MATH 243: DAY 1 ACTIVITY

Please answer the following and submit your responses to me electronically by the end of today's class time.

1. Info about you

(1) What is the name under which you are registered for this class? If it is not the same, by what name do you want me to refer to you? Is there any other info about how I should refer to you (preferred pronouns, etc.)?
(2) What is your major and class standing?
(3) Why are you taking this class? What do you hope to get out of it?
(4) What is one advantage of online instruction for you?
(5) What is one hurdle of online instruction for you? What steps will you take to overcome this hurdle?

2. Class info

(1) Which of the following possible times for office hours work for you?
- Tuesday/Thursday 9:00–10:00
- Tuesday/Thursday 2:00–3:00
- Tuesday/Thursday 3:00–4:00

(2) Do you have any preference on which classmates you want in your group for group work/zoom breakout rooms?
(3) Are there any accessibility accomodations you require to ensure equal access to this class?

3. Diagnostic quiz

This class builds on knowledge you learned in previous math classes. To help me determine whether and to what extent there are subjects we should review, please complete the following diagnostic quiz. **Do not solve the problems.** Instead, carefully read each question and determine where it fits on the following scale.

a. I know how to solve this problem and could do so right now.
b. I know the general process to solve this problem, but there are details I do not remember. I could solve this problem after taking a few minutes to refresh my memory/check a formula in the textbook/etc.
c. I don't know how to solve this problem, but I am familiar with the involved concepts/notation.
d. I don't know how to solve this problem, and I am not familiar with the involved concepts/notation.

(1) Calculate
$$\frac{\mathrm{d}}{\mathrm{d}x}(a^2x - ax^2).$$
(2) Let $y = x^2$. Calculate
$$\frac{|y''|}{(1+(y')^2)^{3/2}}.$$
(3) Let $y = x^3$ and $x = e^t$. Calculate $\frac{\mathrm{d}y}{\mathrm{d}t}$.
(4) Suppose $x(t) = \cos t$ and $y(t) = \sin t$. Calculate $\frac{y'(t)}{x'(t)}$ and determine its domain.
(5) Simplify the expression $\sqrt{(3-1)^2 + (7-2)^2 + (-3-3)^2}$.
(6) Find the limit
$$\lim_{t\to 0} \frac{e^{2t}}{2\sin t}.$$
(7) Calculate the indefinite integral
$$\int xe^{x^2}\,\mathrm{d}x.$$

(8) Calculate the indefinite integral

$$\int 2x \sin x \, \mathrm{d}x.$$

(9) Calculate the definite integral

$$\int_0^1 \sqrt{1+4x^2} \, \mathrm{d}x.$$

(10) Calculate the definite integral

$$\int_{-\pi/4}^{\pi/4} \cos^2(2\theta) \, \mathrm{d}\theta.$$

(11) Consider the hyperbola given by the equation $\frac{x^2}{9} - \frac{y^2}{25} = 1$. Sketch a graph of the hyperbola and identify its foci and asymptotes.

(12) Consider the two vectors $\vec{v} = \langle 2, 5, -3 \rangle$ and $\vec{w} = \langle -1, 4, 5 \rangle$. Calculate $\vec{v} + \vec{w}$, $\vec{v} \cdot \vec{w}$ and $\vec{v} \times \vec{w}$.