

Name:

Perm:

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  $b$ .

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

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

$$x = \boxed{\phantom{000}}$$

$$y = \boxed{\phantom{000}}$$

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

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

Sorry. I tried...

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

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

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

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°?

$$90 = k(13)$$

$$\begin{array}{r} 69.23 \\ 13 \overline{) 90} \\ -70 \\ \hline 120 \\ -117 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 13 \\ \times 5 \\ \hline 65 \\ +15 \\ \hline 78 \end{array}$$

8:17

$$y = Kx$$

$y = \text{Degree/Temp}$

$K = \text{constant/srate}$

$x = \text{time}$

$$90 = k(8:13)$$

$$330 = k(8:17)$$

$$330 = k(8:17)$$

$$90 = k(8:14)$$

$$\begin{array}{r} 42 \\ 11 \overline{) 330} \\ -33 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 3 \\ 69.2 \\ 4 \\ \times 13 \\ \hline 246.0 \end{array}$$

$$\begin{array}{r} 12.2 \\ 8 \overline{) 90} \\ -8 \\ \hline 10 \\ -8 \\ \hline 2 \end{array}$$

$$90^\circ$$

$$90 = k(13)$$

(ans)

?

$$\begin{array}{r} 90 \\ \times 3 \\ \hline 270 \\ +60 \\ \hline 330 \end{array}$$

242  
330  
- 90  

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230



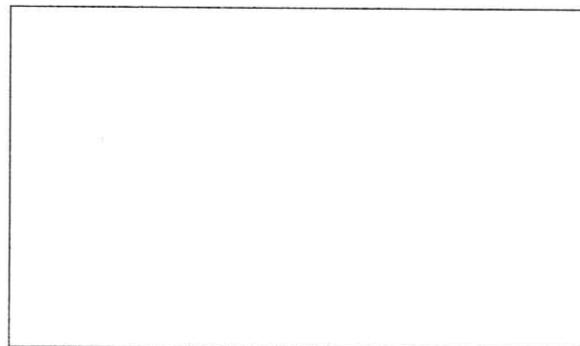
5. (4pts) A city planner wants to build a park with a playground surrounded by a field, and to keep the kids safe she wants to build a fence around it. The field is to be four times as wide as it is long. Fencing purchases are \$350 for shipping plus \$33 per foot of fencing. Express the cost of fencing 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)  $\lim_{x \rightarrow 6} 10x - 5$

$60 - 5 = 55$

55

$\begin{array}{r} 16 \\ \times 8 \\ \hline 128 \end{array}$

(b)  $\lim_{x \rightarrow \infty} \frac{14x+4}{16x+8}$

$\frac{14}{16} = \frac{7}{8}$

$\begin{array}{r} 16 ) 140 \\ -128 \\ \hline 120 \end{array}$

(c)  $\lim_{x \rightarrow \infty} \frac{10x^2+4}{-7x}$

$\frac{100000}{-7000} = -\frac{10000}{700} = -\frac{1000}{70} = -\frac{100}{7} = -\frac{10}{7}$

$\frac{1}{8}$

$\frac{10}{7}$

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8)$

$2 \cdot 2 \cdot 2$   
 $1 \cdot 2$

3

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

$\log \sqrt{10}$

-1

(c)  $\log_5(125)$

$5 \cdot 5 \cdot 5$   
23

3

Name: Katherine Meade

Perm: 816574-8

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  $b$ .

$$2x + 3y = a \quad b = x + y$$

$$x = b - y$$

$$y = b - x$$

$$2x + 3y = a$$

$$x + y = b$$

$$a = 2x + 3y$$

$$2(b-y) + 3(b-x) = a$$

$$2b - 2y + 3b - 3x = a$$

$$5b - 2y - 3x = a$$

⑩

$$\frac{x + a - 11b}{-6} = b$$

$$\frac{+a - 11b}{6}$$

$$5(x+y) - 2y - 3(b-x)$$

$$5x + 5y - 2y - 3b + 3x = a$$

$$5(b-y) + 5y - 2y - 3b + 3(b-y) = a$$

$$5b - 5y + 5y - 2y - 3b + 3b - 3y = a$$

$$\frac{-6y + 11b}{-6} = a - 11b$$

$$x = \boxed{\frac{6b + a - 11b}{6}}$$

$$x = \frac{6b + a - 11b}{6}$$

$$\frac{-5b + a}{6}$$

$$y = \boxed{\frac{-a + 6b}{-6}}$$

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

$$\left(\frac{a^{-1}b}{xy}\right)^{-2}$$

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

$$\left(\frac{b}{(axy)^2}\right)^{-2}$$

$$\frac{a^2x^2y^2}{b^2} \cdot \frac{b}{a^4\sqrt[4]{\frac{1}{b^4}x^4\frac{1}{y^8}}}$$

