Due: August 7, 2024

1. Solve the following equations:
   a) $4x + 7 = 12$
   b) $2x + 6 = 3x - 5$
   c) $14x - 10 = 6x - 8$
2. Solve the following inequalities:
   a) $2x + 5 < x - 4$
   b) $2x - 1 < 6x + 5$
   c) $|4 - 3x| < 2$
3. If $7x - 3 < 0$ and $7x > 0$, express these as a compound inequality and find its solution.
4. Expand the following summation expressions:
   a)
   $$\sum_{i=5}^{8} a_i x_i$$
   b)
   $$\sum_{i=1}^{n} a_i x^{i-1}$$
5. Rewrite the following in summation notation:
   a) $x_1(x_1 - 1) + 2x_2(x_2 - 1) + 3x_3(x_3 - 1)$
   b) $\frac{1}{x} + \frac{1}{x^2} + ... + \frac{1}{x^n}$ $(x \neq 0)$
6. Solve the following polynomial by factoring:
   a) $x^2 + x - 6 = 0$
   b) $x^3 + 2x^2 - 4x - 8 = 0$
   c) $x^2 - 9 = 0$
7. Find the zeros of the following functions by the quadratic formula (show work)
   a) $f(x) = x^2 - 7x + 10$
   b) $g(x) = 2x^2 - 4x - 16$
8. Find a cubic function with roots 4, -2, 3.
9. What are the values of the following logarithms?

a) $\log_{10} 0.0001$

b) $\log_5 3125$

10. Evaluate the following:

a) $\ln e^7$

b) $\ln \frac{1}{e^5}$

c) $\log_e e^{-4}$

11. Evaluate the following by application of the rules of logarithms:

a) $\ln Ae^2$

b) $\ln ABe^{-4}$

12. Suppose you are asked to rate the following beers in order of preference: Budweiser, Samuel Adams, Dos Equis, Harp, Bass, and Goose Island. How many possible orderings are there?

13. Suppose you are asked to pick your three favorite beers from the list above and rank three in order of preference. How many possible arrangements are there?

14. Suppose you are asked to identify your four favorite beers from the list above, but are not required to rank them in order of preference. How many four-beer combinations are possible?

15. Evaluate the following:

a) $10!$

b) ${}_{10}P_9$

c) ${}_{10}C_9$