Name: _____ Date: _____

3.1 Squares and Square Roots

***MathLinks 8*, pages 80–87**

Key Ideas Review

Write the term from column B that matches the correct statement in column A.

A	B
1. A whole number that has only two factors, 1 and itself. Prime Number	**a)** Prime factorization
2. The product of the same two numbers. Square Root	**b)** Square number
3. The number that equals a given value when you multiply the number by itself. Square Number	**c)** Perfect square
4. The product of the same two factors. Perfect Square	**d)** Prime number
5. A number written as the product of its prime factors. Prime Factorization	**e)** Square root

Practise and Apply

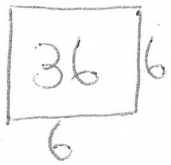
6. a) Determine the prime factorization of 36. Show your work.

36
/ \
6 × 6
2×3 × 2×3

b) Is 36 a perfect square? Explain your thinking.

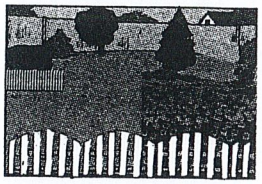
yes $6 \times 6 = 36$
$\sqrt{36} = 6$

c) Draw a quadrilateral that shows whether or not 36 is a perfect square. Label its side lengths.



$A = l \times w$
$A = 6 \times 6$

7. Janie's backyard has an area of 100 m².



a) Determine the prime factorization of 100. Show your work.

100
/ \
10 × 10
/ \ / \
2×5 × 2×5

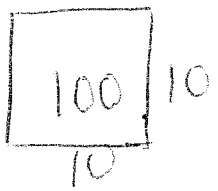
Name: _____ **Date:** _____

b) Is 100 a perfect square? Explain your thinking.

yes $10 \times 10 = 100$

$\sqrt{100} = 10$

c) Draw a quadrilateral that shows whether or not 100 is a perfect square. Label its side lengths.



$A = LW$

$A = 10 \times 10$

8. Write the prime factorization of each number. Circle the perfect squares.

a) 164

2×82

$2 \times 2 \times 41$

b) (196) P.Square

14×14

$2 \times 7 \times 7 \times 2$

c) (225) P.Square

15×15

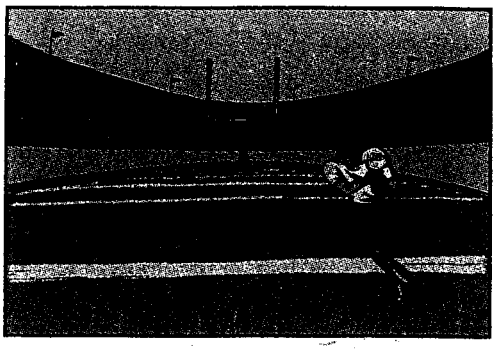
$3 \times 5 \times 5 \times 3$

d) 325

25×13

$5 \times 5 \times 13$

9. Alasie's local football field has an area of 1296 m^2. Is 1296 a perfect square? Show your thinking.



1296 yes

36×36

$6 \times 6 \times 6 \times 6$

$2 \times 3 \times 2 \times 3 \times 2 \times 3 \times 2 \times 3$

$\sqrt{1296} = 36$

10. Ingrid says that she knows that 9 and 16 are perfect squares, and that 10 is not. Is she correct? Explain your thinking.

✓ 9 $\sqrt{9} = 3$

3×3

✓ 16 $\sqrt{16} = 4$

4×4

$2 \times 2 \times 2 \times 2$

10

2×5

$\sqrt{10} = 3.162277$

not a Perfect Square

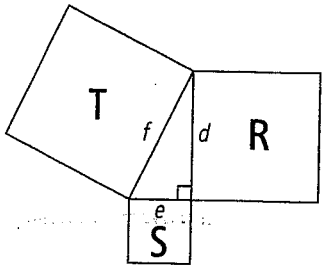
Name: _____ Date: _____

3.2 Exploring the Pythagorean Relationship

MathLinks 8, pages 88–94

Key Ideas Review

Use the diagram below to complete #1.



1. a) Write an addition statement to show the relationship of the squares.

$e^2 + d^2 = f^2$ $S + R = T$

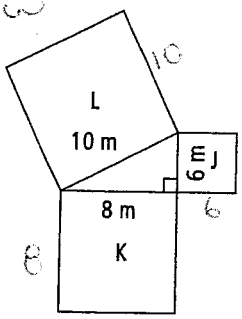
b) Use words to describe the relationship of the squares.

The square of "e" + square of "d" equals the square of "f", which will be T.

Practise and Apply

2. a) What are the areas of the squares in the diagram? Show your work.

$A = L \times W$



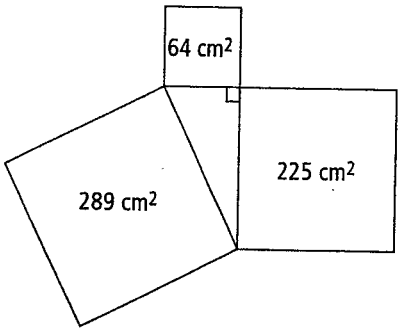
$K = 8 \times 8 = 64\ m^2$
$L = 10 \times 10 = 100\ m^2$
$J = 6 \times 6 = 36\ m^2$

b) Write two addition statements to show the relationship between the squares.

