From the previous module on exponents:

1. Simplify each expression, and write the result in terms of positive exponents and radicals:

In groups:

(a) $\sqrt{x^7}$

(b) $\sqrt[3]{x^7}$

(c) $\sqrt[3]{250a^2b^6c^{13}}$

(d) $\sqrt{\dfrac{x^9}{36}}$

(e) $4\sqrt[3]{\dfrac{p^3z^8}{8}}$

(f) $\sqrt{10} \cdot \sqrt{14}$

(g) $\sqrt[3]{x^2y} \cdot \sqrt[3]{xy^2}$

(h) $\left(3\sqrt[4]{x^3}\right)\left(-5\sqrt[4]{x^3}\right)$

(i) $\left(-\dfrac{1}{2}\sqrt[3]{6x^2y^2z}\right)\left(\dfrac{4}{3}\sqrt[3]{4x^2z^2}\right)$

(j) $\sqrt[5]{x\sqrt[3]{x^2}}$

Individually:

(a) $\sqrt[4]{x^7}$

(b) $\sqrt[8]{x^7}$

(c) $\sqrt{24}$

(d) $\sqrt[3]{24}$

(e) $\sqrt{54}$

(f) $\sqrt[3]{54}$

(g) $\sqrt[4]{40x^3y^9z^{14}}$

(h) $\sqrt[4]{243p^{19}q^{10}}$

(i) $\sqrt{84(a-2)^3}$

(j) $\sqrt{12(x+42)^5}$

(k) $\sqrt{\dfrac{a^{13}}{64}}$

(l) $8\sqrt[3]{\dfrac{x^6y^7}{64}}$

(m) $\sqrt{6} \cdot \sqrt{21}$

(n) $\sqrt[4]{p^3q} \cdot \sqrt[4]{pq^3}$

(o) $\left(7\sqrt[6]{a^5}\right)\left(-2\sqrt[6]{a^5}\right)$

(p) $\left(\dfrac{1}{6}\sqrt[3]{9p^2q^5r}\right)\left(-\dfrac{3}{4}\sqrt[3]{6p^2qz^4}\right)$

(q) $\sqrt[5]{x^6y^5} \cdot \sqrt[4]{x}$

(r) $\sqrt[4]{p^3q} \cdot \sqrt[3]{pq^2}$

(s) $\sqrt[6]{a\sqrt[4]{a^3}}$

(t) $\sqrt{x\sqrt{x\sqrt{x}}}$

(u) $\sqrt[3]{x\sqrt[3]{x\sqrt[3]{x}}}$

2. Add or subtract as indicated. Leave your answers as simplified as possible:

In groups:

(a) $3\sqrt[3]{2x^2} - 9\sqrt[3]{2x^2} + \sqrt[3]{2x^2}$

(b) $-3x\sqrt[3]{16xy^4} + xy\sqrt[3]{54xy} - 5\sqrt[3]{250x^4y^4}$

Individually:

(a) $\dfrac{1}{5}\sqrt{50} - \dfrac{7}{3}\sqrt{18} + \dfrac{5}{6}\sqrt{72}$

(b) $\dfrac{2}{5}\sqrt{75} - \dfrac{2}{3}\sqrt{27} - \dfrac{1}{2}\sqrt{12}$

(c) $8\sqrt[4]{32p^5q^6} - 5q\sqrt[4]{2p^5q^2} - pq\sqrt[4]{162pq^2}$

(d) $-\dfrac{1}{2}\sqrt{8x} + \dfrac{3}{7}\sqrt{98x}$

CHAPTER 2

FACTORING

1. Factor the Greatest Common Factor (GCF).

    Groups:

    (a) $10x^7 - 40x^6 + 15x^5$

    (b) $5a(b - 6c) + 7(b - 6c)$

    Individually:

    (c) $21x^3y^6 - 14x^4y^5 + 35x^5y^2$

    (d) $8p^3(4k + 9) + 4p^2(4k + 9)$

    (e) $36a^5b^8 + 18a^4b^6 - 27a^3b^7$

    (f) $-7q^3p^2 + 49p^4q^3$

    (g) $-8y^4 + 24y^3 - 16y^2$

2. Factor out the indicated common factor.
   Groups:

    (a) Factor out a -1 from $a - b$

(b) Factor out a -1 from $-5k^4 - 15c^3 + 20$

(c) Factor out a -5 from $-15a^2 - 10y + 25$

(d) Factor out a 3 from $-6y^2 + 12y + 9$

(e) Factor out $-7x^3y$ from $-14x^4y^3 + 21x^3y^2 - 7x^3y$

Individually:

(f) Factor out a -1 from $-3y - 2x$

(g) Factor out a -1 from $3y^2 - 5x^3 + 17$

(h) Factor out a 5 from $-15a^2 - 10y + 25$

(i) Factor out a -3 from $-6y^2 + 12y + 9$

(j) Factor out $-4a^2b$ from $-12a^3b^2 - 8a^4b^3 + 4a^2b$

3. Factor by grouping
   Groups:

   (a) $6xy + 9y + 14x + 21$

   (b) $12a^3 - 9a^2 - 40a + 30$

   Individually:

   (c) $8xy + 18x + 20y + 45$

   (d) $30p^3 - 35p^2 - 24p + 28$

   (e) $ab - 8b + 4a - 2b^2$

   (f) $7x - 6y^2 + xy - 42y$

4. Factor the following trinomials. You start by trying to factor any GCF, and then you may use any other method you know such as the AC method or Vietta, etc:
   Groups:

   (a) $x^2 + 2x - 63$

   (b) $2a^3 - 28a^2 + 80a$

   (c) $50y^3 + 160x^2y + 128xy^2$

   Individually:

   (d) $x^2 + 5w - 66$

   (e) $a^2 - 18a + 81$

   (f) $k^2 + 8k + 16$

   (g) $5p^4 - 40p^3 + 35p^2$

   (h) $25k + 6k^2 + 14$

   (i) $8 + 15n^2 + 26n$