#1 $\sqrt{250}$

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

$5\sqrt{10}$

$2 \mid 250$

$5 \mid 125$

25

#2 $4\sqrt{27}$

$4\sqrt{3^2 \cdot 3}$

$12\sqrt{3}$

#3 $3\sqrt{50A^5B^6}$

$3\sqrt{5^2 \cdot 2\, A^2A^2A\, B^2B^2B^2}$

$15\,A^2\,|B^3|\,\sqrt{2A}$

#4 $7\sqrt{8D^7}$

$7\sqrt{2^2 \cdot 2\, D^2D^2D^2D}$

$14\,|D^3|\,\sqrt{2D}$

#5 $\sqrt{108x^2y^3z}$

$\sqrt{2^2 \cdot 3^2 \cdot 3\, x^2y^2yz}$

$6\,|xy|\,\sqrt{3yz}$

$2 \mid 108$

$2 \mid 54$

$3 \mid 27$

9

#6 $2\sqrt{12} + 5\sqrt{18} - 4\sqrt{8} - 2\sqrt{27}$

$2\sqrt{2^2 \cdot 3} + 5\sqrt{3^2 \cdot 2} - 4\sqrt{2^2 \cdot 2} - 2\sqrt{3^2 \cdot 3}$

$4\sqrt{3} + 15\sqrt{2} - 8\sqrt{2} - 6\sqrt{3}$

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

#7 $4\sqrt{75} + 5\sqrt{125} - 3\sqrt{48} - 2\sqrt{80}$

$4\sqrt{3 \cdot 5^2} + 5\sqrt{5 \cdot 5^2} - 3\sqrt{4^2 \cdot 3} - 2\sqrt{5 \cdot 4^2}$

$20\sqrt{3} + 25\sqrt{5} - 12\sqrt{3} - 8\sqrt{5}$

$8\sqrt{3} + 17\sqrt{5}$

#8 $9\sqrt{20} - 3\sqrt{24} - 5\sqrt{42} - 11\sqrt{72}$

$9\sqrt{2^2 \cdot 5} - 3\sqrt{2^2 \cdot 6} - 5\sqrt{2 \cdot 3 \cdot 7} - 11\sqrt{6^2 \cdot 2}$

$18\sqrt{5} - 6\sqrt{6} - 5\sqrt{42} - 66\sqrt{2}$

#9 $9\sqrt{8} + 7\sqrt{50} - 4\sqrt{45} - 2\sqrt{98}$

$9\sqrt{2^2 \cdot 2} + 7\sqrt{5^2 \cdot 2} - 4\sqrt{3^2 \cdot 5} - 2\sqrt{7^2 \cdot 2}$

$18\sqrt{2} + 35\sqrt{2} - 12\sqrt{5} - 14\sqrt{2}$

$39\sqrt{2} - 12\sqrt{5}$

#10 $2\sqrt{6}(3\sqrt{2}-4)$ (2 3)

$6\cdot 2\sqrt{3} - 8\sqrt{6}$

$12\sqrt{3} - 8\sqrt{6}$

#11 $\sqrt{5}(2\sqrt{15}-\sqrt{10})$ (3 5; 2 5)

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

$10\sqrt{3} - 5\sqrt{2}$

#12 $4\sqrt{10}(3\sqrt{8}-\sqrt{10})$ (2 5; 2·2)

$12\cdot 2\cdot 2\sqrt{5} - 4\cdot 10$

$48\sqrt{5} - 40$

#13 $(2\sqrt{3}-4\sqrt{5})(2\sqrt{3}+4\sqrt{5})$

$4\cdot 3 + 8\sqrt{15} - 8\sqrt{15} - 16\cdot 5$

$12 - 80$

-68

#14 $(5\sqrt{2}-3\sqrt{6})(5\sqrt{2}+3\sqrt{6})$

$25\cdot 2 + 15\cdot 2\sqrt{3} - 15\cdot 2\sqrt{3} - 9\cdot 6$

$50 \qquad -54$

-4

#15 $(\sqrt{8}-5\sqrt{6})(2\sqrt{2}+3\sqrt{4})$

$2\cdot 4 + 3\cdot 4\sqrt{2} - 10\cdot 2\sqrt{3} - 15\cdot 2\cdot\sqrt{6}$

$8 + 12\sqrt{2} - 20\sqrt{3} - 30\sqrt{6}$

#16 $(3\sqrt{12}-2\sqrt{5})(4\sqrt{6}-3\sqrt{10})$

$12\cdot 6\sqrt{2} - 9\cdot 2\sqrt{6\cdot 5} - 8\sqrt{30} + 6\cdot 5\sqrt{2}$

$72\sqrt{2} - 18\sqrt{30} - 8\sqrt{30} + 30\sqrt{2}$

$102\sqrt{2} - 26\sqrt{30}$

#17 $\frac{\sqrt{3}}{\sqrt{7}}\cdot\frac{\sqrt{7}}{\sqrt{7}} = \frac{\sqrt{21}}{7}$

