

①  $\sqrt{12}$   
 $= \sqrt{2 \cdot 2 \cdot 3}$   
 $= 2\sqrt{3}$

②  $\sqrt{72}$   
 $= \sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3}$   
 $= 2 \cdot 3 \sqrt{2}$   
 $= 6\sqrt{2}$

③  $\frac{4 - \sqrt{20}}{2}$   
 $= \frac{4 - \sqrt{2 \cdot 2 \cdot 5}}{2}$   
 $= \frac{4 - 2\sqrt{5}}{2}$   
 $= 2 - \sqrt{5}$

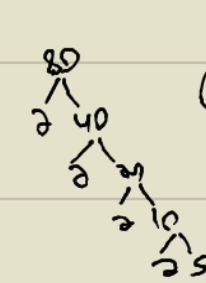
④  $\sqrt{y^{10}}$   
 $= \sqrt{y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y}$   
 $= y \cdot y \cdot y \cdot y \cdot y$   
 $= y^5$

④ SHORTCUT  
 SO. RMT INDEX IS 2  
 $10 \div 2 = 5$  r 0  
 POWER INDEX OUT IN  
 $y^5$

⑤  $\sqrt{75y^{13}}$   
 $= \sqrt{3 \cdot 5 \cdot 5 \cdot y^{13}}$   
 $= 5y^6 \sqrt{y}$   
 $= 5y^6 \sqrt{y^1}$

$13 \div 2 = 6$  r 1  
 OUT IN

⑥  $\sqrt{80n^21}$   
 $= \sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 5 \cdot n^{21}}$   
 $21 \div 2 = 10$  r 1  
 $2 \cdot 2 \cdot n^{10} \sqrt{5n}$   
 $= 4n^{10} \sqrt{5n}$



⑦  $\sqrt{72a^{10}b^7}$   
 $= \sqrt{2 \cdot 6 \cdot 6 \cdot a^{10}b^7}$   
 $= 6a^5b^3 \sqrt{2b}$

9's  
 $10 \div 2 = 5$  r 0  
 OUT IN  
 b's  
 $7 \div 2 = 3$  r 1  
 OUT IN

⑧  $\sqrt{\frac{4}{25}}$   
 SIMPLIFYING RADICALS  
 1. CANNOT HAVE A FRACTION INSIDE A RADICAL  
 $\sqrt{\frac{2}{5} \cdot \frac{2}{5}}$   
 $\frac{2}{5}$   
 2. CANNOT HAVE A RADICAL IN DENOMINATOR

⑨  $\sqrt{\frac{17}{16}}$   
 $= \frac{\sqrt{17}}{\sqrt{16}}$   
 $= \frac{\sqrt{17}}{\sqrt{4 \cdot 4}}$   
 $= \frac{\sqrt{17}}{4}$

⑩  $\sqrt{\frac{3}{x^2}}$   
 $= \frac{\sqrt{3}}{\sqrt{x^2}}$   
 $= \frac{\sqrt{3}}{x}$

⑪  $\sqrt{\frac{40a^5b^8}{c^4}}$   
 $= \frac{\sqrt{40a^5b^8}}{\sqrt{c^4}}$   
 $= \frac{\sqrt{2 \cdot 2 \cdot 5 \cdot a^5b^8}}{\sqrt{c^4}}$   
 $= \frac{2a^2b^4 \sqrt{5a}}{c^2}$

⑫  $\sqrt{\frac{100m^{21}}{9m^{10}}}$   
 $= \sqrt{\frac{100m^{11}}{9}}$   
 $= \frac{\sqrt{100m^{11}}}{\sqrt{9}}$   
 $= \frac{10 \cdot 10 \cdot m^{11}}{3 \cdot 3}$   
 $= \frac{10m^5 \sqrt{m}}{3}$