E: Determining Square Roots of Rational Numbers

Square roots $\sqrt{\ }$

Squaring a value $\#^2$.

Perfect Squares

- the square root of the value is a whole number.

e.g. $\sqrt{4} = 2$ $\sqrt{9} = 3$ ...

You should know:

$\sqrt{1} = 1$	$1 \times 1 = 1^2 = 1$
$\sqrt{4} = 2$	$2 \times 2 = 2^2 = 2$
$\sqrt{9} = 3$	$3 \times 3 = 3^2 = 9$
$\sqrt{16} = 4$	$4 \times 4 = 4^2 = 16$
$\sqrt{25} = 5$	$5 \times 5 = 5^2 = 25$
$\sqrt{36} = 6$	
$\sqrt{49} = 7$	
$\sqrt{64} = 8$	
$\sqrt{81} = 9$	
$\sqrt{100} = 10$	
$\sqrt{121} = 11$	
$\sqrt{144} = 12$	$12 \times 12 = 12^2 = 144$
$\sqrt{169} = 13$	
$\sqrt{196} = 14$	
$\sqrt{225} = 15$	
$\sqrt{256} = 16$	
$\sqrt{289} = 17$	
$\sqrt{324} = 18$	
$\sqrt{361} = 19$	
$\sqrt{400} = 20$	

Memorize!

Examples:

1. Find the number that has the given square root.

a) 4.2

$= 4.2^2$

$= 4.2 \times 4.2$

17.64

b) 1.73

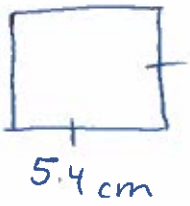
$= 1.73^2$

$= 1.73 \times 1.73$

$= 2.9929$

* Use a calculator.

2. Find the area of ~~each~~ a square if its side length is 5.4cm



Use a calculator.

$A = s \times s$

$= s^2$ ✓

$= (5.4\text{cm})^2$ ✓

$= 29.16\text{cm}^2$ ✓

3. Are the following rational numbers a perfect square?

Do not use a calculator.

a) $\frac{1}{36}$

$= \frac{\sqrt{1}}{\sqrt{36}}$

$= \frac{1}{6}$

$\therefore \frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$ perfect square.

b) $\frac{121}{64}$

$= \frac{\sqrt{121}}{\sqrt{64}}$

$= \frac{11}{8}$

$\therefore \frac{11}{8} \times \frac{11}{8} = \frac{121}{64}$ perfect square.

c) $\frac{9}{12}$

$= \frac{\sqrt{9}}{\sqrt{12}}$

$= \frac{3}{3.464...}$

not a perfect square.

You do not have to be able get this you just have to know it does not work evenly.

d) 0.81

$= \frac{81}{100}$

$= \frac{\sqrt{81}}{\sqrt{100}}$

$= \frac{9}{10}$

$\therefore \frac{9}{10} \times \frac{9}{10} = \frac{81}{100} = 0.81$

Perfect square.

e) 0.20

$= \frac{20}{100}$

$= \frac{\sqrt{20}}{\sqrt{100}}$

$= \frac{4.472}{10}$

See previous note for circled decimal.

not a perfect square!

4. Determine.

a) $\sqrt{441}$

21

b) $\sqrt{3.90}$

$= 1.974841766$

Use a calculator.

5. If the area of a square is $196\,m^2$ what is the length of each side?

$A = s^2$ ✓

$\sqrt{196\,cm^2} = \sqrt{s^2}$ ✓

$14\,cm = s$ ✓

Do not use a calculator.

Assignment. Pg. 78 #7–14

* #9ii, 10, 11a, 12 without calculators

#13 Estimate 1st! Do not just calculate.