

Square Root Practice

1. Find a square root of each number. Which square roots are estimates, and which are exact?

- a) 170 b) 225 c) 360 d) 80

2. For each number in exercise 1, there is another square root. State what the other square root is.

3. Which square roots are between 8 and 9? Explain how you know.

$$\sqrt{67}, \sqrt{91}, \sqrt{78}, \sqrt{62}, \sqrt{84}, \sqrt{80}$$

4. Estimate each square root to 1 decimal place.

- a) $\sqrt{20}$ b) $\sqrt{60}$ c) $\sqrt{120}$ d) $\sqrt{280}$

5. Estimate the square of each number to the nearest whole number.

- a) 9.5 b) 12.5 c) 17.5 d) 19.5

6. Write to explain what is meant by the square root of a number.

7. What are the square roots of each number?

- a) 4 b) 9 c) 49 d) 81 e) 121 f) 64

8. What are the square roots of each number?

- a) $\frac{1}{16}$ b) $\frac{1}{25}$ c) $\frac{16}{25}$ d) $\frac{4}{9}$ e) $\frac{25}{49}$ f) $\frac{64}{81}$

9. Which of the square roots listed below are between each pair of numbers?

- a) 3 and 4 b) 7 and 8 c) 11 and 12

- d) 10 and 11 e) 13 and 14 f) 18 and 19

$$\sqrt{11}, \sqrt{52}, \sqrt{61}, \sqrt{14}, \sqrt{330}, \sqrt{360}, \sqrt{320}, \sqrt{257}, \sqrt{190},$$

$$\sqrt{140}, \sqrt{171}, \sqrt{118}, \sqrt{110}, \sqrt{130}, \sqrt{80}, \sqrt{35}$$

10. Estimate each square root to 1 decimal place.

- a) $\sqrt{76}$ b) $\sqrt{86}$ c) $\sqrt{117}$ d) $\sqrt{140}$ e) $\sqrt{45}$ f) $\sqrt{105}$

11. Determine each square root.

a) $\sqrt{144}$ b) $\sqrt{14\,400}$ c) $\sqrt{1\,440\,000}$

d) $\sqrt{1.44}$ e) $\sqrt{0.0144}$ f) $\sqrt{0.000\,144}$

12. Calculate the length of the side of a square with each area. Round to 1 decimal place where necessary.

a) 400 cm^2 b) 0.25 m^2 c) 90 cm^2

d) 150 cm^2 e) 300 cm^2 f) $25\,000\text{ m}^2$

13. Explain why each answer in exercise 12 involves only the positive square root.

14. Simplify each expression. Give the answer to 2 decimal places where necessary.

a) $\sqrt{64} + \sqrt{36}$

b) $\sqrt{64} + 36$

c) $64 + \sqrt{36}$

d) $\sqrt{64} \times \sqrt{36}$

e) $\sqrt{64 + \sqrt{36}}$

f) $\sqrt{\sqrt{64} + \sqrt{36}}$

15. A square garden has area 230 m^2 .

a) How long is each side of the garden, to the nearest centimetre?

b) How much fencing would be needed to enclose the entire garden?

16. A student drew a sketch on a 16-cm square piece of paper. She wants to mount the sketch on a piece of poster board twice the area of the paper. How would you estimate the length of each side of the poster board? What is your estimate?

17. Suppose the sketch in exercise 16 is enlarged so that its area is 3 times as great as the original. Estimate the length of each side of the enlargement.

19. Simplify each expression. Estimate the result where necessary.

a) $\sqrt{25} + \sqrt{49}$

b) $25 + \sqrt{49}$

c) $\sqrt{25} + 49$

d) $\sqrt{25} \times \sqrt{49}$

e) $\sqrt{25 + 49}$

f) $\sqrt{25 \times 49}$

g) $\sqrt{25 + \sqrt{49}}$

h) $\sqrt{\sqrt{25} + 49}$

i) $\sqrt{\sqrt{25} + \sqrt{49}}$

1. a) Estimate 13

b) Exact 15

11. a) 12

b) 120

e) 1200

c) Estimate 19

d) Estimate 9

d) 1.2

e) 0.12

f) 0.012

2. a) -13

b) -15

c) -19

d) -9

12. a) 20 cm

b) 0.5 m

c) 9.5 cm

3. Since $8^2 = 64$ and $9^2 = 81$, the square roots of numbers between 64 and 81 are between 8 and 9. Thus $\sqrt{67}$, $\sqrt{78}$, and $\sqrt{80}$ are between 8 and 9.

d) 12.2 cm

e) 17.3 m

f) 158.1 m

4. Estimates may vary.

a) 4.5

b) 7.7

c) 11.0

d) 16.7

13. Lengths cannot be negative.

14. a) 14

b) 44

c) 70

d) 48

e) 8.37

f) 3.74

5. Estimates may vary.

a) 90

b) 156

c) 306

d) 380

15. a) 15.17 m

b) 60.7 m

6. Explanations may vary. Consider a number n . The square root of n is a number which, when multiplied by itself, has product n .

7. a) 2, -2

b) 3, -3

c) 7, -7

d) 9, -9

e) 11, -11

f) 8, -8

8. a) $\frac{1}{4}, -\frac{1}{4}$

b) $\frac{1}{5}, -\frac{1}{5}$

c) $\frac{4}{5}, -\frac{4}{5}$

d) $\frac{2}{3}, -\frac{2}{3}$

e) $\frac{5}{7}, -\frac{5}{7}$

f) $\frac{8}{9}, -\frac{8}{9}$

9. a) $\sqrt{11}, \sqrt{14}$

b) $\sqrt{52}, \sqrt{61}$

c) $\sqrt{140}, \sqrt{130}$

d) $\sqrt{118}, \sqrt{110}$

e) $\sqrt{190}, \sqrt{171}$

f) $\sqrt{330}, \sqrt{360}$

16. Estimates and explanations may vary. 21.2 cm

17. Estimates may vary. 26 cm

18. a) Explanations may vary.

b) Answers may vary. The most efficient method is to fold and cut each square along one of its diagonals, creating four right triangles. Then arrange the pieces with the four right angles together to form a large square.

c) About 7.1 cm

d) Answers may vary.

19. Estimates for parts e, g, h, and i may vary.

a) 12

b) 32

c) 54

d) 35

e) 8.6

f) 35

g) 5.7

h) 7.3

i) 3.5

10. Estimates may vary.

a) 8.7

b) 9.3

c) 10.8

d) 11.8

e) 6.7

f) 10.2