

U1A – Squares and Square Roots

Name: _____

Instructions:

Using a pencil, complete the following questions as you work through the related lessons. Show ALL work as is explained in the lessons. Do your best and ask questions if you don't understand any concept!

1.1 Squares Roots of Perfect Squares

1. A square has side length 10 cm. What is the area of the square?

2. A square has area 81 cm^2 . What is the side length of the square?

3.

a. $4^2 =$

b. $7^2 =$

c. $12^2 =$

d. $2^2 =$

e. $5^2 =$

f. $9^2 =$

g. 13^2

h. 17^2

i. 25^2

4. Beside each number below give the square root.

a. $\sqrt{9}$

b. $\sqrt{196}$

c. $\sqrt{1}$

d. $\sqrt{4}$

e. $\sqrt{64}$

f. $\sqrt{0}$

g. $\sqrt{49}$

h. $\sqrt{144}$

i. $\sqrt{100}$

j. $\sqrt{36}$

k. $\sqrt{16}$

l. $\sqrt{225}$

m. $\sqrt{9^2}$

n. $\sqrt{11^2}$

o. $\sqrt{5^2}$

5. For each of the numbers below, do a prime factorization. If there is a whole number square root, write it at the bottom

<p>a) 36</p> <p>Square root ?</p>	<p>b) 48</p> <p>Square root ?</p>
<p>c) 81</p> <p>Square root ?</p>	<p>d) 175</p> <p>Square root ?</p>

6. Listed beside each number below are its factors. State whether or not it is a perfect square and if it is, circle the square root.

		Factors:	Perfect Square? (y or n)
a.	48	1, 2, 4, 6, 8, 12, 24, 48	
b.	225	1, 3, 5, 9, 15, 25, 45, 75, 225	
c.	112	1, 2, 4, 7, 8, 14, 16, 28, 56, 112	
d.	441	1, 3, 7, 9, 21, 49, 63, 147, 441	

How can you tell, by determining the factors, whether or not a number is a perfect square?

1.2 Square Roots of Whole Numbers

1. List the closest perfect squares below and above the following numbers, and then provide an estimate. The first one is done for you. Since 5 is closer to 4 (vs 9), the estimate is closer to 2.

- a) $\sqrt{4} = 2$ 5 $\sqrt{9} = 3$ Estimate of root: $\sqrt{5} \approx 2.2$
- b) _____ 75 _____ Estimate of root: _____
- c) _____ 17 _____ Estimate of root: _____
- d) _____ 10 _____ Estimate of root: _____
- e) _____ 69 _____ Estimate of root: _____
- f) _____ 28 _____ Estimate of root: _____
- g) _____ 89 _____ Estimate of root: _____
- h) _____ 34 _____ Estimate of root: _____

2. The following numbers are between the square roots of which two perfect squares? e.g. 7.3 lies between $\sqrt{49}$ and $\sqrt{64}$

Between:

Between:

a. 5.5

b. 9.5

c. 3.7

d. 1.2

e. 4.5

f. 6.3

3. Between which two whole numbers is each square root? e.g. $\sqrt{87}$ is between 9 and 10.

Between:

Between:

a. $\sqrt{7}$

b. $\sqrt{14}$

c. $\sqrt{33}$

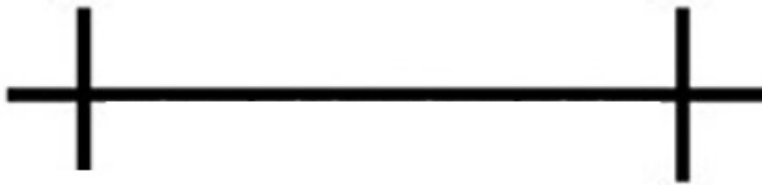
d. $\sqrt{101}$

4. A square room has an area of 130m^2 . What is the length of one side?

5. Estimate $\sqrt{30}$ using the number line below.



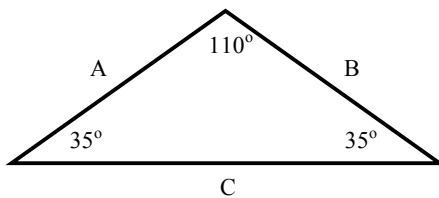
6. Estimate $\sqrt{53}$ using the number line below.



1.3 Pythagorean Theorem

1. For the following questions, label (leg or hypotenuse) the indicated parts of the right triangles. If the triangle is **not** a right triangle, write 'not' in all the appropriate spaces.

a)

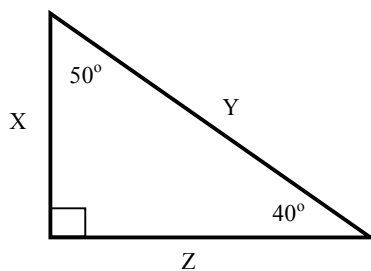


A = _____

B = _____

C = _____

b)

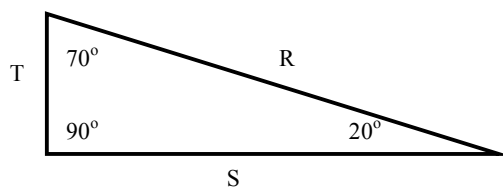


X = _____

Y = _____

Z = _____

c)

