

## Mth 28.5, Homework 9 on sections 7.4, 8.1, 8.2

Due by Wed, Nov 13.

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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.

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### Section 7.4 Solve Rational Equations

(1) Give an example of a rational expression and an example of a rational equation. What is the difference?

(2) Solve this rational equation using the following steps:  $\frac{2}{x} + \frac{1}{2} = \frac{7}{6}$

(a) Find the LCD of all the fractions on both sides. This is the smallest expression that has  $x$ , 2 and 6 as factors.

(b) Multiply everything on both sides by this LCD. This clears away all the fractions.

(c) Solve the linear equation you get in the usual way.

(d) For rational equations it is important to check your answer works in the original equation and you are not dividing by zero anywhere. Any numbers that lead to division by zero are not solutions.

(3) Solve:  $\frac{3}{x+4} + \frac{7}{x-4} = \frac{-4}{x^2-16}$

(Hint: use the same steps as the previous question.)

(4) Solve:  $\frac{15}{x^2+x-6} - \frac{3}{x-2} = \frac{2}{x+3}$

(Does the solution you found really work in the original equation?)

(5) Solve:  $\frac{y}{y+3} + 1 = \frac{-4}{y^2-9}$

(There are two solutions and one of them is  $5/2$ .)

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### Section 8.1 Simplify expressions with roots

(6) Evaluate these radicals (a)  $\sqrt{49}$  (b)  $-\sqrt{64}$  (c)  $\sqrt{289}$

(7) Find the two square roots of 121. They are  $\sqrt{121}$  and  $-\sqrt{121}$

(8) Fill in the blanks:

$-13$  is a square root of 169 because  $(\quad)^2 = (\quad)$

(9) Fill in the blanks:

3 is a fifth root of 243 because  $(\quad)^5 = (\quad)$  and we say  $\sqrt[5]{\quad} = (\quad)$

(10) Compute these radicals

- (a)  $\sqrt[3]{125}$
- (b)  $\sqrt[3]{-8}$
- (c)  $\sqrt{-64}$
- (d)  $\sqrt[7]{-1}$
- (e)  $-\sqrt[4]{10000}$

(The correct answer for some of these might be: "this radical is not a real number".)

(11) Can you explain this one without using a calculator? Simplify  $\sqrt[6]{19^6}$

(12) Estimate  $\sqrt{140}$  without a calculator by finding the two whole numbers it must be between. Which of these two numbers do you think it will be closest to?

(Hint: for example  $\sqrt{10}$  is between 3 and 4 because  $3^2 < 10 < 4^2$ , and it's closer to 3.)

(13) Estimate  $\sqrt[3]{300}$  without a calculator by finding the two whole numbers it must be between.

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### Section 8.2 Simplify radicals

(14) Evaluate these radicals (a)  $\sqrt[6]{64}$  (b)  $\sqrt[6]{-64}$  (c)  $-\sqrt{\frac{9}{49}}$  (d)  $\sqrt[3]{-\frac{1}{27}}$

(15) Simplify these radicals by separating perfect powers

- (a)  $\sqrt{18}$
- (b)  $\sqrt{700}$
- (c)  $\sqrt{147}$
- (d)  $\sqrt[3]{81}$

(Hint: write the answer to the first one like this,  $\sqrt{18} = \sqrt{9 \cdot 2} = \sqrt{9}\sqrt{2} = 3\sqrt{2}$ . Also  $7\sqrt{10}$  is not the answer to the second one!)

(16) Simplify these radicals by separating perfect powers

- (a)  $\sqrt{75}$
- (b)  $\sqrt[3]{-56}$
- (c)  $\sqrt[4]{160}$

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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.