#18 $\frac{2\sqrt{3}}{\sqrt{5}}\cdot\frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{15}}{5}$

#19 $\frac{\sqrt{3}}{\sqrt{7}}\cdot\frac{\sqrt{14}}{\sqrt{5}}$

$\frac{\sqrt{3}}{\sqrt{7}}\cdot\frac{\sqrt{7}\cdot 2}{\sqrt{5}} = \frac{\sqrt{6}}{\sqrt{5}}$

$\frac{\sqrt{6}}{\sqrt{5}}\cdot\frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{30}}{5}$

#20 $\frac{\sqrt{3x^3y^2}}{\sqrt{7xy^2}} = \frac{\sqrt{3x^2}}{\sqrt{7}} = \frac{\sqrt{3}|x|}{\sqrt{7}}$

$\frac{\sqrt{3x}}{\sqrt{7}}\cdot\frac{\sqrt{7}}{\sqrt{7}} = \frac{\sqrt{21x}}{7}$

#21 $\frac{2\sqrt{3}+\sqrt{5}}{\sqrt{6}}$

$\frac{\sqrt{6}}{\sqrt{6}}\cdot\frac{(2\sqrt{3}+\sqrt{5})}{\sqrt{6}} = \frac{2\cdot 3\sqrt{2} + \sqrt{30}}{6}$

$= \frac{6\sqrt{2} + \sqrt{30}}{6}$

#22 $\dfrac{5\sqrt{2} - 15\sqrt{5}}{20\sqrt{3}}$

* REDUCE EVERYWHERE AS FIRST STEP [FACTOR OF 5]

$$\frac{\sqrt{2} - 3\sqrt{5}}{4\sqrt{3}}$$

$$\frac{\sqrt{3}(\sqrt{2} - 3\sqrt{5})}{\sqrt{3}\ 4\sqrt{3}} = \frac{\sqrt{6} - 3\sqrt{15}}{4 \cdot 3} = \frac{\sqrt{6} - 3\sqrt{15}}{12}$$

#23 $\dfrac{3\sqrt{6} - 7\sqrt{2}}{2\sqrt{12}}$

* REDUCE WITH FACTOR OF $\sqrt{2}$

$$\frac{3\sqrt{3} - 7}{2\sqrt{6}}$$

$$\frac{\sqrt{6}(3\sqrt{3} - 7)}{\sqrt{6} \cdot 2\sqrt{6}} = \frac{3 \cdot 3 \cdot \sqrt{2} - 7\sqrt{6}}{2 \cdot 6} = \frac{9\sqrt{2} - 7\sqrt{6}}{12}$$

#24 $\dfrac{2}{4 + \sqrt{3}}$

CONJUGATE! WHEN TWO TERMS ARE IN THE DENOMINATOR, SUPPLY THE MISSING PART TO A DIFFERENCE OF SQUARE TO REMOVE RADICAL(S) FROM DENOMINATOR

$$\frac{2\ (4 - \sqrt{3})}{(4 + \sqrt{3})(4 - \sqrt{3})}$$

$$\frac{8 - 2\sqrt{3}}{16 - 3}$$

$$\boxed{\frac{8 - 2\sqrt{3}}{13}}$$

ALWAYS CHECK TO REDUCE!

#25 $\dfrac{3\sqrt{2}\ (5 + 3\sqrt{3})}{(5 - 3\sqrt{3})(5 + 3\sqrt{3})}$

$$\frac{15\sqrt{2} + 9\sqrt{6}}{25 - 9(3)}$$

$$\frac{15\sqrt{2} + 9\sqrt{6}}{-2}$$

#26 $\dfrac{4\sqrt{3}}{2-\sqrt{5}}$

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

$\dfrac{8\sqrt{3}+4\sqrt{15}}{4-5}$

$\dfrac{8\sqrt{3}+4\sqrt{15}}{-1} = -8\sqrt{3}-4\sqrt{15}$

#27 $\dfrac{3\sqrt{2}+5}{2-3\sqrt{2}}$

$\dfrac{(3\sqrt{2}+5)(2+3\sqrt{2})}{(2-3\sqrt{2})(2+3\sqrt{2})}$ F.O.I.L!

$\dfrac{6\sqrt{2}+9\cdot 2+10+15\sqrt{2}}{4-9\cdot 2}$

$\dfrac{21\sqrt{2}+28}{-14}$ REDUCE! [FACTOR OF 7]

$\dfrac{3\sqrt{2}+4}{-2}$

#28 $\dfrac{5\sqrt{3}+2}{4-\sqrt{6}}$

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

$\dfrac{20\sqrt{3}+5\cdot 3\sqrt{2}+8+2\sqrt{6}}{16-6}$

$\dfrac{20\sqrt{3}+15\sqrt{2}+8+2\sqrt{6}}{10}$ NO COMMON FACTOR AMONG ALL TERMS SO CAN NOT REDUCE!