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

$$\frac{1}{b} \times \frac{1}{y^2}$$

$$\frac{a^2x^2y^2}{b^2} \cdot \frac{y}{a^4\sqrt[4]{\frac{1}{b^4}x^4\frac{1}{y^8}}} = \frac{xy^2}{y}$$

$$\frac{xy^2}{y} \cdot \frac{xy^2}{x} = xy^4$$

$$\frac{1}{b^2} \times \frac{1}{y^6}$$

$$xy^4$$

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

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

$$\begin{aligned}
 & (a+b)(a^4 - a^3b + a^2b^2 - ab^3 + b^4)(a+b - 2b) \\
 & (a+b)(a^5 - a^4 + a^3b^2 - a^2b^3 + ab^4 + ba^4 - b^2a^3 + a^2b^3 - ab^4 + b^5) \\
 & (a^6 - a^5a^2b^2 - a^3b^3 + a^2b^4 + ba^5 - b^2a^4 + a^3b^3 - a^2b^4 + ab^5) - b \\
 & - ba^6 + ba^5 - a^4b^3 + a^3b^4 - a^2b^5 - b^2a^5 + b^3a^4 - a^3b^4 - a^2b^5 - ab^6 \\
 & (-a^5 + a^4 - a^3b^2 + a^2b^3 - ab^4 - a^4b + a^3b^2 - a^2b^3 - ab^4 - ab^6) \\
 & (a+b)(a-b) \\
 & (a^2 - b^2)(a^4 - a^3b + a^2b^2 - ab^3 + b^4) \\
 & a^6 - a^5b + a^4b^2 - a^3b^3 + a^2b^4 - ab^5 - b^6 \\
 & a^4 - a^5b + a^4b^2 - a^2b^4 + ab^5 - b^6
 \end{aligned}$$

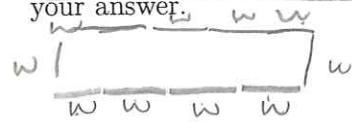
$$a^6 - a^5b + a^4b^2 - a^2b^4 + ab^5 - b^6$$

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  $450^\circ$ . You notice that at exactly 8:13PM, the oven's temperature is  $90^\circ$ . You check back at exactly 8:17PM and the oven's temperature is now  $330^\circ$ . Using linear extrapolation, at what time do you estimate will the oven will be preheated to  $450^\circ$ ?

$$\begin{array}{l} \text{Data points: } (0, 90), (4, 330) \\ \text{Slope: } \frac{330 - 90}{4 - 0} = \frac{240}{4} = 60 \\ \text{Equation: } y = 60x + b \\ 90 = 60(0) + b \\ b = 90 \\ \text{Equation: } y = 60x + 90 \\ 450 = 60x + 90 \\ 450 - 90 = 60x \\ 360 = 60x \\ \frac{360}{60} = x \\ x = 6 \\ \text{Time: } 8:13 + 6 \text{ minutes} \\ \boxed{8:19} \end{array}$$

8:19 PM

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.



$$w = 4l$$

$$A = wl$$

$$\text{price} = 350 + 33(\text{Perimeter})$$

$$w = 4l$$

$$P = 4w + 4w + lw + lw$$

$$8w + 2w$$

$$\frac{w = 4l}{4}$$

$$P = 10w$$

$$P = 10\left(\frac{w}{4}\right)$$

$$\text{price} = 350 + 33\left(\frac{10w}{4}\right)$$

$$\frac{10w}{4} = P$$

$$\frac{5w}{2} = P$$

$$350 + 33\left(\frac{5w}{2}\right)$$

$$\frac{330w}{4}$$

$$\begin{array}{r} 165 \\ 2 \sqrt{330} \\ \underline{-2} \\ 13 \\ \underline{-12} \\ 10 \end{array}$$

$$10(4l)$$

$$350 + 33(40l)$$

$$40l = P$$

$$350 + 1320l$$

$$\begin{array}{r} 33 \\ .40 \\ \hline 1320 \end{array}$$

Fencing Cost = \$

$$350 + 1320l$$

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.



$$w:h$$
$$\sqrt{w^2 + h^2}$$

$$55^2 = w^2 + h^2$$

$$\sqrt{55^2 - h^2} = w$$

$$\sqrt{55^2 - h^2} : h$$

$$\sqrt{55^2 - h^2} : h$$

Aspect Ratio =

$$\sqrt{55^2 - h^2} : h$$

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

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

$$\begin{aligned}10(6) - 5 \\60 - 5 \\55\end{aligned}$$

55

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

$$\frac{14(1000)}{16(1000)} \rightarrow \frac{14}{16} \rightarrow \frac{7}{8}$$

$\frac{7}{8}$

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

$$\frac{x(10x+1)}{-7x} \rightarrow \frac{10}{-7}$$

$\frac{10}{-7}$

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8)$

$2^x = 8$

$3 = x$

3

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

$$10^x = \frac{1}{100}$$

$$\frac{1}{10}$$

$$10^{\frac{1}{100}}$$

$$10^x = \frac{1}{100}$$

-2

$$\log_{10} \frac{1}{100}$$

$$\begin{array}{r} 100 \\ \overline{)10.0} \\ 100 \\ \hline 0.0 \end{array}$$

-2

-2

(c)  $\log_5(125)$

$5^x = 125$

$5^x = 5^3$

$$\frac{3}{5}$$

3

3

Name:

Tonglin Wu

Perm:

5668660

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  $b$ .

