Name:	
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Math 34A Midterm 1, Summer 2022

1. (*2pts*) Solve the system of equations below for x and y. Your answers should be in terms of a and b.

$$\begin{aligned} 2x + 3y &= a \\ x + y &= b \end{aligned}$$

$x =$ $y =$

2. (*2pts*) Multiply out and simplify. Your answer should have no negative exponents in it.

$$\left(\frac{a^{-1}b}{xy}\right)^{-2} \cdot \frac{a^{-1}b}{\sqrt[4]{b^{-4}x^4y^{-8}}}$$

3. (*2pts*) Substitute $x = a + b$ into the expression below and simplify completely. There should be no parentheses in your answer.

$$x(a^4 - a^3b + a^2b^2 - ab^3 + b^4)(x - 2b)$$

4. (*4pts*) Your classmate Eve has been studying for the 34A midterm so hard that they forgot to eat dinner. You want to make them a pizza as quickly as possible, and you set the oven to preheat to 450°. You notice that at exactly 8:13PM, the oven's temperature is 90°. You check back at exactly 8:17PM and the oven's temperature is now 330°. Using linear extrapolation, at what time do you estimate will the oven will be preheated to 450°?

5. (*4pts*) A city planner wants to build a park with a playground surrounded by a field, and to keep the kids safe she wants to build a fence around it. The field is to be four times as wide as it is long. Fencing purchases are \$350 for shipping plus \$33 per foot of fencing. Express the cost of fencing for the perimeter in terms of the length of the field. Simplify your answer.

Fencing Cost = \$ [ ]

6. (*5 points*) You are considering the purchase of a 55in TV (TV sizes are measured by the diagonal, not the length or width). You know that the aspect ratio of a screen is the ratio of the width to the height. However, the manufacturer will only disclose the height of the TV, not the width. Express the **aspect ratio** in terms of the height h of the TV.

Aspect Ratio =

7. (*3 points*) What are the following limits?

   (a) $\lim_{x \to 6} 10x - 5$

   (b) $\lim_{x \to \infty} \frac{14x+4}{16x+3}$

   (c) $\lim_{x \to \infty} \frac{10x^2+x}{-7x}$

8. (*3 points*) Compute the logarithms below.

   (a) $\log_2(8)$

   (b) $\log_{10}(.01)$

   (c) $\log_5(125)$