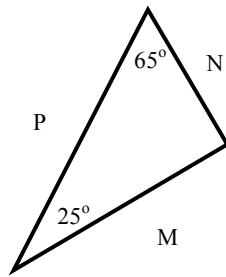


R = _____

S = _____

T = _____

d)



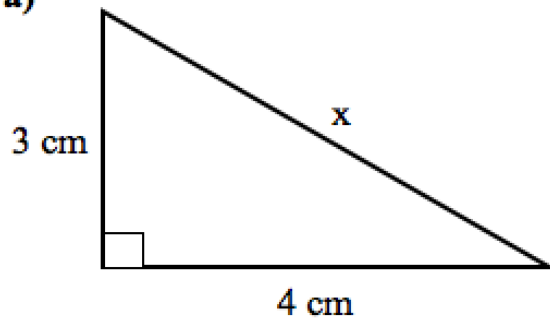
M = _____

N = _____

P = _____

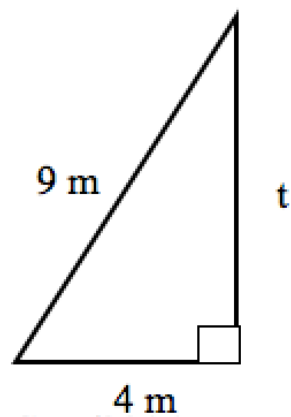
2. Use Pythagoras's Theorem ($a^2 + b^2 = c^2$) to solve for the unknown side length. Present your answers with two decimal points if appropriate. **Show your work.**

a)



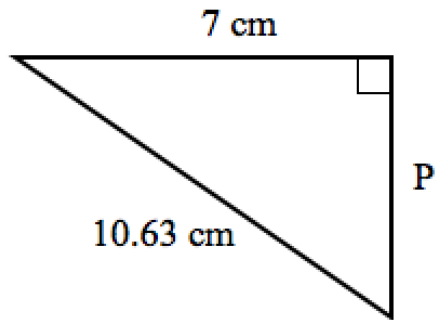
x = _____

b)

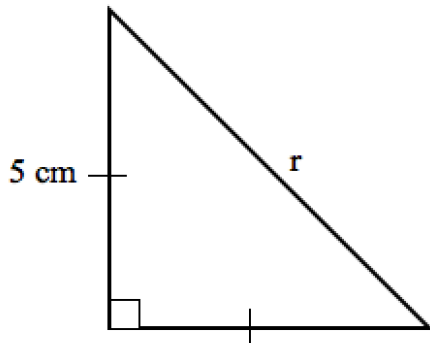


t = _____

c)



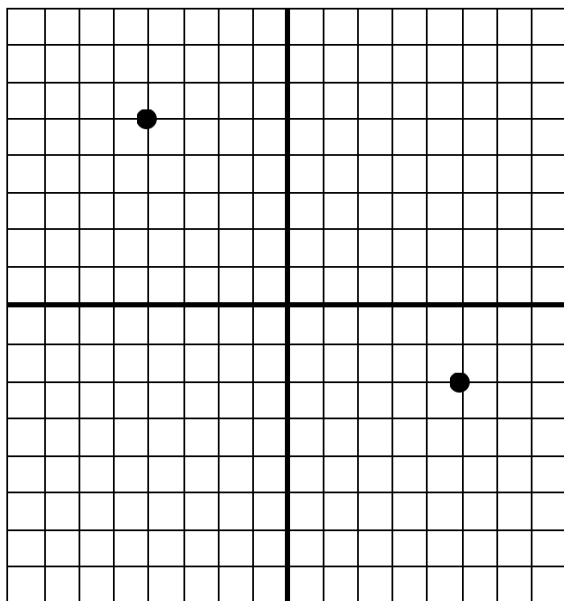
d)



The small line on the legs means they are congruent (the same length)

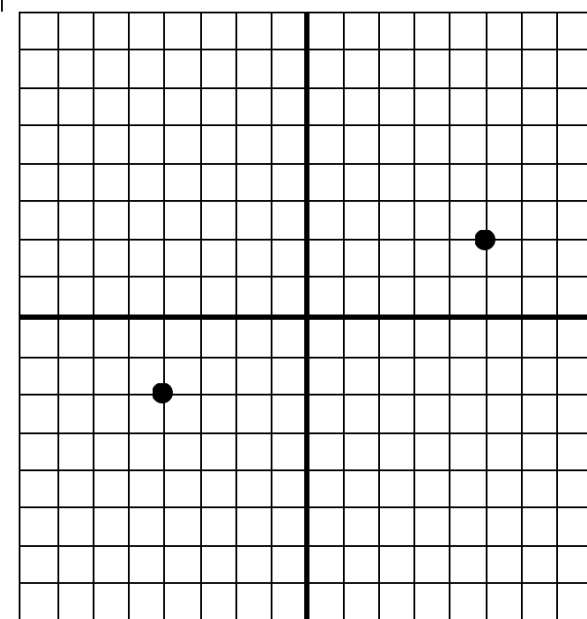
3. Use Pythagoras's Theorem ($a^2 + b^2 = c^2$) to solve for the length of the hypotenuse. First complete the grid by connecting the points and drawing the appropriate triangle. (You put in the third point to make a right triangle) Present your answers with two decimal points if appropriate. All units will be in 'cm'. **Show your work.**

a)



