# Square Roots
## Estimating and the Real Number System

Find the square root of the following numbers (or estimate to the nearest integer). Then classify them as Real, Rational or Irrational, Integers, and Whole Numbers.

The first row is an example!

| | sq. root/est | R | Q | I | Z | W |
|---|---|---|---|---|---|---|
| $\sqrt{81}$ | 9 | ✓ | ✓ | | ✓ | ✓ |
| $\sqrt{390}$ | 20 | ✓ | | ✓ | | |
| $\sqrt{49}$ | 7 | ✓ | ✓ | | ✓ | ✓ |
| $\sqrt{42}$ | 6 | ✓ | | ✓ | | |
| $-\sqrt{144}$ | -12 | ✓ | ✓ | | ✓ | |
| $\sqrt{250}$ | 16 | ✓ | | ✓ | | |
| $\sqrt{100}$ | 10 | ✓ | ✓ | | ✓ | ✓ |
| $\sqrt{289}$ | 17 | ✓ | ✓ | | ✓ | ✓ |
| $\sqrt{400}$ | 20 | ✓ | ✓ | | ✓ | ✓ |
| $-\sqrt{455}$ | -21 | ✓ | | ✓ | | |
| $\sqrt{324}$ | 18 | ✓ | ✓ | | ✓ | ✓ |
| $\sqrt{144}$ | 12 | ✓ | ✓ | | ✓ | ✓ |
| $-\sqrt{190}$ | -14 | ✓ | | ✓ | | |
| $\sqrt{369}$ | 19 | ✓ | | ✓ | | |
| $\sqrt{24}$ | 5 | ✓ | | ✓ | | |
| $\sqrt{90}$ | 9 | ✓ | | ✓ | | |
| $-\sqrt{9.8}$ | -3 | ✓ | | ✓ | | |
| $\sqrt{576}$ | [illegible] | ✓ | ✓ | | ✓ | ✓ |
| $\sqrt{220}$ | 15 | ✓ | | ✓ | | |
| $\sqrt{169}$ | 13 | ✓ | ✓ | | ✓ | ✓ |

## Finding Square Roots

Answer the following. Estimate to the nearest whole number if it's not a perfect square. Remember to write your answer in the correct form as indicated by the way the problem is written.

1. $a^2 = 121$ $\pm 11$
2. $\sqrt{144}$ $12$
3. $-\sqrt{256}$ $-16$
4. $\sqrt{110}$ $10$
5. $b^2 = 576$ $\pm 24$
6. $c^2 = 324$ $\pm 18$
7. $-\sqrt{81}$ $-9$
8. $\sqrt{400}$ $20$
9. $d^2 = 361$ $\pm 19$
10. $-\sqrt{24}$ $-5$
11. $\sqrt{169}$ $13$
12. $-\sqrt{180}$ $-13$
13. $e^2 = 9$ $\pm 3$
14. $\sqrt{550}$ $23$
15. $-\sqrt{484}$ $-22$
16. $f^2 = 144$ $\pm 12$
17. $\sqrt{64}$ $8$
18. $-\sqrt{60}$ $-8$
19. $\sqrt{361}$ $19$
20. $g^2 = 441$ $\pm 21$

## Square R
## Estimating and the Re

Find the square root of the following numbers
Then classify them as Real, Rational or Irrat

The first row is

| | sq. root/est | R | Q |
|---|---|---|---|
| $\sqrt{81}$ | 9 | ✓ | ✓ |
| $\sqrt{390}$ | 20 | ✓ | |
| $\sqrt{49}$ | 7 | ✓ | ✓ |
| $\sqrt{42}$ | 6 | ✓ | |
| $-\sqrt{144}$ | -12 | ✓ | ✓ |
| $\sqrt{250}$ | 16 | ✓ | |
| $\sqrt{100}$ | 10 | ✓ | ✓ |
| $\sqrt{289}$ | 17 | ✓ | ✓ |
| $\sqrt{400}$ | 20 | ✓ | ✓ |
| $-\sqrt{455}$ | -21 | ✓ | |
| $\sqrt{324}$ | 18 | ✓ | ✓ |
| $\sqrt{144}$ | 12 | ✓ | ✓ |
| $-\sqrt{190}$ | -14 | ✓ | |
| $\sqrt{369}$ | 19 | ✓ | |
| $\sqrt{24}$ | 5 | ✓ | |
| $\sqrt{90}$ | 9 | ✓ | |
| $-\sqrt{9.8}$ | -3 | ✓ | |
| $\sqrt{576}$ | [illegible] | ✓ | ✓ |
| $\sqrt{220}$ | 15 | ✓ | |
| $\sqrt{169}$ | 13 | ✓ | ✓ |

# What Is Special About the Testing Program at the Acme College of Cosmetics?

TO ANSWER THIS QUESTION, FOLLOW THESE INSTRUCTIONS:
For each exercise, figure out which consecutive integers the square root lies between. Write the letter of the exercise on the number line between these two integers.



THEY TWEEN TEST TAKERS MAKE UP EXAMS

−15 −14 −13 −12 −11 −10 −9 −8 −7 −6 −5 −4 −3 −2 −1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

(A) $\sqrt{30}$ 5
(E) $-\sqrt{61}$ -8
(N) $\sqrt{2}$ 1
(U) $-\sqrt{89}$ -9
(T) $-\sqrt{15}$ -4
(S) $\sqrt{217}$ 15
(A) $-\sqrt{5}$ -2
(U) $\sqrt{80}$ 9
(E) $-\sqrt{167}$ -13
(Y) $\sqrt{11}$ 3
(T) $-\sqrt{27}$ -5
(A) $\sqrt{150}$ 12
(S) $-\sqrt{141}$ -12
(O) $\sqrt{0.5}$ 1
(E) $\sqrt{120}$ 11
(H) $-\sqrt{189}$ -14
(L) $\sqrt{7}$ 3
(S) $-\sqrt{23}$ -5
(E) $\sqrt{55}$ 7
(D) $-\sqrt{74}$ -9
(M) $\sqrt{175}$ 13
(E) $-\sqrt{0.1}$ +0
(M) $\sqrt{19}$ 4
(K) $-\sqrt{3}$ -2
(N) $-\sqrt{43}$ -7
(P) $\sqrt{95}$ 10
(T) $-\sqrt{109}$ -10
(X) $\sqrt{132}$ 11
(K) $\sqrt{41}$ 6
(T) $-\sqrt{200}$ -14