

Mth 28.5, Homework 10 on sections 8.3, 8.4, 8.5

Due by Wed, Nov 20.

Try these questions. Please use lots of space and as many pages as you want, so I can include corrections or comments. You do not need to write the questions, but it is very important that you show clearly any work you had to do to get your answers. Each question is worth 2 points.

Section 8.3 Simplify rational exponents

- (1) (a) Write $x^{1/4}$ as a radical.
(b) Write $(2y)^{1/3}$ as a radical.
- (2) (a) Write \sqrt{x} using a rational exponent.
(b) Write $\sqrt[5]{-3xy}$ using a rational exponent.
- (3) (a) Write $x^{2/3}$ as a radical expression in two different ways.
(b) Write $\sqrt{m^5}$ using a rational exponent.
(c) Write $(\sqrt[4]{21w})^7$ using a rational exponent.
- (4) Evaluate:
- (a) $64^{1/2}$
 - (b) $64^{2/3}$
 - (c) $(-64)^{2/3}$
 - (d) $-64^{2/3}$
 - (e) $64^{-1/6}$

(In part (d), remember that $-64^{2/3}$ means $-(64^{2/3})$. For part (e) use that $a^{-n} = \frac{1}{a^n}$.)

- (5) Assume all variables are positive and simplify these. Keep the rational exponents - no need to convert to radicals.
- (a) $x^{3/2} \cdot x^{1/4}$
 - (b) $(27x^{1/3})^{2/3}$
 - (c) $(16x^{-2/5}y^{3/5})^{5/2}$

(Use the properties of exponents, going step by step. For part (a) you should add the exponents.)

(6) Assume all variables are positive and simplify: $\left(\frac{625x^4y^{-1/3}}{y^2}\right)^{3/4}$

(One way to start is to first simplify the inside part $\frac{y^{-1/3}}{y^2}$. Then use the Quotient to a Power property: $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$ with $m = 3/4$...)

Section 8.4 Add, subtract, and multiply radical expressions

(7) Simplify:

(a) $2\sqrt{5} + 8\sqrt{5}$

(b) $4\sqrt{3} + \sqrt{6} - 10\sqrt{6}$

(8) Simplify: $\sqrt{12} + 4\sqrt{3} - \sqrt{75}$

(Simplify the radicals first by taking out perfect square factors. Then you can add and subtract.)

(9) Simplify:

(a) $(4\sqrt{3})(2\sqrt{7})$

(b) $3\sqrt{5}(7 - 2\sqrt{5})$

(10) Simplify:

(a) $(8 + \sqrt{3})(5 - 2\sqrt{3})$

(b) $(10 - 3\sqrt{6})^2$

(You should be FOILing for both of these. And remember that $\sqrt{m}\sqrt{m} = m$.)

Section 8.5 Divide radical expressions

(11) Simplify:

(a) $\frac{\sqrt{50}}{\sqrt{2}}$ (b) $\sqrt{\frac{3}{40}}$

(Remember, for a square root expression to be simplified there should be no perfect squares or fractions inside the square root, and no square roots in the denominator of a fraction.)

(12) Simplify:

(a) $\frac{\sqrt{18}}{\sqrt{x}}$ (b) $\frac{-4\sqrt{75t}}{5\sqrt{2}}$

(Use that $\sqrt{x}\sqrt{x} = x$.)

(13) Simplify:

(a) $\frac{\sqrt[3]{y}}{\sqrt[3]{4}}$ (b) $\frac{\sqrt[3]{-16}}{\sqrt[3]{25w}}$

(This time, for cube roots, $\sqrt[3]{x}\sqrt[3]{x}\sqrt[3]{x} = \sqrt[3]{x}\sqrt[3]{x^2} = x$. Did you get $-2\sqrt[3]{10w^2}/(5w)$ for part (b)?)

(14) Simplify:

(a) $\frac{6}{4 + \sqrt{10}}$ (b) $\frac{5\sqrt{2}}{3 - \sqrt{2}}$

(Hint: this needs the trick of multiplying top and bottom by the conjugate of the bottom. So for part (a) use $4 - \sqrt{10}$.)

(15) Simplify: $\frac{\sqrt{x} + \sqrt{13}}{\sqrt{x} - \sqrt{13}}$

If you get stuck on a question or aren't sure if you understand it:

- Go over the relevant class notes and section in the textbook.
- Check if you get the right answer for a similar odd-numbered question in the textbook (answers at the back of the book).
- Ask me about it after class.
- Come to my office hours: Mon 12:00 - 1:00, Wed 12:00 - 1:00 in CP 317.
- Go to the Math Tutorial Lab in-person in CP 303 or online.