

## Rationalizing the Denominator - Radicals (NOTES)

Simplify.

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

$$= \frac{\sqrt{20}}{\sqrt{25}} = \frac{\sqrt{4 \cdot 5}}{5}$$

$$= \boxed{\frac{2\sqrt{5}}{5}}$$

2)  $\frac{7\sqrt{5}}{\sqrt{15}} \cdot \frac{\sqrt{15}}{\sqrt{15}}$

$$= \frac{7\sqrt{75}}{\sqrt{225}} = \frac{7\sqrt{25 \cdot 3}}{15}$$

$$= \frac{7 \cdot 5\sqrt{3}}{15} = \frac{35\sqrt{3}}{15 \div 5}$$

$$= \boxed{\frac{7\sqrt{3}}{3}}$$

3)  $\frac{8\sqrt{36}}{5\sqrt{30}} \cdot \frac{\sqrt{30}}{\sqrt{30}}$

$$= \frac{8\sqrt{1080}}{5\sqrt{900}}$$

$$= \frac{8\sqrt{36 \cdot 30}}{5 \cdot 30}$$

$$= \frac{8 \cdot 6\sqrt{30}}{150}$$

$$= \frac{48\sqrt{30}}{150 \div 6}$$

$$= \boxed{\frac{8\sqrt{30}}{25}}$$

4)  $\frac{7\sqrt{3} - \sqrt{5}}{6\sqrt{20}} \cdot \frac{\sqrt{20}}{\sqrt{20}}$

$$= \frac{(7\sqrt{3} - \sqrt{5})\sqrt{20}}{6\sqrt{400}} = \frac{7\sqrt{60} - \sqrt{100}}{6\sqrt{400}}$$

$$= \frac{7\sqrt{4 \cdot 15} - 10}{6 \cdot 20}$$

$$= \frac{7 \cdot 2\sqrt{15} - 10}{120}$$

$$= \frac{14\sqrt{15} - 10 \div 2}{120 \div 2}$$

$$= \boxed{\frac{7\sqrt{15} - 5}{60}}$$



$$5) \frac{-8-9\sqrt{5}}{10\sqrt{14}} \cdot \frac{\sqrt{14}}{\sqrt{14}}$$

$$= \frac{-8\sqrt{14} - 9\sqrt{70}}{10\sqrt{196}}$$

$$= \frac{-8\sqrt{14} - 9\sqrt{70}}{10 \cdot 14}$$

$$= \boxed{\frac{-8\sqrt{14} - 9\sqrt{70}}{140}}$$

$$6) \frac{-2-\sqrt{7}}{6-\sqrt{5}} \cdot \frac{6+\sqrt{5}}{6+\sqrt{5}}$$

$$= \frac{(-2-\sqrt{7})(6+\sqrt{5})}{(6-\sqrt{5})(6+\sqrt{5})}$$

$$= \frac{-12 - 2\sqrt{5} - 6\sqrt{7} - \sqrt{35}}{36 + 6\sqrt{5} - 6\sqrt{5} - \sqrt{25}}$$

$$= \frac{-12 - 2\sqrt{5} - 6\sqrt{7} - \sqrt{35}}{36 - 5}$$

$$= \boxed{\frac{-12 - 2\sqrt{5} - 6\sqrt{7} - \sqrt{35}}{31}}$$

$$7) \frac{10\sqrt{6}-6}{-1+4\sqrt{7}} \cdot \frac{-1-4\sqrt{7}}{-1-4\sqrt{7}}$$

$$= \frac{(10\sqrt{6}-6)(-1-4\sqrt{7})}{(-1+4\sqrt{7})(-1-4\sqrt{7})}$$

$$= \frac{-10\sqrt{6} - 40\sqrt{42} + 6 + 24\sqrt{7}}{1 + 4\sqrt{7} - 4\sqrt{7} - 16 \cdot 7}$$

$$= \frac{-10\sqrt{6} - 40\sqrt{42} + 6 + 24\sqrt{7}}{1 - 112}$$

$$= \frac{-10\sqrt{6} - 40\sqrt{42} + 6 + 24\sqrt{7}}{1 - 112}$$

$$= \boxed{\frac{-10\sqrt{6} - 40\sqrt{42} + 6 + 24\sqrt{7}}{-111}}$$

$$8) \frac{-7+\sqrt{3}}{10-8\sqrt{7}} \cdot \frac{10+8\sqrt{7}}{10+8\sqrt{7}}$$

$$= \frac{(-7+\sqrt{3})(10+8\sqrt{7})}{(10-8\sqrt{7})(10+8\sqrt{7})}$$

$$= \frac{-70 - 56\sqrt{7} + 10\sqrt{3} + 8\sqrt{21}}{100 + 80\sqrt{7} - 80\sqrt{7} - 64 \cdot 49}$$

$$= \frac{-70 - 56\sqrt{7} + 10\sqrt{3} + 8\sqrt{21}}{100 - 64 \cdot 7}$$

$$= \frac{-70 - 56\sqrt{7} + 10\sqrt{3} + 8\sqrt{21}}{100 - 448}$$

$$= \boxed{\frac{-70 - 56\sqrt{7} + 10\sqrt{3} + 8\sqrt{21}}{-348}}$$