

GRADE 8 MATHS

Squares, Square Roots, Cubes & Cube Roots

Complete Printable Worksheet Pack

6 Worksheets • Perfect Squares • Square Roots • Perfect Cubes • Cube Roots • Real-Life Applications • Challenge

Worksheet 1: Squares & Perfect Squares

Name: _____ Date: _____

1. Find 12^2 , 15^2 and 25^2 .
2. Which of these are perfect squares: 36, 45, 64, 72, 81, 100?
3. Write the first ten positive perfect squares.
4. Find the missing number: $17^2 = \underline{\hspace{2cm}}$.
5. A square has side 28 cm. Find its area.
6. Between which two consecutive whole numbers does 50 lie?
7. Without a calculator, decide whether 1250 is a perfect square. Explain.
8. Find the value of $35^2 - 34^2$.
9. The area of a square is 1225 cm^2 . Find its side length.
10. Explain how you can tell that the square of an odd number is odd.

Answer Key — Worksheet 1

1. 144, 225, 625.
2. 36, 64, 81 and 100.
3. 1, 4, 9, 16, 25, 36, 49, 64, 81, 100.
4. 289.
5. 784 cm^2 .
6. $7^2=49$ and $8^2=64$, so 50 lies between 7 and 8 when square roots are considered.
7. No. $35^2=1225$ and $36^2=1296$, so 1250 is between them.
8. $(35-34)(35+34)=69$.
9. 35 cm.
10. An odd number is odd; multiplying two odd numbers gives an odd product.

Worksheet 2: Square Roots & Estimation

Name: _____ Date: _____

1. Find the square roots of 49, 81, 144 and 225.
2. Estimate the square root of 70 to the nearest whole number.
3. Between which two whole numbers is square root of 150?
4. Find the positive square root of 196.
5. A number has square root 18. What is the number?
6. Estimate square root of 500 to the nearest whole number.
7. Without a calculator, decide whether square root of 90 is closer to 9 or 10.
8. Find the missing value: square root of $x = 27$.
9. The area of a square is 850 m^2 . Between which two whole-number side lengths does it lie?
10. Explain why square root of 2 is not a whole number.

Answer Key — Worksheet 2

1. 7, 9, 12, 15.
2. About 8, because $8^2=64$ and $9^2=81$.
3. Between 12 and 13, because $12^2=144$ and $13^2=169$.
4. 14.
5. 324.
6. About 22, because $22^2=484$ and $23^2=529$.
7. 90 is closer to 81 than 100, so square root of 90 is closer to 9.
8. 729.
9. Between 29 m and 30 m, because $29^2=841$ and $30^2=900$.
10. No whole number squared equals 2.

Worksheet 3: Cubes & Perfect Cubes

Name: _____ Date: _____

1. Find 3^3 , 5^3 and 10^3 .
2. Which are perfect cubes: 8, 16, 27, 36, 64, 125?
3. Write the first six positive perfect cubes.
4. Find 12^3 .
5. A cube has side 7 cm. Find its volume.
6. Is 500 a perfect cube? Explain using nearby cubes.
7. Find the difference between 10^3 and 9^3 .
8. The volume of a cube is 1728 cm^3 . Find its side.
9. Which is greater: 8^3 or 4^4 ? Show your reasoning.
10. Explain why the cube of an even number is even.

Answer Key — Worksheet 3

1. 27, 125, 1000.
2. 8, 27, 64 and 125.
3. 1, 8, 27, 64, 125, 216.
4. 1728.
5. 343 cm^3 .
6. No. $7^3=343$ and $8^3=512$, so 500 is between them.
7. $1000-729=271$.
8. 12 cm.
9. $8^3=512$ and $4^4=256$, so 8^3 is greater.
10. Even $\times$ even $\times$ even is even.