1) $K + J = L$

2) $8^2 + 6^2 = L^2$
$64 + 36 = L^2$
$100 = L^2$
$\sqrt{100} = L$
$10 = L$

3. a) Complete the table using information provided in the diagram below.



Area of Square	Side Length of Square
$64\ cm^2$	8cm
$289\ cm^2$	17cm
$225\ cm^2$	15cm

Name: _____ Date: _____

b) Show the relationship of the squares.

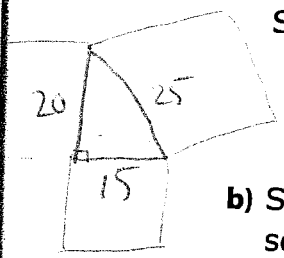
$a^2+b^2=c^2$

$64+225=289$

$289=289$

4. The sides of a right triangle measure 15 cm, 20 cm, and 25 cm.

a) What is the area of each square? Show your work.



$15^2+20^2=25^2$

$225+400=625$

$625=625$

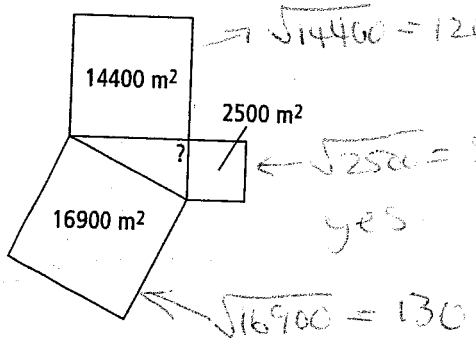
b) Show the relationship of the squares.

$a^2+b^2=c^2$

$15^2+20^2=25^2$

$225+400=625$

5. Is the triangle below a right triangle? Explain your reasoning.



$\sqrt{14400}=120$

$\sqrt{2500}=50$

yes

$\sqrt{16900}=130$

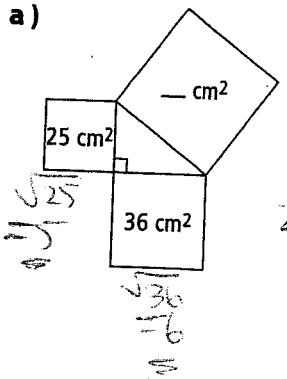
$a^2+b^2=c^2$

$14400+2500=16900$

$16900=16900$

6. Use the Pythagorean relationship to find the unknown area of the squares in the following diagrams. Show your work.

a)



$\sqrt{25}=5$

$\sqrt{36}=6$

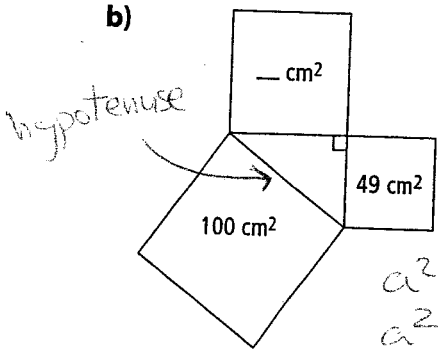
$a^2+b^2=c^2$

$5^2+6^2=c^2$

$25+36=c^2$

$61=c^2$

b)



$a^2+b^2=c^2$

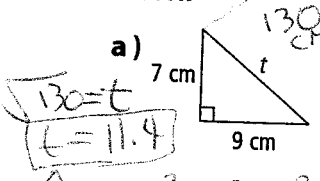
$a^2+49=100$ (−49)

$a^2=100-49$

$a^2=51\ cm^2$

7. What is the area of the square on side t of each triangle? Show your work.

a)



$7^2+9^2=c^2$

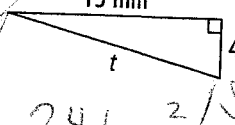
$49+81=c^2$

$130=c^2$

$\sqrt{130}=t$

$t=11.4$

b)



$15^2+4^2=t^2$

$225+16=t^2$

$241=t^2$

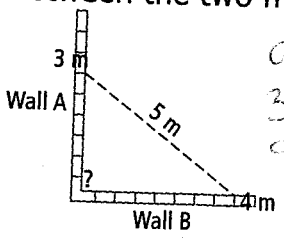
$\sqrt{241}=t$

$15.52=t$

mm

$241\ mm^2$

8. Jeremy wants to make sure that the walls he is building are at right angles to each other. He measures and marks 3 m along Wall A, and 4 m along Wall B. The distance between the two marks is 5 m.



$a^2+b^2=c^2$

$3^2+4^2=c^2$

$9+16=c^2$

$25=c^2$ yes it is!

$\sqrt{25}=c$

$5=c$

Are the walls at right angles to each other? Explain how you know.

$a^2+b^2=c^2$

$3^2+4^2=5^2$

$9+16=25$

$25=25$