PROBLEMS AND SOLUTIONS - OPERATIONS ON IRRATIONAL NUMBERS
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PLEASE NOTE THAT YOU CANNOT USE A CALCULATOR ON THE ACCUPLACER - ELEMENTARY ALGEBRA TEST! YOU MUST BE ABLE TO DO THE FOLLOWING PROBLEMS WITHOUT A CALCULATOR!

Problem 1:

Simplify $\sqrt{9}$.

The word "simplify" takes on many meanings in mathematics. Often you must figure out its meaning from the mathematical expression you are asked to "simplify." Here we are asked to "simplify" instead of finding the square root.

Problem 2:

Simplify $\sqrt{32}$.

The word "simplify" takes on many meanings in mathematics. Often you must figure out its meaning from the mathematical expression you are asked to "simplify." Here we are asked to "simplify" instead of factoring out perfect-square factors.

Problem 3:

Simplify $\sqrt{18}$.

Problem 4:

Simplify $\sqrt{75}$.

Problem 5:

Simplify $\sqrt{12}$.

Problem 6:

Simplify $\sqrt{54}$.

Problem 7:

Add $4\sqrt{5} + 2\sqrt{5}$ and simplify, if possible.

The word "simplify" takes on many meanings in mathematics. Often you must figure out its meaning from the mathematical expression you are asked to "simplify." Here we are asked to "simplify" instead of factoring perfect-square factors out of the sum.

Problem 8:

Add $2\sqrt{3} + \sqrt{3}$ and simplify, if possible.

Problem 9:

Combine the "like" radicals in $4\sqrt{13} + 8\sqrt{11} - 2\sqrt{13} - 15\sqrt{11}$ and simplify, if possible.

The word "simplify" takes on many meanings in mathematics. Often you must figure out its meaning from the mathematical expression you are asked to "simplify." Here we are asked to "simplify" instead of factoring perfect-square factors out of the result

Problem 10:

Subtract $5 - \sqrt{5}$ and simplify, if possible.

The word "simplify" takes on many meanings in mathematics. Often you must figure out its meaning from the mathematical expression you are asked to "simplify." Here we are asked to "simplify" instead of factoring perfect-square factors out of the difference.

Problem 11:

Subtract $\sqrt{7} - \sqrt{13}$ and simplify, if possible.

Problem 12:

Add $4\sqrt{5} + 2\sqrt{20}$ and simplify, if possible.

Problem 13:

Subtract $\sqrt{2} - 5\sqrt{32}$ and simplify, if possible.

Please note that there is an implied coefficient of *1* in front of $\sqrt{2}$. It is NOT customary to write it. However, it must be used in addition and subtraction!

Problem 14:

Subtract $5\sqrt{11} + 2\sqrt{18}$ and simplify, if possible.

Problem 15:

Multiply $\sqrt{7} \cdot \sqrt{13}$ and simplify, if possible.

The word "simplify" takes on many meanings in mathematics. Often you must figure out its meaning from the mathematical expression you are asked to "simplify." Here we are asked to "simplify" instead of factoring perfect-square factors out of the product.

Problem 16:

Multiply $\sqrt{\dfrac{7}{2}} \cdot \sqrt{\dfrac{2}{5}}$ and simplify, if possible.

Problem 17:

Multiply $3\sqrt{5} \cdot 2\sqrt{7}$ and simplify, if possible.

Problem 18:

Multiply $4\sqrt{3} \cdot 2\sqrt{20}$ and simplify, if possible.

Problem 19:

Multiply $\sqrt{11} \cdot \sqrt{11}$ and simplify, if possible.

Problem 20:

Multiply $(3 + \sqrt{3})(4 + \sqrt{3})$ and simplify, if possible.

Please note that the two middle products have like radicands that is why we added their coefficients!

Problem 21:

Multiply $(\sqrt{7} + \sqrt{5})(\sqrt{7} - \sqrt{5})$ and simplify, if possible.

Problem 22:

Divide $\dfrac{\sqrt{12}}{\sqrt{2}}$ and simplify, if possible.

The word "simplify" takes on many meanings in mathematics. Often you must figure out its meaning from the mathematical expression you are asked to "simplify." Here we are asked to "simplify" instead of factoring perfect-square factors out of the quotient.

Problem 23:

Divide $\dfrac{3\sqrt{6}}{6}$ and simplify, if possible.

Problem 24:

Divide $\dfrac{5\sqrt{20}}{\sqrt{10}}$ and simplify, if possible.

Problem 25:

Rationalize the denominator in $\dfrac{5}{7\sqrt{11}}$ and simplify, if possible.

Problem 26:

Rationalize the denominator in $\dfrac{4}{\sqrt{6}}$ and simplify, if possible.

Problem 27:

Rationalize the denominator in $\dfrac{5}{\sqrt{x}}$ and simplify, if possible.

Problem 28:

Rationalize the denominator in $\dfrac{\sqrt{13}}{\sqrt{3}}$ and simplify, if possible.

Problem 29:

Rationalize the denominator in $\dfrac{1}{\sqrt{2}}$ and simplify, if possible.

Problem 30:

Rationalize the denominator in $\sqrt{\dfrac{7}{5}}$ and simplify, if possible.

SOLUTIONS
You can find detailed solutions below the link for this problem set!

1. 3	2. $4\sqrt{2}$	3. $3\sqrt{2}$
4. $5\sqrt{3}$	5. $2\sqrt{3}$	6. $3\sqrt{6}$
7. $6\sqrt{5}$	8. $3\sqrt{3}$	9. $2\sqrt{13} - 7\sqrt{11}$
10. No simplification can take place. The only thing that could be done is to change the radical to a rounded decimal number and then subtract.	11. No simplification can take place. The only thing that could be done is to change the radicals to rounded decimal numbers and then subtract.	12. $8\sqrt{5}$
13. $-19\sqrt{2}$	14. $5\sqrt{11} + 6\sqrt{2}$	15. $\sqrt{91}$
16. $\sqrt{\dfrac{7}{5}}$	17. $6\sqrt{35}$	18. $16\sqrt{15}$
19. 11	20. $15 + 7\sqrt{3}$	21. 2
22. $\sqrt{6}$	23. $\dfrac{\sqrt{6}}{2}$	24. $5\sqrt{2}$
25. $\dfrac{5\sqrt{11}}{77}$	26. $\dfrac{2\sqrt{6}}{3}$	27. $\dfrac{5\sqrt{x}}{x}$
28. $\dfrac{\sqrt{39}}{3}$	29. $\dfrac{\sqrt{2}}{2}$	30. $\dfrac{\sqrt{35}}{5}$