answers may vary. Example: The sum of the squares of the two shorter sides does not equal the square of the long side.

Chapter 3 Practice Test Page 115 Question 15

a) Since each factor in the prime factorization of 15 876 appears an even number of times, then 15 876 is a perfect square.

b) The calculator sequencing to determine the square root of a number may vary depending on the type of calculator. A typical sequence would be:

$[C]$ $[1]$ $[5]$ $[8]$ $[7]$ $[6]$ $[\sqrt{x}]$

c) From the prime factorization of 15 876, take one prime factor from each identical pairing and then multiply to find the square root:

$$15\,876 = (2 \times 2) \times (3 \times 3) \times (3 \times 3) \times (7 \times 7)$$
$$\sqrt{15876} = 2 \times 3 \times 3 \times 7 = 126$$

The square root of 15 876 is 126.