

Mth 28.5, Homework 11 on sections 8.6, 8.8, 9.1, 9.2

Due by Mon, Dec 2.

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 8.6 Radical equations

(1) Solve: $\sqrt{3x - 2} = 5$

(The method to solve square root equations is to get the square root alone on one side and then square both sides.)

(2) Solve: $\sqrt{4x + 8} + 6 = 0$

(Make sure to check that the solution you find works in the original equation.)

(3) Solve: $\sqrt{2x - 6} + 3 = x$

(The method produces two solutions this time; make sure they are valid.)

(4) Solve: $\sqrt{12 - x} = 3\sqrt{x - 2}$

(5) Solve: $\sqrt{x} + 2 = \sqrt{2x + 4}$

(This one is a little harder. First, square both sides. There is still a \sqrt{x} term, so move it to be alone on one side and then square both sides again.)

Section 8.8 Complex numbers

(6) Say if these are true or false (don't go too fast!):

(a) $\sqrt{-1} = i$ (b) $i = -1$ (c) i is a real number (d) $i^2 = 1$

(7) Write using i and simplify:

(a) $\sqrt{-16}$ (b) $-2\sqrt{-18}$ (c) $\sqrt{-8}\sqrt{-50}$

(Use that $\sqrt{-x} = \sqrt{x}i$ whenever $x \geq 0$.)

(8) Simplify:

(a) $(3 + 4i) + (-4 + i)$

(b) $(3 + 4i) - (-4 + i)$

(c) $7 + 3i - 4i^2 - 11 + 2i$

(Hint: combine like terms and use that $i^2 = -1$.)

(9) Simplify:

(a) $(2 + i)(3 - 4i) - (4 - 2i)$

(b) $(4 + 7i)(4 - 7i)$

(Show that the answer to part (a) is $6 - 3i$. The answer to part (b) should be a real number.)

(10) Divide and write the answer in the standard form $a + bi$: $\frac{7 - i}{1 + 2i}$

(Hint: just like if we had for example $1 + 2\sqrt{3}$ on the bottom, multiply top and bottom by the conjugate of the bottom. That's $1 - 2i$ here.)

(11) Compute:

(a) i^3 (b) i^{16} (c) i^{266}

(The powers of i repeat since $i^4 = 1$. For large powers, divide by 4 and see what the remainder is.)

Sections 9.1, 9.2 Solving quadratic equations

(12) Solve using the square root property:

(a) $x^2 = 5$ (b) $-3x^2 = -21$

(13) Solve using the square root property:

(a) $\frac{1}{2}x^2 - 4 = 0$

(b) $y^2 + 63 = 0$

(Make sure any radicals in your answers are simplified. Any square roots of negative numbers should be written using i .)

(14) Solve: $3x^2 + 10 = 26$

(15) Solve: $(x - 4)^2 - 18 = 0$

(For this one, don't multiply out $(x - 4)^2$. Instead, move the 18 to the other side and then use the square root property.)

(16) Find the number to be added to each of these expressions to complete the square:

(a) $x^2 - 18x$ (b) $x^2 + x$

(Remember, to complete the square for $x^2 + bx$ you need $(b/2)^2$.)

(17) Fill in the blanks: $x^2 + 10x + (\quad) = (x + \quad)^2$

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.