Warmup (you need paper)

① Simplify

$$-3\sqrt{3} + \sqrt{12} - 7\sqrt{12}$$

$$-3\sqrt{3} + 2\sqrt{3} \quad -7 \cdot 2\sqrt{3}$$

$$-3\sqrt{3} + 2\sqrt{3} - 14\sqrt{3}$$

$$\boxed{-15\sqrt{3}}$$

② Perimeter 14√10

Side length = $2\sqrt{2}$
Find other side

$$2\sqrt{2} \mid \quad 14\sqrt{10} \quad \mid 2\sqrt{2}$$

$$14\sqrt{10} - 4\sqrt{2}$$

2 sides → $\dfrac{14\sqrt{10}}{2} - \dfrac{4\sqrt{2}}{2}$

$$\boxed{7\sqrt{10} - 2\sqrt{2}}$$

0.7A   Multiplying Radicals - Notes

1. **Multiply outside by outside and the answer goes outside.**
2. **Multiply inside by inside and the answer goes inside.**
3. **Then simply the inside if possible.**

1) $\sqrt{5} \cdot 4\sqrt{10}$

$4\sqrt{50}$

$5 \cdot 4\sqrt{2}$

$5 \quad 10$

$5 \quad 2$

$\boxed{20\sqrt{2}}$

2) $-4\sqrt{2} \cdot -5\sqrt{3}$

$20\sqrt{6}$ type in cale

$20\sqrt{6}$

things you circle go in front of $\sqrt{}$

3) $5\sqrt{3x} \cdot \sqrt{5x}$

$5\sqrt{15x^2}$ xx

$3 \quad 5$

$5x\sqrt{15}$

4) $5\sqrt{5n^2} \cdot 4\sqrt{4n}$

$20\sqrt{20n^3}$ nnn

$4 \quad 5$

$2 \quad 2$

$20 \cdot 2 \cdot n\sqrt{5n}$

$40n\sqrt{5n}$

5) $\sqrt{6a} \cdot -3\sqrt{6a^3}$

$-3\sqrt{36a^4}$ $aaaa$

$6 \quad 6$

$-3 \cdot 6 \cdot a \cdot a = -18a^2$

6) $\sqrt{3m^3} \cdot \sqrt{5m^2}$

$\sqrt{15m^5}$ $mm\,mm\,m$

$3 \quad 5$

$m \cdot m\sqrt{15m}$

$m^2\sqrt{15m}$

7) $2\sqrt{6}(\sqrt{2} + 3)$ *Distribute

$2\sqrt{6}(1\sqrt{2}) + 2\sqrt{6}(3)$

$2\sqrt{12} + 6\sqrt{6}$ type in calc

$6\sqrt{6} + 4\sqrt{3}$

8) $-\sqrt{10}(-\sqrt{10} + 3)$

$-\sqrt{10}(-\sqrt{10}) - \sqrt{10}(3)$

$1\sqrt{100} - 3\sqrt{10}$

$-3\sqrt{10} + 10$

OR

$10 - 3\sqrt{10}$

-1-

9) $2\sqrt{10}(\sqrt{2} + \sqrt{5})$

$2\sqrt{10}(\sqrt{2}) + 2\sqrt{10}(\sqrt{5})$

$2\sqrt{20} + 2\sqrt{50} = \boxed{4\sqrt{5} + 10\sqrt{2}}$

10) $\sqrt{5}(4 + \sqrt{10})$

$\sqrt{5}(4) + \sqrt{5}(\sqrt{10})$

$4\sqrt{5} + \sqrt{50} = \boxed{4\sqrt{5} + 5\sqrt{2}}$

11) $-2\sqrt{6r}(3\sqrt{3r} + \sqrt{5r})$

$-2\sqrt{6r}(3\sqrt{3r}) \quad -2\sqrt{6r}(\sqrt{5r})$

$-6\sqrt{18r^2} \quad -2\sqrt{30r^2} \quad (rr)$

12) $-\sqrt{15m}(\sqrt{5} + \sqrt{3})$
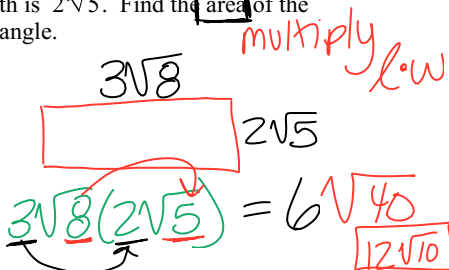
$-\sqrt{15m}(\sqrt{5}) - \sqrt{15m}(\sqrt{3})$

$-\sqrt{75m} - \sqrt{45m} = \boxed{-5\sqrt{3m} - 3\sqrt{5m}}$

$-6 \cdot 3 \cdot r\sqrt{2} \qquad -2 \cdot r\sqrt{30}$

$\underline{-18r\sqrt{2} \quad -2r\sqrt{30}}$

13) The length of a rectangle is $3\sqrt{8}$. The width is $2\sqrt{5}$. Find the area of the rectangle.

multiply $\ell \cdot w$

$3\sqrt{8}$ [rectangle] $2\sqrt{5}$

$3\sqrt{8}(2\sqrt{5}) = 6\sqrt{40}$

$\boxed{12\sqrt{10}}$

14) The length of a rectangle is $\sqrt{15}$. The width is $\sqrt{5}$. Find the area of the rectangle.

