

Name : _____ ID. # : _____ SER. # : _____

1. (a) Find the product and then simplify: $(\sqrt{2} + \sqrt[3]{2})(\sqrt{2} + \sqrt{\sqrt{2}})$ (3.5 pts)

(b) Rationalize the denominator and simplify: $\frac{15}{\sqrt{18}} - \frac{2}{\sqrt[3]{16}}$ (3 pts)

2. (a) Let $P(x)$ and $Q(x)$ be two polynomials of degree 5 and 3. What is the degree of $P(x) + Q(x)$ and $P(x) \cdot Q(x)$. (2 pts)

(b) Perform the indicated operations and simplify: $(x - 1 - 2y)^3$ (3 pts)

3. Factor as completely as possible:

(a) $3x^6 + 12x^3y^2 + 12y^4$

(3 pts)

(b) $x^3 + 6x^2 + 12x + 8 - y^3$

(3.5 pts)

Bonus: If $x < 3$, then simplify $\sqrt{x^2 - 6x + 9} + \sqrt[3]{x^3 - 9x^2 + 27x - 27}$

(2 pts)