Name: _____ Date: _____

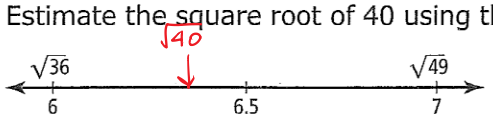
3.3 Estimating Square Roots

MathLinks 8, pages 95–100

Key Ideas Review

Use your estimating skills to complete #1.

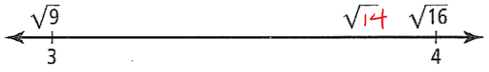
1. a) Estimate the square root of 40 using the number line below.



$\sqrt{40} \simeq 6.3$

you can have 6.2 - 6.4

b) Estimate the whole number that has a square root two thirds of the way along the number line between 3 and 4.



$\sqrt{14} \simeq 3.\overline{6}$

you can have $\sqrt{13}$ as well.

2. Complete the following.

a) When I use a calculator to calculate the square root of a natural number that is a perfect square, I get a ___whole___ number as my answer. This is a(n) ___exact___ answer.

actual, real

b) When I use a calculator to get the square root of a natural number that is *not* a perfect square, the answer the calculator gives me has a ___decimal___ in it. This is not an exact answer. It is a(n) ___approximation___.

Practise and Apply

3. List the perfect squares immediately before and after the whole number.

	Perfect Square Before	Whole Number	Perfect Square After
a)	4	5	9
b)	16	18	25
c)	64	78	81
d)	81	95	100

4. Identify all of the whole numbers with a square root larger than 5 and smaller than 6.

26, 27, 28, 29, 30, 31, 32, 33, 34, 35

5. Estimate the square root to one decimal place. Show your work. Check your answer with a calculator.

a) $\sqrt{17} \simeq 4.1$

answers may vary little.

b) $\sqrt{85} \simeq 9.2$

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6. Write the perfect square immediately before and after the whole number, and then estimate the square root of the whole number to one decimal place. Check your estimates with a calculator.

	Perfect Square Before	Whole Number	Perfect Square After	Approximate Square Root
a)	25	27	36	5.2
b)	49	55	64	7.4
c)	100	105	121	10.2
d)	121	140	144	11.8

7. Martina's painting is on a square canvas with an area of 45 cm². She needs to buy a frame for the painting. Estimate the square's side length to one decimal place. Show your work.

$\sqrt{45cm^2} \simeq 6.7cm$

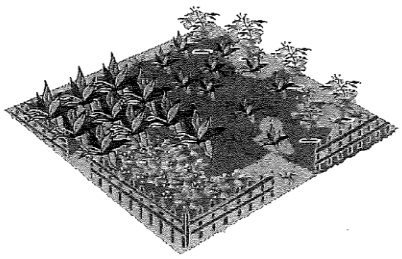
8. Braden's new game board has 225 small squares. All of the small squares form one large square. How many small squares are along one side? Show your work.

$\sqrt{225}$

$= \sqrt{15 \times 15}$

$= 15$ squares

9. Chelsea's square garden has an area of 60 m².



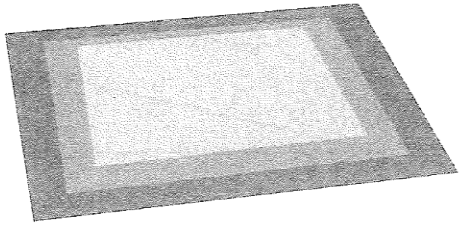
a) Estimate to one decimal place the side length of the garden.

$\sqrt{60m^2} \simeq 7.7m$

b) She has 32 m of fencing to go around the garden. Does she have enough fencing? Explain your thinking. yes.

If each side is about 7.7m, multiply that times 4 to get 30.8m, which is less than 32m.

10. Aaron's parents want to buy an area rug for their 4 m × 4 m living room. They want space around the rug. The rug itself cannot take up more than 90% of the living room. What is the maximum size of rug they can buy? Show your work.



The maximum size of rug should be approximately 14.4m².

$16m^2 \times 0.9 = 14.4m^2$