Printable Rules for Square Roots and Radicals: Reference and Practice

Complete worked example / separate answer key

Simplify sqrt(75) and check the result by squaring.

Answer: sqrt(75)=5*sqrt(3). Check: (5*sqrt(3))^2=25*3=75.

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Original tasks 1, 2, 3, 4 / complete keys

Task 1

Simplify sqrt(98).

Answer: 7*sqrt(2)

Reason: Factor 98 as 49*2. Then sqrt(98)=sqrt(49)*sqrt(2)=7*sqrt(2).

Check: Square the answer: (7*sqrt(2))^2=49*2=98, which matches the original radicand.

Task 2

Simplify sqrt(45/16).

Answer: (3*sqrt(5))/4

Reason: Apply the quotient rule: sqrt(45)/sqrt(16)=sqrt(45)/4. Then sqrt(45)=sqrt(9*5)=3*sqrt(5), so the result is (3*sqrt(5))/4.

Check: Square the answer: ((3*sqrt(5))/4)^2=(9*5)/16=45/16, which matches the original radicand.

Task 3

Simplify sqrt(20)*sqrt(5).

Answer: 10

Reason: By the product rule, sqrt(20)*sqrt(5)=sqrt(20*5)=sqrt(100)=10.

Check: Square the answer: 10^2=100, and 20*5=100, so the result is correct.

Task 4

Simplify 6/sqrt(3).

Answer: 2*sqrt(3)

Reason: Rationalize the denominator by multiplying numerator and denominator by sqrt(3): 6/sqrt(3)=(6*sqrt(3))/3=2*sqrt(3).

Check: Square the answer: (2*sqrt(3))^2=4*3=12. Also, (6/sqrt(3))^2=36/3=12, so the expressions are equivalent.

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Task 1, Task 2, Task 3, Task 4 / Answer Key

Separate answer key with simplified answer, reasoning, and check method for each of the four tasks.

Task 1: 7*sqrt(2). Reasoning: Factor 98 as 49*2. Then sqrt(98)=sqrt(49)*sqrt(2)=7*sqrt(2). Check: (7*sqrt(2))^2=49*2=98, which matches the original radicand.

Task 2: (3*sqrt(5))/4. Reasoning: Apply the quotient rule: sqrt(45)/sqrt(16)=sqrt(45)/4. Then sqrt(45)=sqrt(9*5)=3*sqrt(5), so the result is (3*sqrt(5))/4. Check: ((3*sqrt(5))/4)^2=(9*5)/16=45/16, which matches the original radicand.

Task 3: 10. Reasoning: By the product rule, sqrt(20)*sqrt(5)=sqrt(20*5)=sqrt(100)=10. Check: 10^2=100, and 20*5=100, so the result is correct.

Task 4: 2*sqrt(3). Reasoning: Rationalize the denominator by multiplying numerator and denominator by sqrt(3): 6/sqrt(3)=(6*sqrt(3))/3=2*sqrt(3). Check: (2*sqrt(3))^2=4*3=12. Also, (6/sqrt(3))^2=36/3=12, so the expressions are equivalent.

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Worked example / Worked Example: sqrt(75)

Distinct from the four practice tasks.

Simplify sqrt(75) and check the result by squaring.

sqrt(75)=5*sqrt(3). Check: (5*sqrt(3))^2=25*3=75.

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Source rubric / reflection

- [ ] States the product rule, quotient rule, and perfect-square extraction rule correctly.
- [ ] Applies each rule to a numerical example with correct arithmetic.
- [ ] Extracts all perfect-square factors greater than 1 from the radicand.
- [ ] Removes fractions from inside radicals and radicals from denominators.
- [ ] Checks the simplified expression by squaring and comparing to the original radicand.
- [ ] Uses the defined radical convention: the radical sign covers the entire radicand, and the vinculum extends over all terms inside.
- [ ] Accepts valid alternative handwritten letter styles when the radicand boundary is clear and the expression is mathematically equivalent.

Reflection: What did you check, what did you change, and what will you try next?