Name:	Date	•

Math 7: Estimating Roots

Estimating Square Roots



$$\sqrt{17} \approx 4$$

Perfect Square: a number whose principle square root is a whole number

The following is a list of perfect squares that should be memorized.

Number Squared	=	Perfect Square
	=	0
	=	1
	=	4
	=	9
	=	16
	=	25
	=	36
	=	49
	=	64
	=	81
	=	100
	=	121
	=	144
	=	169
	=	196
	=	225

If you are finding the square root of a whole number that is **not a perfect square**, you will have to **estimate to the nearest whole number**.

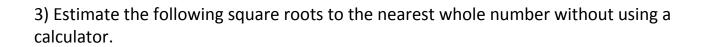
1)

Square Root	=	Exact Answer	Answer to the nearest whole number
$\sqrt{4}$	=	2	
$\sqrt{5}$	=	2.230678798	
$\sqrt{6}$	=	2.449489743	
$\sqrt{7}$	=	2.645751311	
$\sqrt{8}$	=	2.828427125	
$\sqrt{9}$	=	3	

To find the square root of a non-perfect square to the nearest whole number, use the square root of the nearest perfect square.

2)

Square Root	Closest perfect squares above and below	Closest perfect square	Final Answer
$\sqrt{5}$			$\sqrt{5} \approx$
$\sqrt{7}$			$\sqrt{7} \approx$
$\sqrt{10}$			$\sqrt{10} \approx$
$\sqrt{17}$			$\sqrt{17} \approx$
$\sqrt{35}$			$\sqrt{35} \approx$
$\sqrt{79}$			√79 ≈



 $\sqrt{15}$

 $\sqrt{23}$

 $\sqrt{105}$

 $\sqrt{13}$

 $\sqrt{50}$

 $\sqrt{23.5}$

 $\sqrt{38.4}$

 $\sqrt{170}$

 $\sqrt{130}$

 $\sqrt{3}$

 $\sqrt{32}$

 $\sqrt{8.7}$

4) Estimate the following solutions to the nearest integer.

$$d^2 = 55$$

$$e^2 = 32$$

$$67 = f^2$$

$$g^2 = 3.2$$

$$m^2 = -25$$

$$100 = p^2$$

5) Order the following numbers from least to greatest:

$$\sqrt{91}$$
 , 7 , 5 , $\sqrt{38}$

Perfect Cube: a number whose cube root is a whole number

The following is a list of perfect cubes that should be memorized.

Number Cubed	=	Perfect Square
	=	0
	=	1
	=	8
	=	27
	=	64
	=	125
	=	216
	=	343
	=	512
	=	729
	=	1,000

To find the cube root of a non-perfect cube to the nearest whole number, use the cube root of the nearest perfect cube.

6) Estimate the following square roots to the nearest integer without using a calculator.

$$\sqrt[3]{51}$$

$$\sqrt[3]{14}$$

$$\sqrt[3]{-200}$$

$$\sqrt[3]{145}$$

$$\sqrt[3]{95}$$

$$\sqrt[3]{-29}$$

7) Estimate the following roots to the nearest integer without using a calculator.

 $\sqrt{5}$

 $\sqrt{18}$

 $\sqrt{10}$

 $\sqrt{34}$

 $\sqrt{55}$

 $\sqrt{80}$

³√510

∛–999

 $\sqrt[3]{119}$

 $\sqrt{77}$

 $\sqrt{171}$

 $\sqrt{230}$

 $\sqrt{147}$

 $\sqrt{194}$

 $\sqrt{290\frac{3}{7}}$

 $\sqrt{440}$

 $\sqrt{578}$

 $\sqrt{730}$

 $\sqrt[3]{780}$

³√1,370

 $\sqrt[3]{947}$

 $\sqrt{17.8}$

 $\sqrt{11.5}$

 $\sqrt{37.7}$