

Review sheet for CMSC 250

Spring 2017

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1 Guidelines

In order to make this review sheet most useful to you, please follow the following guidelines:

1. **Isolate yourself from the Internet.** Shut down all phone/ tablet/laptop/PC notifications
2. **Time yourself!** An analogue or digital wrist watch, or an AA/AAA-battery powered alarm clock would be perfect for this, but you can also use a phone that has its notifications disabled. If you take **more than 10 minutes** to complete any one of exercises 2.1, 2.2, 2.3 or 2.4, you will likely benefit from a thorough review of the relevant parts of algebra and univariate calculus in order to have an easier time with 250, **even if that would mean delaying the course for a semester!** Our goal in UMD is to make you into awesome Computer Scientists, and that implies that we have to assume a basic background on highschool-level math.
3. When solving these exercises, use **pencil and paper** and your own sheet of paper. Afterwards, if you'd like some practice with \LaTeX and ELMS, feel free to edit the source file (which has a lot of comments!) with your responses, compile it to a PDF and upload the PDF on our platform.

Remember that this review sheet is *ungraded*: it is simply provided as a helpful resource to you in order to see if you have the necessary background for succeeding in 250, and give you some \LaTeX exposure.

2 Exercises

2.1 Fractions

Simplify the following expressions into a single, non-complex fraction.

i) $\frac{\alpha}{\beta} - \alpha, \beta \neq 0$

ii) $\frac{\alpha}{\beta} + \frac{\gamma}{\delta} - \frac{\epsilon}{\beta}, \beta, \delta \neq 0$

iii) $\frac{\rho}{\sigma} \cdot \frac{\epsilon}{\rho \cdot \sigma} + \frac{\delta}{\alpha} \cdot \frac{\alpha^2}{\delta^2}, \sigma, \rho, \alpha, \delta \neq 0$

iv) $\frac{\frac{\alpha}{\beta}}{\frac{\gamma}{\alpha \cdot \beta}}, \alpha, \beta, \gamma \neq 0$

2.2 Exponents

Simplify the following expressions into as few exponentiations (“powers”) as possible:

i) $\beta^\mu \cdot \beta^{\mu-\nu}$

ii) $\beta^\mu \cdot \beta^{\nu-\mu}$

iii) $\alpha^\gamma \cdot \beta^{-\gamma}, \beta \neq 0$

iv) $\frac{\sigma^{\rho-\mu}}{\frac{\sigma^{\rho-\kappa} \cdot \sigma^\kappa}{\sigma^{\mu-\tau} \cdot \sigma^\tau}}, \sigma \neq 0$

2.3 Functions

Match the function types on the left to the appropriate graph on the right.

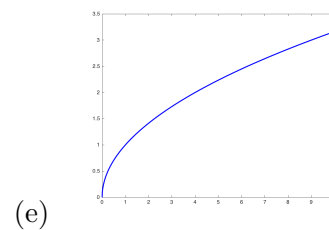
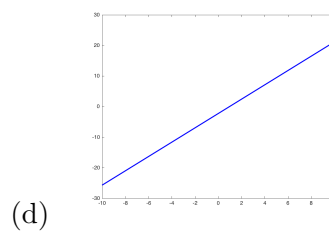
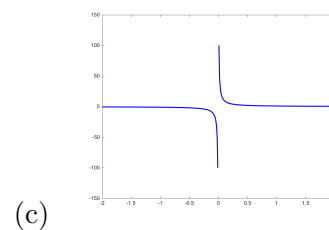
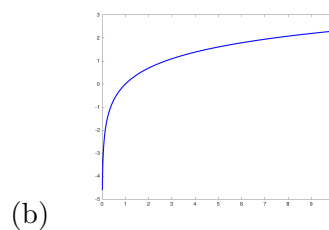
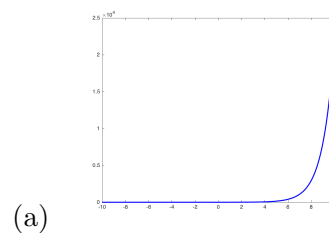
(i) $f(x) = \sqrt{x}$

(ii) $g(z) = e^z$

(iii) $r(t) = \frac{1}{t}$

(iv) $l(t) = \log t$

(v) $s(x) = 2.345x - \sqrt{5}$



2.4 Polynomials

Factor the following polynomials:

i) $x^2 - 9$

ii) $x^2 - 5x + 6$

iii) $x^2 + x - \frac{3}{4}$