

Electro Critical Skills Resource Suite



Entry Level Literacy and Numeracy Assessment for the Electrotechnology Trades

Enrichment Resource

UNIT 1: Squares and Square Roots



managing apprentice progression

An E-Oz Energy
Skills Australia project.



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SQUARES AND SQUARE ROOTS

In using a lot of mathematical formula in the Electrotechnology area we have to be able to square a number or find the square root of a number.

LEARNING OUTCOME

- Understand and perform calculations using squares and square roots.

PERFORMANCE CRITERIA

- Understand the concepts of squares and square roots.
- Identify the need for calculations involving squares and square roots.
- Use the calculator to make accurate work and make specific calculations.

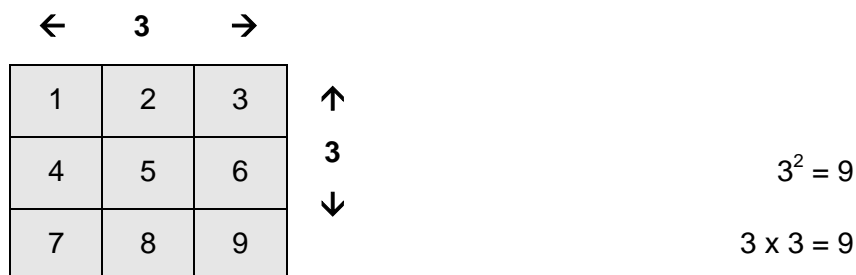


SQUARES AND SQUARE ROOTS

In order to calculate areas and apply certain formulae such as Pythagoras' theorem, it is important to have an understanding of squares and square roots.

SQUARING A NUMBER

To square a number you must multiply a number the number by itself.



3 **squared** equals 9

This is written as $3^2 = 9$

so	$4^2 = 16$	(4×4)	4 squared equals 16
	$5^2 = 25$	(5×5)	5 squared equals 25
	$8^2 = 64$	(8×8)	8 squared equals 64

EXERCISE 1

Calculate the following. Show your working out.

Example: $3^2 = 3 \times 3 = 9$

a. $10^2 =$

b. $9^2 =$

c. $12^2 =$



Using the calculator

To find 9^2

Method 1	or	Method 2
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9 x 9 = Answer 81

9 X² Answer 81

EXERCISE 2

Calculate the following, using the calculator.

a. $24^2 =$

b. $15^2 =$

c. $128^2 =$

d. $52^2 =$



Use the answer sheet to check your work.

SQUARE ROOT

Finding the square root is the opposite of squaring a number.

$$3^2 = 9 \quad (\text{squaring})$$

$$\sqrt{9} = 3 \quad (\text{square root})$$

The square root of 9 is 3.

This is written as $\sqrt{9} = 3$

Now look at these:-

$$3 \times 3 = 9$$

$$\text{or } 3^2 = 9$$

$$\text{therefore } \sqrt{9} = 3$$

$$6 \times 6 = 36$$

$$\text{or } 6^2 = 36$$

$$\text{therefore } \sqrt{36} = 6$$

$$16 \times 16 = 256$$

$$\text{or } 16^2 = 256$$

$$\text{therefore } \sqrt{256} = 16$$

EXERCISE 3

Complete the following statements:

- a. $4 \times 4 = \dots$ or $4^2 = \dots$ therefore $\sqrt{\dots} = 4$
- b. $\dots \times \dots = 81$ or $\dots^2 = 81$ therefore $\sqrt{81} = \dots$
- c. $\dots \times \dots = 49$ or $\dots^2 = 49$ therefore $\sqrt{49} = \dots$



Using the calculator

Note: Steps on some calculators may differ. Refer to your calculator guide.

$\sqrt{289}$

2

8

9

\sqrt{x}

Answer 17

Depression of the square root key tells the calculator to find the square root of the number on the display. The square root then appears on the display.

EXERCISE 4

Calculate the following (answers are provided to two decimal places)

a. $\sqrt{100} =$

b. $\sqrt{529} =$

c. $\sqrt{231} =$

d. $\sqrt{54.76} =$

e. $\sqrt{702.25} =$

f. $\sqrt{5643.21} =$

g. $\sqrt{5 + 8.2}$ Answer

h. $\sqrt{17.9 - 2.6 + 32.8} =$

i. $\sqrt{8} + \sqrt{15} =$

j. $\sqrt{7^2 + 24^2}$



Use the answer sheet to check your work.

ANSWERS

EXERCISE 1

- a. $10^2 = 10 \times 10$ = 100
b. $9^2 = 9 \times 9$ = 81
c. $12^2 = 12 \times 12$ = 144

EXERCISE 2

- a. 24^2 = 576
b. 15^2 = 225
c. 128^2 = 16,384
d. 52^2 = 2,704

EXERCISE 3

- a. $4 \times 4 =$ 16 or $4^2 = 16$ therefore $\sqrt{16} = 4$
b. $9 \times 9 =$ 81 or $9^2 = 81$ therefore $\sqrt{81} = 9$
c. $7 \times 7 =$ 49 or $7^2 = 49$ therefore $\sqrt{49} = 7$

EXERCISE 4

- a. $\sqrt{100} = 10$
- b. $\sqrt{529} = 23$
- c. $\sqrt{231} = 15.2$
- d. $\sqrt{54.76} = 7.4$
- e. $\sqrt{702.25} = 26.5$
- f. $\sqrt{5643.21} = 75.12$
- g. $\sqrt{5 + 8.2} = \sqrt{13.2} = 3.63$
- h. $\sqrt{17.9 - 2.6 + 32.8} = \sqrt{48.1} = 6.94$
- i. $\sqrt{8} + \sqrt{15} = 2.83 + 3.87 = 6.7$
- j. $\sqrt{7^2 + 24^2} = \sqrt{49 + 576} = \sqrt{625} = 25$