

MAT 0024 Multiplying/Dividing Radical Expressions Classwork

Perform indicated operations and simplify: (some problems worked on page 2.)

1. $\sqrt{3}\sqrt{21}$

2. $\sqrt{22}\sqrt{66}$

3. $\sqrt{10}\sqrt{30}$

4. $4(\sqrt{2} - \sqrt{7})$

5. $\sqrt{5}(6 - \sqrt{5})$

6. $2\sqrt{3}(2\sqrt{3} - 4\sqrt{5})$

7. $\sqrt{7}(4\sqrt{7} - 2\sqrt{3})$

8. $\sqrt{3x}(\sqrt{6x} - \sqrt{12})$

9. $3\sqrt{2}(\sqrt{2} - 4) + \sqrt{2}(5 - \sqrt{2})$

10. $(\sqrt{6} - 3)(\sqrt{6} + 4)$

11. $(\sqrt{m} - \sqrt{5})^2$

12. $(5\sqrt{x} + 2)(2\sqrt{x} - 1)$

13. $(\sqrt{5} - x)(\sqrt{5} + x)$

14. $(5\sqrt{2} + 3)(\sqrt{2} - 3)$

15. $(3 + 2\sqrt{5})^2$

16. $\frac{5}{\sqrt{2}}$

17. $\frac{2}{\sqrt{7}}$

18. $\frac{4}{\sqrt{10}}$

19. $\frac{2}{\sqrt{6}}$

20. $\sqrt{\frac{2}{3}}$

21. $\sqrt{\frac{5}{7}}$

$$\begin{aligned} \textcircled{1} \quad \sqrt{3} \sqrt{21} &= \sqrt{3 \cdot 21} \\ &= \sqrt{3 \cdot 3 \cdot 7} \\ &= 3\sqrt{7} \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad \sqrt{22} \sqrt{66} &= \sqrt{22 \cdot 66} \\ &= \sqrt{11 \cdot 2 \cdot 11 \cdot 6} \\ &= \sqrt{11 \cdot 2 \cdot 11 \cdot 2 \cdot 3} \\ &= \sqrt{11 \cdot 11 \cdot 2 \cdot 2 \cdot 3} \\ &= 11 \cdot 2 \sqrt{3} \\ &= 22 \sqrt{3} \end{aligned}$$

Monomial \times Binomial: Distribute

$$\begin{aligned} \textcircled{4} \quad &4(\sqrt{2} - \sqrt{7}) \\ &4\sqrt{2} - 4\sqrt{7} \end{aligned}$$

$$\begin{aligned} \textcircled{7} \quad &\sqrt{7}(4\sqrt{7} - 2\sqrt{3}) \\ &4\sqrt{7}\sqrt{7} - 2\sqrt{3}\sqrt{7} \\ &4\sqrt{7 \cdot 7} - 2\sqrt{3 \cdot 7} \\ &4(7) - 2\sqrt{21} \\ &28 - 2\sqrt{21} \end{aligned}$$

Binomial \times Binomial: use FOIL

$$\begin{aligned} \textcircled{10} \quad &(\sqrt{6} - 3)(\sqrt{6} + 4) \\ &\sqrt{6}\sqrt{6} + 4\sqrt{6} - 3\sqrt{6} - 12 \\ &6 + \sqrt{6} - 12 \\ &-6 + \sqrt{6} \end{aligned}$$

$$\begin{aligned} \textcircled{15} \quad &(3 + 2\sqrt{5})^2 \\ &(3 + 2\sqrt{5})(3 + 2\sqrt{5}) \\ &3 \cdot 3 + 6\sqrt{5} + 6\sqrt{5} + 2\sqrt{5} \cdot 2\sqrt{5} \\ &9 + 12\sqrt{5} + 4\sqrt{5}\sqrt{5} \\ &9 + 12\sqrt{5} + 20 \\ &29 + 12\sqrt{5} \end{aligned}$$

Division Involving Radicals:

Do not leave a radical in the denominator.

$$\begin{aligned} \textcircled{16} \quad &\frac{5\sqrt{2}}{\sqrt{2}\sqrt{2}} \\ &\frac{5\sqrt{2}}{\sqrt{2 \cdot 2}} \\ &\frac{5\sqrt{2}}{2} \end{aligned}$$

$$\begin{aligned} \textcircled{17} \quad &\frac{2\sqrt{7}}{\sqrt{7}\sqrt{7}} \\ &\frac{2\sqrt{7}}{7} \end{aligned}$$

$$\begin{aligned} \textcircled{18} \quad &\frac{4\sqrt{10}}{\sqrt{10}\sqrt{10}} \\ &\frac{4\sqrt{10}}{10} \\ &\frac{2\sqrt{10}}{5} \end{aligned}$$

$$\begin{aligned} \textcircled{20} \quad &\sqrt{\frac{2}{3}} \\ &\frac{\sqrt{2}}{\sqrt{3}} \\ &\frac{\sqrt{2}\sqrt{3}}{\sqrt{3}\sqrt{3}} \\ &\frac{\sqrt{6}}{3} \end{aligned}$$