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

$$x = b - y$$

$$2(b - y) + 3y = a$$

$$2b - 2y + 3y = a$$

$$y = a - 2b$$

$$x = b - (a - 2b) = b - a + 2b = 3b - a.$$

$$x = \boxed{3b - a}$$

$$y = \boxed{a - 2b}$$

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

$$\begin{aligned} &\frac{a^4 b^{-2}}{x^2 y^{-2}} \cdot \frac{a^{-1} b}{(b^{-4} x^4 y^{-8})^{\frac{1}{4}}} \\ &\frac{a^4 b^{-2} b^{-1}}{x^2 y^{-2}} \cdot \frac{a^{-1} b}{x^4 y^{-2}} \\ &= \frac{\overbrace{a^4}^{a} \cdot \cancel{x^2}^1 \cdot \cancel{y^{-2}}^1}{\cancel{x^2}^1 \cdot \cancel{y^{-2}}^1} \cdot a^{-1} b \cdot \frac{1}{x^4} \cdot \frac{1}{\cancel{y^{-8}}^4} \\ &= a^3 \cdot x^{-1} \cdot y^4 \end{aligned}$$

$$\begin{aligned} &\textcircled{1} \quad \left( \frac{a^{-1} b}{xy} \right)^{-2} \cdot \frac{a^{-1} b}{\sqrt[4]{b^{-4} x^4 y^{-8}}} \quad 1/b^{-1} \\ &= \left( \frac{b}{a \cdot xy} \right)^{-2} \cdot \frac{a^{-1} b}{(b^{-4} x^4 y^{-8})^{\frac{1}{4}}} \quad 1 \div \frac{1}{b} \\ &= \left( \frac{b}{axy} \right)^{-2} \cdot \frac{a^{-1} b}{b^{-1} xy^{-2}} \\ &= \left( \frac{axy}{b} \right)^2 \cdot \frac{b}{a} \cdot \frac{1}{b^{-1} xy^{-2}} \\ &= \frac{a^2 x^2 y^2}{b} \cdot \frac{b}{a} \cdot \frac{b y^2}{x} \\ &= \frac{a x^2 y^2}{b} \cdot \frac{b y^2}{x} \\ &= a x y^4 \end{aligned}$$

$$\boxed{axy^4}$$

$$\frac{(a^2-b^2)^2(a^2-b^2)}{a^4+b^4}$$

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

$$\begin{aligned}
 & x(a^4 - a^3b + a^2b^2 - ab^3 + b^4)(x - 2b) \\
 &= (a+b)(a^4 - a^3b + a^2b^2 - ab^3 + b^4)(a+b-2b) \\
 &= (a+b)(a-b)(a^4 - a^3b + a^2b^2 - ab^3 + b^4) \\
 &= (a^2-b^2)(a^4 - a^3b + a^2b^2 - ab^3 + b^4) \\
 &= a^6 - a^5b + a^4b^2 - a^3b^3 + a^2b^4 + a^3b^3 - a^2b^4 + ab^5 - b^6 \\
 &= a^6 - a^5b + ab^5 - b^6 \\
 &\quad (a^2-b^2)(a^2-b^2)(a^2+b^2) = a^4 + a^2b^2 - a^2b^2 + b^4 \\
 &\quad (a^2-b^2) = a^4 - a^2b^2 - a^2b^2 + b^4 \\
 &(a+b)(a^4 - a^3b + a^2b^2 - ab^3 + b^4)(a-b) \\
 &= 
 \end{aligned}$$

$$a^6 - a^5b + ab^5 - b^6$$

$$\begin{array}{r} 330 \\ - 90 \\ \hline 240 \end{array}$$

$$\begin{array}{r} 160 \\ \times 7 \\ \hline 1120 \end{array}$$

$$\begin{array}{r} 690 \\ + 120 \\ \hline 810 \end{array}$$

$$\begin{array}{r} 780 \\ - 690 \\ \hline 90 \end{array}$$

$$\begin{array}{r} 120 \\ \times 6 \\ \hline 720 \end{array}$$

$$\begin{array}{r} 780 \\ - 720 \\ \hline 60 \end{array}$$

$$\begin{array}{r} 19 \\ \times 6 \\ \hline 1140 \end{array}$$

$$\begin{array}{r} 540 \\ + 1140 \\ \hline 1680 \end{array}$$

$$\begin{array}{r} 1020 \\ - 680 \\ \hline 340 \end{array}$$

$$\begin{array}{r} 690 \\ + 140 \\ \hline 830 \end{array}$$

$$\begin{array}{r} 1140 \\ - 830 \\ \hline 310 \end{array}$$

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  $450^\circ$ . You notice that at exactly 8:13PM, the oven's temperature is  $90^\circ$ . You check back at exactly 8:17PM and the oven's temperature is now  $330^\circ$ . Using linear extrapolation, at what time do you estimate will the oven will be preheated to  $450^\circ$ ?

