(DN) ON BACK OF PACKET

Name _____**Per**_____
   LO: I can simplify radical expressions including
        adding, subtracting, multiplying, dividing and
        rationalizing denominators.

☐ (1)   **Simplifying Radicals: Finding hidden perfect squares and taking their root.**
calculator
Simplify each expression by factoring to find perfect squares and then taking their root.

1) $\sqrt{75}$ 2) $\sqrt{16}$

3) $\sqrt{36}$ 4) $\sqrt{64}$

5) $\sqrt{80}$ 6) $\sqrt{30}$

7) $\sqrt{8}$ 8) $\sqrt{18}$

9) $\sqrt{32}$ 10) $\sqrt{12}$

11) $\sqrt{8}$ 12) $\sqrt{108}$

13) $\sqrt{125}$ 14) $\sqrt{50}$

15) $\sqrt{175}$ 16) $\sqrt{28}$

17) $\sqrt{45}$ 18) $\sqrt{72}$

19) $\sqrt{20}$ 20) $\sqrt{150}$

(2) Simplifying Radical Expressions: Adding and Subtracting

calculator

Add or subtract radicals by simplifying each term and then combining like terms.

a. $2\sqrt{2} + \sqrt{5} - 6\sqrt{2} = -4\sqrt{2} + \sqrt{5}$ **Subtract like radicals.**

b. $4\sqrt{3} - \sqrt{27} = 4\sqrt{3} - \sqrt{9 \cdot 3}$ **Perfect square factor**

$= 4\sqrt{3} - \sqrt{9} \cdot \sqrt{3}$ **Use product property.**

$= 4\sqrt{3} - 3\sqrt{3}$ **Simplify.**

$= \sqrt{3}$ **Subtract like radicals.**

1) $3\sqrt{6} - 4\sqrt{6}$

2) $-3\sqrt{7} + 4\sqrt{7}$

3) $-11\sqrt{21} - 11\sqrt{21}$

4) $-9\sqrt{15} + 10\sqrt{15}$

5) $-10\sqrt{7} + 12\sqrt{7}$

6) $-3\sqrt{17} - 4\sqrt{17}$

7) $-10\sqrt{11} - 11\sqrt{11}$

8) $-2\sqrt{3} + 3\sqrt{27}$

9) $2\sqrt{6} - 2\sqrt{24}$

10) $2\sqrt{6} + 3\sqrt{54}$

11) $-\sqrt{12} + 3\sqrt{3}$

12) $3\sqrt{3} - \sqrt{27}$

13) $3\sqrt{8} + 3\sqrt{2}$

14) $-3\sqrt{6} + 3\sqrt{6}$

☐ (3) **Simplifying Radical Expressions: Multiplying**
calculator
  ☐ (a) Multiply numbers that are BOTH OUTSIDE the radical.
      Multiply numbers that are BOTH INSIDE the radical.
      Simplify the expression

$2 \cdot 5 =$ _____ $2 \cdot \sqrt{5} =$ _____ $\sqrt{2} \cdot 5 =$ _____

$2\sqrt{3} \cdot 5 =$ _____ $2\sqrt{3} \cdot \sqrt{5} =$ _____ $2\sqrt{3} \cdot 4\sqrt{5} =$ _____

1) $\sqrt{6} \cdot 4\sqrt{6}$ 2) $-\sqrt{5} \cdot \sqrt{20}$

3) $-\sqrt{2} \cdot \sqrt{3}$ 4) $4\sqrt{8} \cdot \sqrt{2}$

5) $\sqrt{12} \cdot \sqrt{15}$ 6) $\sqrt{5} \cdot -2\sqrt{5}$

7) $-3\sqrt{5} \cdot \sqrt{20}$ 8) $\sqrt{15} \cdot 3\sqrt{5}$

9) $\sqrt{9} \cdot \sqrt{3}$ 10) $-4\sqrt{8} \cdot \sqrt{10}$

☐ **(4)** **Simplifying Radical Expressions: Dividing and rationalizing the Denominator**
calculator

$$\frac{6}{3} = \underline{\hspace{1.5cm}} \qquad \frac{\sqrt{6}}{\sqrt{2}} = \underline{\hspace{1.5cm}} \qquad \frac{\sqrt{6}}{2} = \underline{\hspace{1.5cm}} \qquad \frac{12\sqrt{6}}{2} = \underline{\hspace{1.5cm}} \qquad \frac{12\sqrt{6}}{\sqrt{2}} = \underline{\hspace{1.5cm}}$$

Simplest form for fractions with $\sqrt{}$

1. No perfect square factor under $\sqrt{}$ ex. $\sqrt{75} = \sqrt{25}\sqrt{3} = 5\sqrt{3}$

2. No fractions under a $\sqrt{}$ ex. $\sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{\sqrt{4}} = \frac{\sqrt{3}}{2}$

3. No $\sqrt{}$ in a denominator   ex. $\frac{2}{\sqrt{3}} \bullet \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{\sqrt{9}} = \frac{2\sqrt{3}}{3}$

