

Please show **all** your work! Answers without supporting work will not be given credit.

Name: _____

1. Logistics

- TA: Yacoub Kureh (Pronounced: Yeah Coob)
- Discussion Times and Locations:
 - Tuesday 8am-8:50am PAB 2434
 - Thursday 8am-8:50am PAB 2434
 - Tuesday 9am-9:50am MS 6229
 - Thursday 9am-9:50am MS 5117
- www.math.ucla.edu/~ykureh/teaching.html (worksheets and other stuff will be posted here)
- Email: ykureh@math.ucla.edu
- Office Hours: MS 3957, Tuesday at 10a and Thursdays at 11a
- SMC: MS 3974 (I'll be there Thursdays at 10a)

2. Group Problems

- (a) You have one bucket of milk and one bucket of coffee (same size buckets). First you transfer one spoon of milk from the milk bucket into the coffee bucket. After thoroughly mixing, you transfer one spoon of the milky coffee mixture from the coffee bucket into the milk bucket. Is there more coffee in the milk bucket or more milk in the coffee bucket?
- (b) You and your twin decide to host a twins only party (no triplets allowed!). You invite ten pairs of twins, so in total there are 22 people at your party (you, your twin, and your guests). At the party, some hand shaking takes place. Of course no one shakes his or her own hand and no one shakes the hand of his or her twin. At the end of the party you decide to ask the 21 other people in the room how many hands they shook. No two people answered with the same number. How many hands did you shake?

3. Curve Sketching

Review:

- Vertical Asymptotes/Holes (For rational functions, set denominator to zero, solve for all x)
- Horizontal Asymptotes (Find limit of $f(x)$ as $x \rightarrow \pm\infty$)
- Slant Asymptote (Find limit of $\frac{f(x)}{x}$ as $x \rightarrow \pm\infty$)
- Vertical Intercept (Set x to 0)
- Horizontal Intercepts (Set $f(x)$ to 0, solve for all x)
- Increase/Decrease (First derivative is positive/negative)
- Critical Point (First derivative is zero or undefined)
- Concave up/down (Second derivative is positive or negative)

Sketch the following functions. Label all asymptotes and intercepts. Label all the intervals where the function is increasing. Label all intervals where the function is concave up.

(a) $f(x) = \frac{2x + 6}{x - 4}$

(b) $g(x) = x + \frac{1}{x^2 - 2}$