8:13 PM  $90^\circ$

8:17 PM  $330^\circ$

?  $450^\circ$

Suppose after  $x$  minute

$$x_1 = 13 \quad y_1 = 90$$

$$x_2 = 17 \quad y_2 = 330$$

$$\therefore \begin{cases} 13m+b=90 \\ 17m+b=330 \end{cases}$$

$$17m+b - 13m+b = 240$$

$$4m = 240$$

$$m = 60$$

$$b = 90 - 13m = 90 - 13 \times 60$$

$$= 90 - 780$$

$$= -690$$

$$\therefore y = 60x - 690$$

$$\text{when } y = 450$$

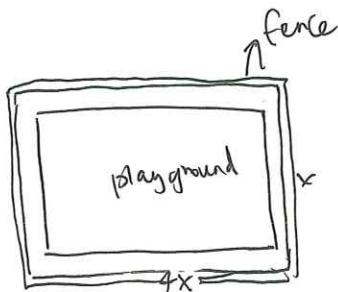
$$60x - 690 = 450$$

$$60x = 1140$$

$$x = 19.$$

8:19 PM.

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.



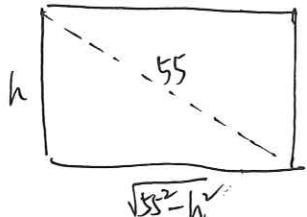
$$\begin{aligned} \text{Cost} &= 350 + (4x+x+4x+x) 33 \\ &= 350 + 33 \times 10x \\ &= 350 + 330x \end{aligned}$$

Fencing Cost = \$ 350 + 330L

$$\begin{aligned}
 & (55-h)(55+h) \\
 & = 55^2 + 55h - 55h - h^2 \\
 & = 55^2 - h^2
 \end{aligned}$$

$\begin{array}{r} 55 \\ \times 55 \\ \hline 275 \\ 275 \\ \hline 3025 \end{array}$

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.



$$\text{Aspect ratio} = \frac{\text{width}}{\text{height}} = \frac{\sqrt{55^2 - h^2}}{h}$$

Aspect Ratio =

$$\frac{\sqrt{3025 - h^2}}{h}$$

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

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

= 60 - 5

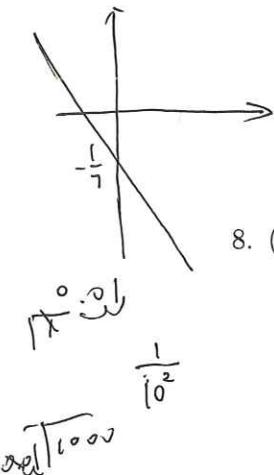
55

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

$\frac{14}{16} = \frac{7}{8}$

$\frac{7}{8}$

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



$$\begin{aligned}\frac{x(10x+1)}{-7x} &= -\frac{10x+1}{7} \\ &= -\frac{10}{7}x - \frac{1}{7}\end{aligned}$$

-∞

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8) = 3$

$$\begin{aligned}2 \times 2 \times 2 &= 8 \\ \log_2(8) &= \log_2(2^3) = 3\end{aligned}$$

3

$$\begin{aligned}\log_{10}(1000) &= 3 \\ \log_{10}(10^3) &= 3 \\ 10^3 &= 1000 \\ \frac{10}{x} &= 0.01 \\ x &= \frac{10}{0.01} = 1000\end{aligned}$$

(b)  $\log_{10}(0.01)$

$$\log_{10}(10^{-2})$$

-2

(c)  $\log_5(125)$

$$\log_5(5^3) = 3$$

3

$$\begin{array}{r} 25 \\ \times 5 \\ \hline 125 \end{array}$$

Name: QI XUAN HE

Perm: 3666948

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  $b$ .

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

$$\begin{aligned}
 x + (-a - 2b) &= b \\
 x - a - 2b &= b \\
 x &= -b + a
 \end{aligned}$$

$$x = -b + a$$

$$y = -a + 2b$$

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

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

$$\frac{\frac{1}{a} \cdot b}{x^2 \cdot y^1}$$

$$(a+b)(a-b) = a^2 - b^2 + ab - ab$$

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

$$\begin{aligned} & x(a^4 - a^3b + a^2b^2 - ab^3 + b^4)(x - 2b) \\ &= (a+b)(a^4 - a^3b + a^2b^2 - ab^3 + b^4)(a+b-2b) \\ &= (a^2 - b^2)(a^4 - a^3b + a^2b^2 - ab^3 + b^4) \\ &= a^8 - a^6b + \cancel{a^4b^2} - \cancel{a^3b^3} + \cancel{ab^4} - \cancel{a^2b^2} + \cancel{ab^3} - \\ &\quad a^2b^4 + ab^6 - b^8 \\ &= a^8 - a^6b + ab^6 - b^8 \end{aligned}$$

$$a^8 - a^6b + ab^6 - b^8$$

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  $450^\circ$ . You notice that at exactly 8:13PM, the oven's temperature is  $90^\circ$ . You check back at exactly 8:17PM and the oven's temperature is now  $330^\circ$ . Using linear extrapolation, at what time do you estimate will the oven will be preheated to  $450^\circ$ ?

$$y = 60x + 90$$
$$\Rightarrow 450 = 60x + 90$$

$$\frac{360}{60} = x$$

$$6 = x$$

$$8:17 + 6 = 8:23$$

$$\begin{array}{r} 330 \\ - 90 \\ \hline 240 \end{array}$$
$$\begin{array}{r} 240 \\ \times 6 \\ \hline 1440 \end{array}$$
$$\begin{array}{r} 1440 \\ + 90 \\ \hline 1530 \end{array}$$