4. Must be reduced   ex. $\frac{8\sqrt{5}}{2} = 4\sqrt{5}$

11) $\dfrac{\sqrt{8}}{\sqrt{7}}$

12) $\dfrac{7}{8\sqrt{7}}$

13) $\dfrac{\sqrt{2}}{\sqrt{6}}$

14) $\dfrac{\sqrt{21}}{\sqrt{15}}$

15) $\dfrac{\sqrt{3}}{6\sqrt{7}}$

16) $\dfrac{\sqrt{5}}{\sqrt{3}}$

17) $\dfrac{\sqrt{15}}{3\sqrt{6}}$

18) $\dfrac{\sqrt{8}}{2\sqrt{7}}$

☐ (5) **Exit Ticket**

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☐ (6) **Homework**
calculator

Simplify each radical expression. ODD PROBLEMS REQUIRED

1. $\sqrt{5}\ \sqrt{15}$

2. $\sqrt{14}\ \sqrt{35}$

3. $\sqrt{2}\,(\sqrt{3}\ -\ \sqrt{5}\,)$

4. $\sqrt{3}\,(\sqrt{27}\ -\ \sqrt{3}\,)$

5. $\sqrt{2}\,(\sqrt{6}\ +\ \sqrt{10}\,)$

6. $\sqrt{7}\,(3\ -\ \sqrt{7}\,)$

7. $\sqrt{5}\,(3\sqrt{5}\ -\ 4\sqrt{3}\,)$

8. $\sqrt{y}\,(\sqrt{y}\ -\ \sqrt{5}\,)$

☐ (6)   **Homework**
calculator

☐ Simplify each radical expression. ODD PROBLEMS REQUIRED

21. $\sqrt{\dfrac{27}{16}}$

22. $\sqrt{\dfrac{14}{y^2}}$

23. $\sqrt{\dfrac{24}{25}}$

24. $\sqrt{\dfrac{7}{5}}$

25. $\sqrt{\dfrac{10}{7}}$

26. $\dfrac{2}{\sqrt{3}}$

27. $\dfrac{5}{\sqrt{10}}$

28. $\dfrac{6}{\sqrt{3}}$

29. $\dfrac{2}{\sqrt{6}}$

.

15) $-3\sqrt{20} - \sqrt{5}$

16) $2\sqrt{45} - 2\sqrt{5}$
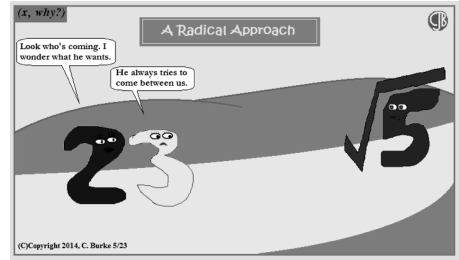
17) $3\sqrt{18} - 2\sqrt{2}$

18) $-3\sqrt{18} + 3\sqrt{8} - \sqrt{24}$

19) $3\sqrt{18} + 3\sqrt{12} + 2\sqrt{27}$

20) $-3\sqrt{5} - \sqrt{6} - \sqrt{5}$

Simplify each expression completely.

2. $\sqrt{14}\ \sqrt{35}$

4. $\sqrt{3}\ (\sqrt{27}\ -\ \sqrt{3}\ )$

24. $\sqrt{\dfrac{7}{5}}$

26. $\dfrac{2}{\sqrt{3}}$

16) $2\sqrt{45} - 2\sqrt{5}$

18) $-3\sqrt{18} + 3\sqrt{8} - \sqrt{24}$

A perfect square is a number whose square root is an integer. Half of the first 300 perfect squares are listed for you. Fill in the other 15 perfect squares.

$\sqrt{1} = 1$ because $1^2 = 1$ $\sqrt{256} = 16$ because $16^2 = 256$

$\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$ $\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$

$\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$ $\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$

$\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$ $\sqrt{361} = 19$ because $19^2 = 361$

$\sqrt{25} = 5$ because $5^2 = 25$ $\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$

$\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$ $\sqrt{441} = 21$ because $21^2 = 441$

$\sqrt{49} = 7$ because $7^2 = 49$ $\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$

$\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$ $\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$

$\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$ $\sqrt{576} = 24$ because $24^2 = 576$

$\sqrt{100} = 10$ because $10^2 = 100$ $\sqrt{625} = 25$ because $25^2 = 625$

$\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$ $\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$

$\sqrt{144} = 12$ because $12^2 = 144$ $\sqrt{729} = 27$ because $27^2 = 729$

$\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$ $\sqrt{784} = 28$ because $28^2 = 784$

$\sqrt{196} = 14$ because $14^2 = 196$ $\sqrt{\underline{}} = \underline{}$ because $\underline{}^2 = \underline{}$

$\sqrt{15} = 225$ because $15^2 = 225$ $\sqrt{900} = 30$ because $30^2 = 900$