Key

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
ADDING & SUBTRACTING RADICALS	① SIMPLIFY all radicals. ② Identify radicals with the **SAME INDEX** and **SAME RADICAND.** Only these can be combined! ③ For common radicals, **add/subtract the coefficients** and **KEEP THE COMMON RADICAL.** **EXAMPLE:** $-2\sqrt{20}-2\sqrt{5}$
More Examples	**Directions:** Find each sum or difference. Make sure you simplify FIRST!

1. $3\sqrt{6}-2\sqrt{6}$

$\sqrt{6}$

2. $2\sqrt{5}+2\sqrt{5}$

$4\sqrt{5}$

3. $10\sqrt{7}+2\sqrt{63}$

$16\sqrt{7}$

4. $\sqrt{15}-6\sqrt{60}$

$-11\sqrt{15}$

5. $2\sqrt{32}-3\sqrt{18}$

$-\sqrt{2}$

6. $-4\sqrt{28}+4\sqrt{112}$

$8\sqrt{7}$

7. $-4\sqrt{160}-2\sqrt{90}$

$-22\sqrt{10}$

8. $4\sqrt{45}+3\sqrt{245}$

$33\sqrt{5}$

9. $-2\sqrt{10}-3\sqrt{6}-2\sqrt{10}$

$-4\sqrt{10}-3\sqrt{6}$

10. $2\sqrt{7}+5\sqrt{3}+4\sqrt{7}$

$6\sqrt{7}+5\sqrt{3}$

11. $-3\sqrt{50}+\sqrt{18}-3\sqrt{3}$

$-12\sqrt{2}-3\sqrt{3}$

12. $2\sqrt{8}+4\sqrt{96}-\sqrt{24}$

$4\sqrt{2}+14\sqrt{6}$

13. $-5\sqrt{8}+2\sqrt{45}+3\sqrt{200}$

$20\sqrt{2}+6\sqrt{5}$

14. $10\sqrt{6}+18\sqrt{150}-4\sqrt{54}$

$88\sqrt{6}$

15. $-\sqrt{5}+3\sqrt{7}-\sqrt{5}-2\sqrt{5}$

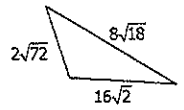
$-4\sqrt{5}+3\sqrt{7}$

16. $-3\sqrt{6}-5\sqrt{6}+4\sqrt{8}+4\sqrt{2}$

$-8\sqrt{6}+12\sqrt{2}$

Applications

17. Write the perimeter of the triangle as an expression in simplest radical form.



18. The length and width of a rectangle is represented by the expressions $2\sqrt{405}$ and $9\sqrt{48}$. Write an expression to represent the perimeter of the rectangle in simplest radical form.

More Notes on Simplifying Radicals Name Key

When there are variables in the radicand, it is assumed that they represent positive values.

Nevertheless, consider $\sqrt{x^{40}}$. What quantity, times itself, equals x^{40}? Remember you add exponents when multiplying.

Simplify.

1. $\sqrt{x^2}$ 2. $\sqrt{y^3z^4}$ 3. $\sqrt{3a^{22}}$

Notes on Multiplying Radicals

How to Multiply Radicals

1)Multiply the coefficients and the radicands separately (**do not cross the streams!!!**).
2)Simplify the radicand at the end.

For example, consider $3\sqrt{2} \bullet 4\sqrt{5}$.

Multiply "3 and 4", and multiply "2 and 5" to get $12\sqrt{10}$.

The radicand, 10, cannot be simplified any more, so $12\sqrt{10}$ is the final answer.

Simplify.

4. $9\sqrt{2} \bullet 5\sqrt{6}$ 5. $(4\sqrt{3})(-8\sqrt{15})(2\sqrt{2})$

Classwork on Simplifying and Multiplying Radicals

Simplify. Assume all variables represent positive numbers.

1. $\sqrt{64}$ 8
2. $\sqrt{4}$ 2
3. $\sqrt{169}$ 13
4. $\sqrt{256}$ 16

5. $\sqrt{24}$ $2\sqrt{6}$
6. $\sqrt{48}$ $4\sqrt{3}$
7. $\sqrt{32}$ 4
8. $5\sqrt{98}$ $= 35\sqrt{2}$

9. $-3\sqrt{3}$ $-3\sqrt{3}$ (already simplified!)
10. $10\sqrt{200}$ $100\sqrt{2}$
11. $\sqrt{y^2}$ y
12. $\sqrt{a^2b}$ $a\sqrt{b}$

13. $\sqrt{c^4d^5}$ $c^2d^2\sqrt{d}$
14. $\sqrt{k^{100}}$ k^{50}
15. $2\sqrt{4x^2y^7z^9}$ $4xy^3z^4\sqrt{yz}$
16. $r^2\sqrt{40r^4s^{12}}$ $2r^4s^6\sqrt{10}$

17. $\sqrt{3} \bullet \sqrt{6}$ $3\sqrt{2}$
18. $2\sqrt{12} \bullet \sqrt{2}$ $4\sqrt{6}$
19. $100\sqrt{5} \bullet -2\sqrt{6}$ $-200\sqrt{30}$

STOP (1/11/17)

20. $8 \bullet 3\sqrt{2}$
21. $(3\sqrt{6})(9\sqrt{2})(4\sqrt{10})$
22. $-\sqrt{11} \bullet -4\sqrt{121}$

23. $x\sqrt{3x} \bullet x\sqrt{5x}$
24. $\sqrt{x} \bullet \sqrt{y} \bullet \sqrt{z^2}$
25. $2\sqrt{3} \bullet 4\sqrt{5} \bullet 6\sqrt{7}$