Grade 8 Name Date

Unit 1 Final Exam Review

1. Which of these numbers is a perfect square? How do you know? **a)** 15 **b)** 63 **c)** 36

NO NO YES

A square cannot be formed from 15 or 63 blocks

$\sqrt{36} = 6$

2. Which two consecutive square numbers is each number between? **a)** 7 **b)** 50

$1^2=1$ $2^2=4$ $3^2=9$ $4^2=16$ $5^2=25$ $6^2=36$ $7^2=49$ $8^2=64$

a) 4 → 7 → 9 b) 49 → 50 → 64

3. I am a two-digit square number. The sum of my digits is 13. What square number am I?

16, 25, 36, 49, 64, 81

Sum of digits: 7, 7, 9, 13, 10, 10

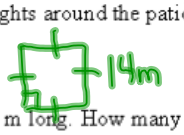
4. A square patio has area 196 m^2.

a) Find the dimensions of the patio.

Since it is a square → $\sqrt{196} = 14$

14m by 14m

b) The owner wants to put lights around the patio. How many metres of lighting is needed?



$4 \times 14 = 56$ m

c) Each string of lights is 25 m long. How many strings of lights are needed?

$\frac{56}{25} = 2.24$ So 3 strings are needed.

5. Find.

a) 8^2 $= 8 \times 8 = 64$

b) 11^2 $= 11 \times 11 = 121$

c) 5^2 $= 5 \times 5 = 25$

6. Find a square root of each number.

a) 49 **b)** 81 **c)** 225

Think "what # multiplied by itself gives 49?"

$\sqrt{49} = 7$ $\sqrt{81} = 9$ $\sqrt{225} = 15$

7. The factors of each number are listed in ascending order. Which numbers are square numbers? Find a square root of each square number.

a) 216: 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 27, 36, 54, 72, 108, 216

16 factors → even # of factors, so no factor repeats

b) 196: 1, 2, 4, 7, 14, 28, 49, 98, 196

NO

8. Calculate.

YES → ODD # of factors → middle factor repeats

a) 12^2 **b)** 9^2 **c)** $\sqrt{9}$ **d)** $\sqrt{196}$ $\sqrt{121}$ 14

$12 \times 12 = 144$ $9 \times 9 = 81$ $\sqrt{9} = 3$ since $3 \times 3 = 9$ $\sqrt{121} = 11$ since $11 \times 11 = 121$

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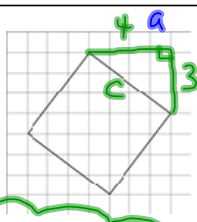
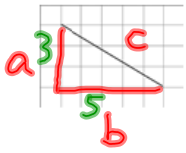
9. What is the side length of the square.



Side length is 5 units

$a^2+b^2=c^2$
$4^2+3^2=c^2$
$16+9=c^2$
$25=c^2$
$c=\sqrt{25}=5$

10. Find the length of the line segment.



$a^2+b^2=c^2$
$3^2+5^2=c^2$
$9+25=c^2$
$34=c^2$
$c=\sqrt{34}\doteq 5.8$ units

11. A farmer has 600 m of fencing. He wants to enclose a square field of area 24 200 m^2.
What are the approximate dimensions of the field? Give your answer to one decimal place.
Does the farmer have enough fencing to enclose the field? Explain.

Field is a square.

$\sqrt{24200}\doteq 155.6$ m

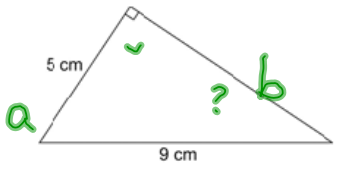
use a calculator

155.6m

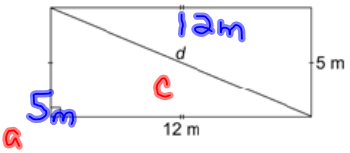
Fence goes around the perimeter.
4×155.6 m
$= 622.4$ m of fencing needed

* He is short 22.4m of fencing.

12. Find the length of the unmarked side in each right triangle.



c
$a^2+b^2=c^2$
$5^2+b^2=9^2$
$25+b^2=81$
$b^2=81-25$
$b^2=56$
$b=\sqrt{56}\doteq 7.5$ units



a
b
$a^2+b^2=c^2$
$5^2+12^2=d^2$
$25+144=d^2$
$169=d^2$
$d=\sqrt{169}=13$m

13. Identify which triangles are right triangles. How do you know?

a) 3 cm, 4 cm, 6 cm **b)** 7 m, 24 m, 25 m **c)** 1 m, 2 m, $\sqrt{5}$ m

NO
$3^2+4^2 \mid 6^2$
$9+16 \neq 36$

YES
$7^2+24^2 \mid 25^2$
$49+576 \mid 625$
$625=625$

YES
$1^2+2^2 \mid (\sqrt{5})^2$
$1+4 \mid 5$
$5=5$

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14. Is this a Pythagorean triple? 11, 34, 35

It is a Pyth Triple if $a^2+b^2=c^2$

a b c

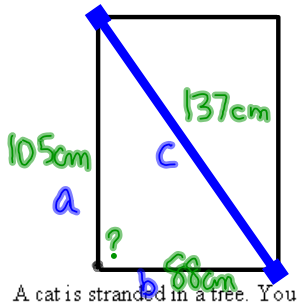
$11^2+34^2 \mid 35^2$

$121+1156 \mid$

$1277 \neq 1225$

Since $1277 \neq 1225$ it is not a Pyth Triple.

15. Petra is building a frame for her window. The frame is 88 cm wide and 105 cm tall. She measures the diagonal of her frame and finds that it is 137 cm. Is the frame a rectangle? Justify your answer.



A rectangle has 90° angles.

This is a rectangle if $a^2+b^2=c^2$

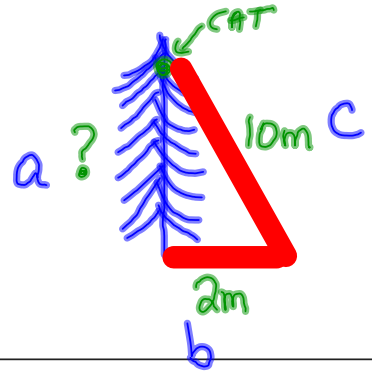
$105^2+88^2 \mid 137^2$

$11025+7744 \mid$

$18769 = 18769$

Since both sides are equal, it is a rectangle

16. A cat is stranded in a tree. You lean a 10-m ladder against the tree. It is 2 m from the base of the tree. How far up the tree does the ladder reach?



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

$a^2+2^2=10^2$

$a^2+4=100$

$a^2=100-4$

$a^2=96$

$a=\sqrt{96} \doteq 9.8\text{m}$