Simplify each radical. Show at least one intermediate step for each.

1 $\sqrt[10]{36^5}$

Since $36 = 6^2$,

$$\sqrt[10]{36^5} = \sqrt[10]{\left(6^2\right)^5} = \sqrt[10]{6^{10}} = |6| = 6.$$

2 $\sqrt{200a^2}$

Since $200 = 2 \cdot 10^2$,

$$\sqrt{200a^2} = \sqrt{2 \cdot 10^2 \cdot a^2} = \sqrt{2} \cdot \sqrt{10^2} \cdot \sqrt{a^2} = \sqrt{2} \cdot |10| \cdot |a| = 10\,|a|\sqrt{2}.$$

3 $\sqrt[3]{\dfrac{27p^3}{8}}$

Since $27 = 3^3$ and $8 = 2^3$,

$$\sqrt[3]{\frac{27p^3}{8}} = \sqrt[3]{\frac{3^3 \cdot p^3}{2^3}} = \frac{\sqrt[3]{3^3} \cdot \sqrt[3]{p^3}}{\sqrt[3]{2^3}} = \frac{3 \cdot p}{2} = \frac{3}{2}p.$$