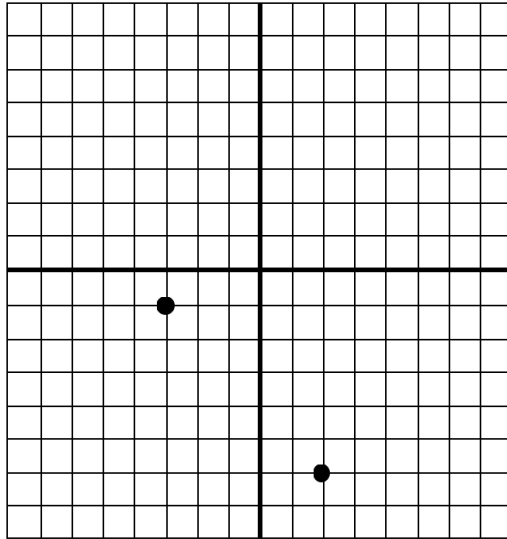
Hypotenuse =

b)



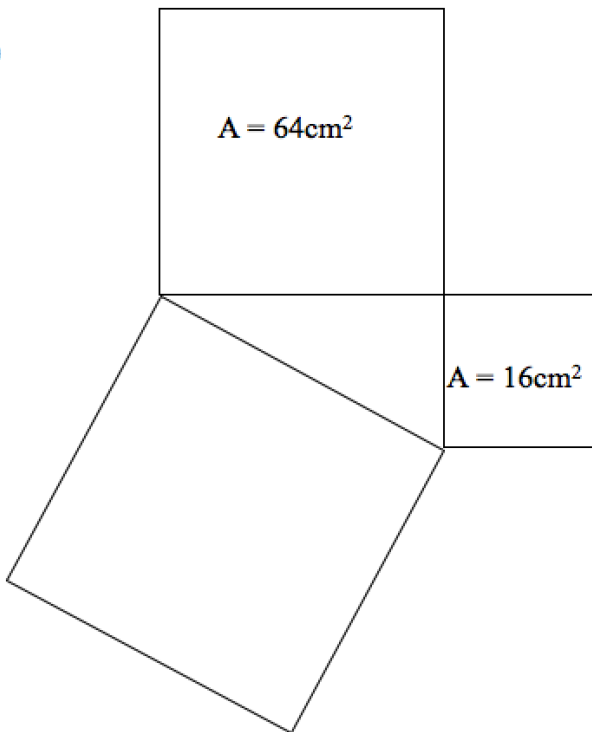
Hypotenuse =

c)



Hypotenuse = _____

d)



Hypotenuse = _____

1.5 Cubes and Cube Roots

1. Fill in the table for the following cubes

	<i>Number</i>	<i>Working</i>	<i>Cube</i>
<i>a</i>	<i>1</i>		
<i>b</i>	<i>2</i>		
<i>c</i>	<i>3</i>		
<i>d</i>	<i>4</i>	<i>4 x 4 x 4</i>	<i>64</i>
<i>e</i>	<i>5</i>		
<i>f</i>	<i>6</i>		
<i>g</i>	<i>7</i>		
<i>h</i>	<i>8</i>		
<i>i</i>	<i>9</i>		
<i>j</i>	<i>10</i>		

2. Explain in your own words what a cube root is. Give 2 examples.

3. Fill in the following table. Use a calculator if you wish. Express answers of non-perfect cubes to 2 decimal points.

	<i>Number</i>	<i>Cube root</i>
<i>a</i>	<i>125</i>	
<i>b</i>	<i>25</i>	
<i>c</i>	<i>64</i>	
<i>d</i>	<i>300</i>	
<i>e</i>	<i>542</i>	
<i>f</i>	<i>8000</i>	
<i>g</i>	<i>439</i>	
<i>h</i>	<i>87</i>	
<i>i</i>	<i>47</i>	
<i>j</i>	<i>1000</i>	

Answers to selected questions

1.1 Square Roots of Perfect Squares

3. a) 16 b) 49 c) 144 g) 169 h) 289 i) 625 4) a) 3 c) 1 6) a) n b) y, 15 c) n d) y, 21

1.2 Square Roots of Whole Numbers: 2. b) $\sqrt{81}$ & $\sqrt{100}$ d) $\sqrt{1}$ & $\sqrt{4}$ f) $\sqrt{36}$ & $\sqrt{49}$

3. b) 3 & 4 d) 10 & 11

1.3 Pythagorean Theorem

1. a) not a right triangle c) R = hyp; S = leg; T = leg

2. a) 5cm c) 8cm

3. a) 11.40cm c) 7.07cm

1.4 Cubes and Cube Roots

3. a) 5 b) 2.92