8:23 PM

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.

make wide as  $x$ , then  
length is  $4x$ .



$$\Rightarrow 8x + x + x = 10x \text{ for the fencing need for perimeter.}$$

$$10x \cdot 33 + 350 \\ = 330x + 350.$$

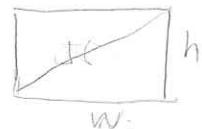
Fencing Cost = \$

$330x + 350$

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.

$$\text{Aspect Ratio} = \frac{w}{h} = ?$$

$$\begin{array}{r} 35 \\ \times 3 \\ \hline 105 \\ 275 \\ \hline 3025 \end{array}$$



$$w^2 + h^2 = 55^2$$

$$w^2 = 3025 - h^2$$

$$w = \sqrt{3025 - h^2}$$

$$\Rightarrow \text{Aspect Ratio} = ? \frac{\sqrt{3025 - h^2}}{h}$$

Aspect Ratio =

$$\frac{\sqrt{3025 - h^2}}{h}$$

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

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

make  $x = 6$ .

$60 - 5 = 55$

55

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

$\frac{7}{8}$

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

$-\infty$

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8)$

3

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

-2

(c)  $\log_5(125)$

3

Name: Ebony Negrete

Perm: 5705215

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  $b$ .

$$\begin{aligned} 2x + 3y &= a \quad y = a - 2x / 3 \\ (3b - a) + y &= b \quad x + y = b \quad y = b - x \\ 3b - a + y &= b \\ b - 3b + a &= y \\ -2b + a &= y \\ 3(b - x) &= a - 2x \\ 3b - 3x &= a - 2x \\ 3b - a &= x \end{aligned}$$

$$\begin{aligned} 2(3b - a) + 3y &= a \\ 6b - 2a + 3y &= a \end{aligned}$$

$$\begin{aligned} \frac{3y}{3} &= \frac{-6b + 3a}{3} \\ y &= -2b + a \checkmark \end{aligned}$$

$$x = \boxed{3b - a}$$

$$y = \boxed{-2b + a}$$

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

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

$$\frac{a^{+2} b^{-2}}{x^{-2} y^{-2}} \cdot \frac{a^{-1} b}{\sqrt[4]{b^4 x^4 y^{-8}}}$$

$$\frac{a^2 x^2 y^2}{b^2} \cdot \frac{a^{-1} b}{b^{-1} x^{-2}} \Rightarrow \frac{a^2 x^2 y^2}{b^2} \cdot \frac{b \cdot b y^2}{a x} \quad \frac{a^2 x^2 y^2}{b^2}, \frac{b^2 y^2}{a x}$$

$$\frac{a^2 x^2 y^4}{b^2 a x}$$

$$a x y^4$$

$$\boxed{a x y^4}$$

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

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

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

$$(a^5 - a^4b + a^3b^2 - a^2b^3 + ab^4)(a - b)$$

$$a^6 - a^5b + a^4b^2 - a^3b^3 + a^2b^4 - a^5b + a^4b^2 - a^3b^3 + a^2b^4 - ab^5$$

$$a^4 + 2a^4b^2 - 2a^3b^3 + 2a^2b^4 - ab^5$$

$$(a-b)(a^5 - a^4b + a^3b^2 - a^2b^3 + ab^4 + a^4b - a^3b^2 + a^2b^3 - ab^4 + b^5)$$

$$a^6 - a^5b + a^4b^2 - a^3b^3 + a^2b^4 + ab^5 - a^4b^2 + a^3b^3 - a^3b^4 + a^2b^5 - a^5b + a^4b^2 - a^3b^3 + a^2b^4 - ab^5 - a^4b^2 + a^3b^3 - a^2b^4 + ab^5 - b^6$$

$$a^6 - a^5b + ab^5 - b^6$$

$$a^6 - a^5b + ab^5 - b^6$$

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°?

$$\begin{array}{r} 2 \\ \cancel{3} \cancel{3} 0 \\ - 9 0 \\ \hline 2 4 0 \end{array}$$

$$8:13 \rightarrow 90$$

$$8:17 \rightarrow 330$$

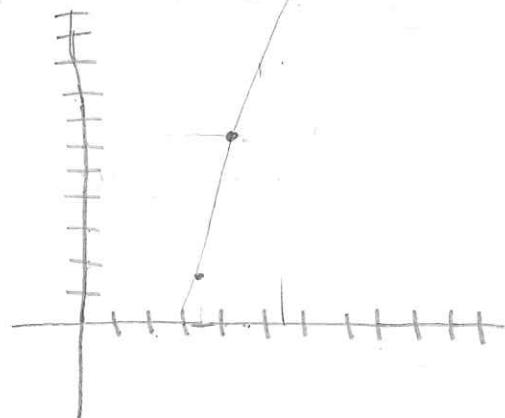
$$5 \text{ min} \rightarrow 240$$

$$\begin{array}{r} 330 \\ + 240 \\ \hline 570 \end{array}$$

$$\begin{array}{r} 330 \\ + 48 \\ \hline 378 \\ + 48 \\ \hline 426 \\ + 24 \\ \hline 450 \end{array}$$

$$\frac{330 - 90}{17 - 13} = \frac{240}{5} = 48$$

between 8:19 & 8:20



8:19:30

hr min sec

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.