Worksheet 4: Cube Roots & Root Reasoning

Name: _____ Date: _____

1. Find the cube roots of 8, 27, 64 and 125.
2. Find the cube root of 1000.
3. Between which two whole numbers is the cube root of 200?
4. Find the missing value: cube root of $x = 15$.
5. Estimate the cube root of 500 to the nearest whole number.
6. A cube has volume 3375 cm^3 . Find its side.
7. Is 1000 both a perfect square and a perfect cube? Explain.
8. Find the positive integer n if $n^3 = 2197$.
9. Which is closer to 10: cube root of 950 or cube root of 1050? Explain.
10. Explain why the cube root of a negative number is negative.

Answer Key — Worksheet 4

1. 2, 3, 4, 5.
2. 10.
3. Between 5 and 6, because $5^3=125$ and $6^3=216$.
4. 3375.
5. About 8, because $8^3=512$.
6. 15 cm.
7. No. $1000=10^3$, but it is not a perfect square.
8. 13.
9. 950 is closer to 1000 than 1050 is, so cube root of 950 is closer to 10.
10. A negative number cubed remains negative, so its cube root must also be negative.

Worksheet 5: Roots in Real Life & Problem Solving

Name: _____ Date: _____

1. A square garden has area 2025 m^2 . Find its side length.
2. A cube-shaped tank has volume 8000 L , treating 1 L as 1 dm^3 . Find its side length in dm .
3. A square tile has side 32 cm . Find its area.
4. A cube has side 18 cm . Find its volume.
5. A square field has perimeter 196 m . Find its area.
6. A cube has volume $15,625 \text{ cm}^3$. Find its side length.
7. A square picture frame has area 0.81 m^2 . Find its side length.
8. A cube-shaped box has side 0.4 m . Find its volume in m^3 .
9. A square number is between 3000 and 4000 . Give all possible whole-number square roots.
10. A cube number is between 1000 and 2000 . Give all possible whole-number cube roots.

Answer Key — Worksheet 5

1. 45 m.
2. 20 dm.
3. 1024 cm^2 .
4. 5832 cm^3 .
5. Side=49 m; area= 2401 m^2 .
6. 25 cm.
7. 0.9 m.
8. 0.064 m^3 .
9. $55^2=3025$ through $63^2=3969$, so roots are 55 to 63.
10. $10^3=1000$ and $12^3=1728$, so roots are 11 and 12 for cubes strictly between 1000 and 2000; if endpoints are included, 10 is also included.

Worksheet 6: Squares, Roots, Cubes & Cube Roots Challenge

Name: _____ Date: _____

1. Find the smallest positive integer that must be added to 500 to make a perfect square.
2. Find the smallest positive integer that must be subtracted from 1000 to reach the next lower perfect cube.
3. A square has area 2.25 m^2 . Find its perimeter.
4. A cube has volume 0.125 m^3 . Find its total edge length, meaning the sum of all 12 edges.
5. Find the value of $101^2 - 99^2$ without multiplying both squares fully.
6. Find a positive integer whose square root is 4 greater than its cube root.
7. Find the smallest perfect square that is also a perfect cube and is greater than 100.
8. The side of a square is increased from 20 cm to 25 cm. By what percentage does its area increase?
9. A cuboid has volume 1728 cm^3 and a square base of area 144 cm^2 . Find its height.
10. A perfect square has exactly three positive factors. What can you say about its square root? Explain.

Answer Key — Worksheet 6

1. 29, because $23^2=529$ and $500+29=529$.
2. 271, because the next lower perfect cube is $9^3=729$ and $1000-729=271$.
3. Side=1.5 m; perimeter=6 m.
4. Side=0.5 m; total edge length=6 m.
5. $(101-99)(101+99)=2\times 200=400$.
6. 64: square root $64=8$ and cube root $64=4$, so the difference is 4.
7. $729=27^2=9^3$.
8. Area increases from 400 to 625; increase is $225/400\times 100=56.25\%$.
9. Height= $1728/144=12$ cm.
10. It must be the square of a prime number, because p^2 has exactly three positive factors: 1, p and p^2 .