

Problem Set 1 - PS & SOC Math Prefresher

Include all your work. You can do this by hand or type it up in R markdown. Your choice as long as it's readable.

1. Exponents and Logarithms

- (a) Multiply $x^4y^3z^2(1 + x^2y^2)$
- (b) Simplify $((xy)^{-6})^{0.5}y^3z^3$
- (c) Simplify $((xy)^2)^{1.5}x^{-3}y^{-3}$
- (d) Solve $\ln(e^5/e^{2.5})$
- (e) Simplify $e^{\ln 7.14}$
- (f) What is $\log_{7134\pi}(1)$?
- (g) Solve for x $\log_x(16) = 4$
- (h) Combine into one term: $\log(3x) + 2\log(y)$

2. Inequalities and Absolute Values

- (a) "Solve" for x: $x + y + 2 < 4$
- (b) "Solve" for x: $(-4)(x + 7) \geq -24$
- (c) What is the absolute value of -24 ?
- (d) Graph $y = |x + 2|$
- (e) On number line, graph $|x + 2| \geq 3$
- (f) On number line, graph $|x - 7| < 1$
- (g) On number line, graph $|2x - 2| = 4$

3. Factor

- (a) $x^2 + 5x + 4$
- (b) $6m^2 + 8m - 8$
- (c) $5y^2 - 12yz + 7z^2$

4. Functions

- (a) What is the difference between a function and relation (in words)?
- (b) Simplify $h(x) = g(f(x))$, where $f(x) = x^2 + 4$ and $g(x) = \sqrt{x - 4}$
- (c) Find the inverse function of $f(x) = 5x - 3$
- (d) What is a quadratic function? (define and provide example)
- (e) Why do we care if a function is monotonically doing anything?

5. Exponent(ials)

- (a) Explain the difference between, and provide an example of, the following. Be sure to use an example different from the slides:
 - i. Exponent:

- ii. Exponential:
- iii. Exponential Function:

6. Identification

- (a) Identify the following greek letters by name. Include the meaning and common usage if you are able.
 - i. δ
 - ii. β
 - iii. α
 - iv. θ
 - v. λ
 - vi. μ
 - vii. Δ
- (b) Identify the following mathematical symbols by name. Include the meaning/usage.
 - i. \in
 - ii. \cup
 - iii. \subset
 - iv. \wedge

7. Necessary and Sufficient

- (a) Provide an example of a necessary condition
- (b) What is the difference between necessary and sufficient?

8. Topics and Questions

- (a) What percent of the material was new to you today?
- (b) What is one new concept you learned today?
- (c) What question do you still have about the material?