$$4l = w$$

$$P = 2l + 2w$$

$$C(x) = 350 + 33x$$

$$P = 2l + 2(4l)$$

$$C(x) = 350 + 33(10l)$$

$$P = 2l + 8l$$

$$P = 10l$$

$$C(x) = 350 + 330l$$

Fencing Cost = \$

350 + 330l

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.



$$a^2 + b^2 = 55^2$$

$$h^2 + b^2 = 55^2$$

$$\sqrt{h^2} = \sqrt{55^2 - w^2}$$

$$a^2 + b^2 = 55^2$$

$$\sqrt{w^2} = \sqrt{55^2 - h^2}$$

$$w = \sqrt{55^2 - h^2}$$

$$h = \sqrt{55^2 - (\sqrt{55^2 - h^2})^2}$$

$$h = \sqrt{55^2 - (55^2 - h^2)}$$

$$h = \sqrt{55^2 - 55^2 + h^2}$$

$$h = h^2$$

Aspect Ratio =

$$55^2 - h^2 : h^2$$

$w \uparrow$

$h \uparrow$

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

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

55

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

$$\frac{14(10000000)+4}{16(10000000)+3} \quad \frac{140000004}{160000003}$$

7/8

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

$$\frac{10(1000000)^2 + (1000000)}{-7(1000000)}$$

1

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8)$

3

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

-2

(c)  $\log_5(125)$

5.5

25.5

3

Name: Breanna Flores

Perm: 4283842

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  $b$ .

$$x+y = b-y$$

$$-y$$

$$x = b - y$$

$$2x + 3y = a$$

$$x + y = b$$

$$2(b-y) + 3y = a$$

$$2b - 2y + 3y = a$$

$$\frac{2b+1y}{-2b} = \frac{a}{-2b}$$

$$y = a - 2b$$

$$x + (a - 2b) = 10$$

$$x + a - 2b = 10$$

$$+2b \quad +2b$$

$$x + a = 3b - a$$

$$-a$$

$$x = 3b - a$$

$$x = \boxed{3b - a}$$

$$y = \boxed{a - 2b}$$

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

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

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

$$\frac{a^{-1}b^2}{xy} \cdot \frac{1}{\sqrt[4]{b^4y^{-8}}} = 2a^{-1}b \cdot xy \cdot \frac{2a^{-2}b^2xy}{b^{-4}y^{-8}} \rightarrow \frac{2a^{-2}x}{b^{-2}y^{-7}} \rightarrow \frac{b^2y^7x}{2a^2} \rightarrow \frac{a^2b^{-2}}{a^2b^{-2}}$$

$$\frac{a^2b^{-2}}{x^2y^{-2}} \cdot \frac{a^{-1}b}{b^{-4}y^{-8}} = \frac{a + a^{-1}b^2 + a^2b + b^{-1}}{b^{-4}x^{-2} + x^{-2}y^{-8} + b^{-4}y^{-2} + y^{-10}}$$

$$\frac{a + b^4x^2 + x^2y^8 + b^4y^2 + y^{10} + a^2b}{ab^2 + b}$$

$$\frac{b^2y^7x}{2a^2}$$

$$\begin{array}{|c|c|c|c|} \hline a^{-1} & a & a^{-1}b & -2 \\ \hline b & \boxed{a^2b} & \boxed{b^{-1}} & \end{array}$$

$$\frac{b^{-4}y^{-8}}{x^{-2}(b^{-4}x^{-2})x^{-2}y^{-8}} \\ y^{-2}(b^{-4}y^{-2})y^{10}$$

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

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

$$b - 2b = -b$$

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

$$(a+b)$$

$$(a^5 + b^5)(a - b)$$

$$a^4 - b^4$$

$$a^4 + ab^5 - a^5b - b^6$$

	$a^5$	$b^5$
$a$	$a^4$	$ab^5$
$-b$	$-a^5b$	$-b^4$

$a^4 + ab^5 - a^5b - b^4$
---------------------------

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°?

$$450^\circ \quad 8:13\text{pm} \rightarrow 90^\circ \quad (0, 90)$$

$$4\text{min.6} \quad 8:17 \rightarrow 330^\circ \quad (4, 330)$$

$$(2, 450^\circ)$$

$$\frac{330-90}{4-0} = \frac{240}{4} = 60 \quad y = 60x + b \quad y = 60x + 90$$

$$90 = 60(0) + b \quad b = 90 \quad 450 = 60x + 90$$

$$-90 \quad -90$$

$$\frac{360}{60} = \frac{60x}{60}$$

$$60 \overline{)360} \quad \begin{array}{r} 2 \\ 60 \\ \times 2 \\ \hline 360 \end{array}$$

