M123-Intermediate Algebra
Review for sections 10.1, 10.3-10.8

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1. Simplify. (Section 10.1)
   a) $\frac{\sqrt{81}}{64}$
   b) $\frac{\sqrt{27x^6}}{64y^3}$
   c) $\sqrt{9x^2 - 24x + 16}$
   d) $\frac{\sqrt{113}}{(a + b)^{113}}$
   e) $\frac{\sqrt{8a^{48}b^{24}c^{16}}}{a^{b^c}}$

2. Simplify.
   $(yz)^{\frac{7}{5}}$

3. Rewrite in exponent form.
   a) $\frac{\sqrt[3]{15x}}{y^{\frac{3}{5}}}$
   b) $\frac{\sqrt[4]{5yz^3}}{y^{\frac{3}{5}}}$

4. Multiply and, if possible, simplify. (Section 10.3)
   a) $\frac{\sqrt[3]{4}}{\sqrt[3]{16}}$
   b) $\frac{\sqrt[3]{(x - 2)^4}}{\sqrt[3]{(x - 2)^6}}$

5. Simplify by factoring. (Section 10.3)
   a) $\sqrt[3]{63}$
   b) $\frac{\sqrt[4]{48a^{5}b^{7}}}{a^{b^c}}$
   c) $\sqrt[3]{m^{19}n^{20}}$
   d) $\frac{\sqrt[5]{54a^{3}b^{9}c^{10}}}{a^{b^c}}$
6. Perform the indicated operation and, if possible, simplify. Write all answers using radical notation. (Section 10.4)
   a) \[ \frac{\sqrt[3]{60xy^3}}{\sqrt[3]{10x}} \]
   b) \[ \frac{\sqrt[4]{75x}}{2\sqrt{3}} \]
   c) \[ \frac{4\sqrt[4]{48a^{11}}}{c^8} \]
   d) \[ \frac{3\sqrt[3]{64a^{11}b^{28}}}{2\sqrt[3]{2ab^{-2}}} \]
   e) \[ \frac{\sqrt[3]{27a^4}}{8b^3} \]
   f) \[ \frac{\sqrt[4]{405a^7b}}{\sqrt[3]{5a^2b^5}} \]

7. Rationalize each denominator. Assume all variables represent positive numbers. (Section 10.4 & 10.5)
   a) \[ \frac{6\sqrt[5]{5}}{5\sqrt[3]{3}} \]
   b) \[ \frac{\sqrt[3]{7a}}{\sqrt[3]{18}} \]
   c) \[ \frac{\sqrt[3]{2b}}{\sqrt[3]{3a^3}} \]
   d) \[ \frac{3\sqrt[3]{2}}{4 - \sqrt[3]{5}} \]
   e) \[ \frac{2}{3 + \sqrt[3]{5}} \]
   f) \[ \frac{\sqrt[3]{2} - \sqrt[3]{5}}{\sqrt[3]{7} + \sqrt[3]{3}} \]

8. Solve the equation. (Section 10.6)
   a) \[ 3 + \sqrt[3]{5 - x} = x \]
   b) \[ x^\frac{1}{4} - 21 = -18 \]
   c) \[ \sqrt[3]{3x + 5} + 4 = 6 \]

9. The shortest leg of a 30-60-90 right triangle is 7cm long. What are the length of the other two sides of the triangle? (Section 10.7)

10. A referee jogs diagonally from one corner of a 50-ft by 90-ft basketball court to the far corner. How far does the referee jog? (Section 10.7)

11. A skate-park jump has a ramp that is 6-ft long and is 2-ft high. How long is the base of the jump? (Section 10.7)

12. Express in terms of \( i \). (Section 10.8)
   a) \[ \sqrt{-75} \]
   b) \[ \sqrt{-48} \]

13. Add or Subtract. Put you answer in standard form. (Section 10.8)
   a) \[ (5 + 3i) + (-2 - 10i) \]
   b) \[ (-3 + 7i) - (12 - i) \]

14. Simplify each of the following. Write your answer in standard form. (Section 10.8)
   a) \[ (4 + 3i)(5 - i) \]
   b) \[ (2 - i)(6 - 2i) \]

15. Divide. Write your and in standard form. (Section 10.8)
   a) \[ \frac{5-3i}{2+7i} \]
   b) \[ \frac{1+i}{4-3i} \]