

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)