$$(13, 90) \quad \frac{330-90}{17-13} = \frac{240}{4} = 60 \checkmark$$

$$(17, 330)$$

$$\begin{array}{r} 60 \\ \times 13 \\ \hline 780 \end{array} \quad \begin{array}{r} 13 \\ \times 10 \\ \hline 130 \end{array} \quad \begin{array}{r} 90 = 780 + b \\ -780 \\ \hline -780 \end{array}$$

$$2 = x$$

$$\begin{array}{r} 690 \\ -90 \\ \hline 600 \end{array} \quad b = 690 \quad y = 60x + 690$$

$$450 = 60x + 690$$

$$-690$$

$$\frac{-240}{60} = \frac{60x}{60}$$

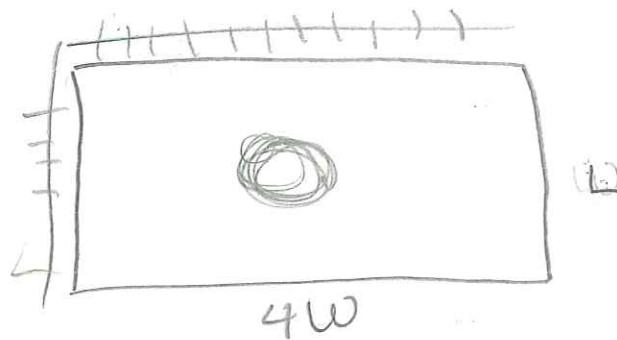
$$\begin{array}{r} 60 \\ \overline{)240} \\ -240 \\ \hline 0 \end{array} \quad x = 4$$

$$8:17$$

$$\begin{array}{r} +4 \\ \hline 8:21 \end{array}$$

8:19pm

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.



$$C(P(L)) =$$

$$A = LW$$

$$P = 2L + 2W$$

$$4w = L$$

$$C(l) =$$

$$4wl$$

$$\frac{A}{4l} = \frac{4wl}{4w}$$

$$4wl = 2w + 2w$$

$$2l + 2(4l)$$

$$2l + 8l = 10l$$

$$l = \frac{A}{4w} \quad \frac{A}{4l} = \frac{4wl}{4w}$$

$$w = 4l$$

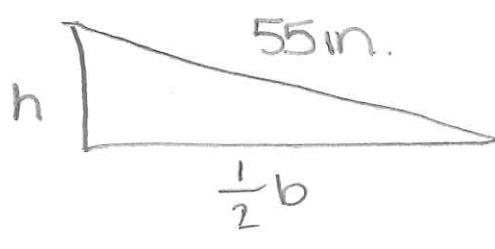
$$\frac{A}{4} = \frac{wl}{l} \quad \frac{A}{4} = w$$

$$y = w$$

Fencing Cost = \$

$$350 + 33l \left( 2l + 8 \left( \frac{4l}{l} \right) \right)$$

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.



$$a^2 + b^2 = c^2$$

$$A = \frac{1}{2}bh$$

$$\frac{55}{h} = \frac{\frac{1}{2}b}{\frac{h}{h}}$$

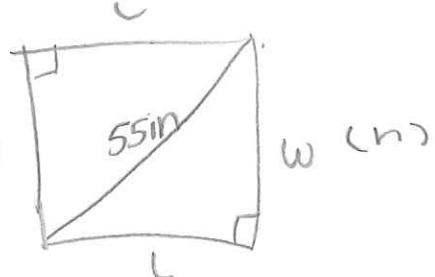
$$A = \frac{1}{2}bh$$

$$A = 55$$

$$A = LW$$

$$\frac{55}{h} = \frac{\frac{1}{2}b}{\frac{1}{2}}$$

(in) w



$$\frac{55}{h} \times \frac{2}{2} =$$

$$A = Lh$$

$$A = \frac{1}{2}bh$$

$$\frac{1}{2} \frac{bh}{bh} = \frac{L(h)}{bh}$$

$$\frac{\frac{1}{2}}{L} = \frac{Lh}{bh}$$

Aspect Ratio =

$$\frac{1}{2}(55h)$$

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

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

$$\begin{array}{r} 10(6) - 5 \\ 60 - 5 = 55 \end{array}$$

55

~~$\frac{14}{28+4} = \frac{14}{32}$~~  (b)  $\lim_{x \rightarrow \infty} \frac{14x+4}{16x+3}$

$$\frac{14x^2}{32x^2} = \frac{14}{32} = \frac{1}{2}$$
$$\frac{14x+4}{16x+3} = \frac{14x}{16x} + \frac{4}{16x} = \frac{14}{16} + \frac{4}{16x} = \frac{7}{8} + \frac{1}{4x}$$

$\frac{7}{8}$

(c)  $\lim_{x \rightarrow \infty} \frac{1000+x}{-7x} \rightarrow \frac{x(10x+1)}{-7x}$