$\sqrt{15}$

$5\sqrt{3}$ [rectangle] $\sqrt{5}$ $\quad \sqrt{15}(\sqrt{5})$

$\sqrt{75}$

$3 \quad 25$

$5 \quad 5$

15) The length of a rectangle is $6\sqrt{12}$. The width is $\sqrt{6}$. Find the area of the rectangle.

$\ell \cdot w$

$6\sqrt{12}(\sqrt{6})$

$6\sqrt{12}$ [rectangle] $\sqrt{6}$

$6\sqrt{72} \rightarrow \boxed{36\sqrt{2}}$

16) The length of a rectangle is $5\sqrt{3}$. The width is $\sqrt{27}$. Find the area of the rectangle.

$5\sqrt{3}$ [rectangle] $\sqrt{27}$ $\qquad 45$

$5\sqrt{3}(\sqrt{27})$

$5\sqrt{81}$

$9 \cdot 9 \qquad 5(9)$

17) The length of a rectangle is $2x\sqrt{2}$. The width is $\sqrt{10}$. Find the area of the rectangle.

$2x\sqrt{2}(\sqrt{10})$

$2x\sqrt{20}$

$2x\sqrt{2}$ [rectangle] $\sqrt{10}$
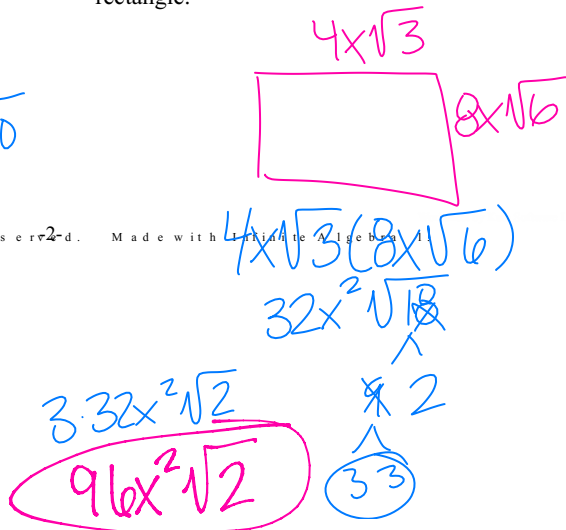
$4x\sqrt{5}$

$2 \cdot 2x\sqrt{5}$

$2 \quad 5$

18) The length of a rectangle is $4x\sqrt{3}$. The width is $8x\sqrt{6}$. Find the area of the rectangle.

$4x\sqrt{3}$ [rectangle] $8x\sqrt{6}$

$4x\sqrt{3}(8x\sqrt{6})$

$32x^2\sqrt{18}$

$3 \cdot 32x^2\sqrt{2} \qquad 9 \quad 2$

$\boxed{96x^2\sqrt{2}} \qquad 3 \quad 3$

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4) $5\sqrt{5n^2} \cdot 4\sqrt{4n}$

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5) $\sqrt{6a} \cdot -3\sqrt{6a^3}$

$-18a^2$

6) $\sqrt{3m^3} \cdot \sqrt{5m^2}$

$m^2\sqrt{15m}$

7) $2\sqrt{6}\left(\sqrt{2} + 3\right)$

$4\sqrt{3} + 6\sqrt{6}$

8) $-\sqrt{10}\left(-\sqrt{10} + 3\right)$

$10 - 3\sqrt{10}$

9) $2\sqrt{10}\left(\sqrt{2} + \sqrt{5}\right)$

$4\sqrt{5} + 10\sqrt{2}$

10) $\sqrt{5}\left(4 + \sqrt{10}\right)$

$4\sqrt{5} + 5\sqrt{2}$

11) $-2\sqrt{6r}\left(3\sqrt{3r} + \sqrt{5r}\right)$

$-18r\sqrt{2} - 2r\sqrt{30}$

12) $-\sqrt{15m}\left(\sqrt{5} + \sqrt{3}\right)$

$-5\sqrt{3m} - 3\sqrt{5m}$

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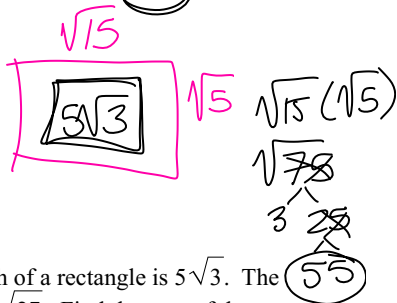
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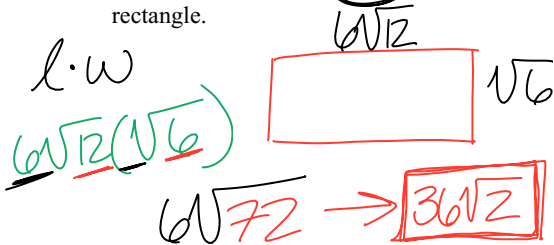
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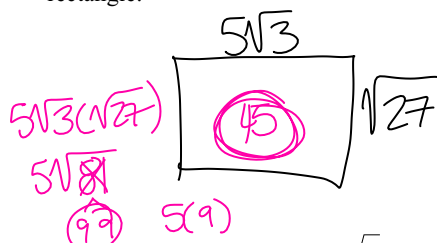
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18) The length of a rectangle is $4x\sqrt{3}$. The width is $8x\sqrt{6}$. Find the area of the rectangle.