$\frac{10}{-7}$

~~$\frac{10(2)^2}{-7(2)} = \frac{10(4)}{-14} = \frac{40}{-14} = -\frac{20}{7}$~~

$$\frac{10(2)^2}{-7(2)} = \frac{10(4)}{-14} = \frac{40}{-14} = -\frac{20}{7}$$

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8)$

$$2 \cdot 2 = 4 \cdot 2 = 8$$

$$\log_2(8) = 3$$

3

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

$$-2$$

-2

(c)  $\log_5(125)$

$$5 \cdot 5 = 25 \cdot 5 = 125$$

$$\begin{array}{r} 225 \\ \times 5 \\ \hline 125 \end{array}$$

3

Name:	Anthony Zendegas
Perm:	42335105

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  $b$ .

$$\begin{aligned}x+y &= b \\x &= b-y \\y &= b-x\end{aligned}$$

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

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

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

$$x+y = b$$

$$\hookrightarrow x + \frac{a-2x}{3} = b$$

$$x = b - \frac{a-2x}{3} ?$$

$$2(b-y) + 3y = a$$

$$2b - 2y + 3y = a$$

$$2b + y = a$$

$$y = a - 2b$$

check:  $x+y = b$

$$-a+3b + a - 2b$$

$$3b - 2b = b$$

$$x = \boxed{-a+3b}$$

$$2x + 3(b-x) = a$$

$$2x + 3b - 3x = a$$

$$2x - 3x = a - 3b$$

$$-x = a - 3b$$

$$x = -(a - 3b)$$

$$x = -a + 3b$$

$$y = \boxed{a-2b}$$

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

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

$$\boxed{\quad}$$

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

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

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

$$\begin{aligned} & (a^5 - a^4b + a^3b^2 - a^2b^3 + ab^4 + b^5)(a+b-2b) \\ & (a^5 + b^5)(a+b-2b) = (a^6 + a^5b - \cancel{2a^5b} + ab^5 + b^6 - \cancel{2b^6}) \\ & = (a^6 - a^5b + ab^5 + b^6 - \cancel{2b^6}) \\ & = a^6 - a^5b + ab^5 - b^6 \end{aligned}$$

$$a^6 - a^5b + ab^5 - b^6$$

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°?

$$8:13 \text{ PM} \rightarrow 90^\circ$$

$$8:17 \text{ PM} \rightarrow 330^\circ$$

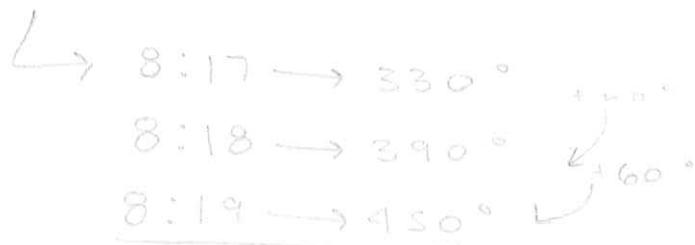
$$\text{? PM} \rightarrow 450^\circ$$

$$330 - 90 = 240^\circ$$

↳ 240° in 4 min.

$$\frac{240^\circ}{4} = \underline{\underline{60^\circ \text{ per minute}}}$$

Want to get to 450°!



8:19 PM

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.

\$350 shipping



\$33 per foot

$$\text{Cost} = \text{feet of fencing} + 350$$
$$\text{Cost} = \$33(P) + 350$$

$$P = 4x + 4x + x + x$$

$$= 8x + 2x$$

$$= 10x \text{ ft}$$

P of rectangle

$$L = W/W-1$$

$$\text{Cost} = 33(10x) + 350$$

$$= 330x + 350$$

Fencing Cost = \$

$$330x + 350$$

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.



w  
h  
SS

$$a^2 + b^2 = c^2$$

$$SS^2 = w^2 + h^2$$

$$\rightarrow w^2 + h^2 = SS^2$$

$$w^2 = SS^2 - h^2$$

$$w = \sqrt{SS^2 - h^2}$$

$$AR = W : h$$

$$\hookrightarrow \sqrt{SS^2 - h^2} : h$$

Aspect Ratio =

$$\sqrt{SS^2 - h^2} : h$$

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

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

$$\begin{aligned}\hookrightarrow & 10(6) - 5 \\ \hookrightarrow & 60 - 5 \\ \hookrightarrow & 55\end{aligned}$$

55

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

$$\begin{aligned}& \frac{14 \text{ terms } + x}{16 \text{ terms } + 3} \quad \text{small terms} \\ \hookrightarrow & \frac{14 \text{ terms}}{16 \text{ terms}} \\ \hookrightarrow & \frac{7}{8}\end{aligned}$$

$\frac{7}{8}$

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

$$\begin{aligned}& \frac{10(\text{terms})^2 + (\text{terms})}{-7(\text{terms})} \\ & \quad \text{as } x \rightarrow \infty, \text{ terms higher than } x^2 \text{ become negligible}\end{aligned}$$

$-\frac{100}{7}$

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8)$

$$\begin{aligned}\hookrightarrow & 2^x = 8 \\ \hookrightarrow & x = 3\end{aligned}$$

3

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

$$\begin{aligned}10^x &= .01 \\ \hookrightarrow x &= -2\end{aligned}$$

-2

(c)  $\log_5(125)$

$$\begin{aligned}5^x &= 125 \\ \hookrightarrow x &= 3\end{aligned}$$

$$\begin{array}{c}1 \\ | \\ 5 \times 5 \\ | \\ 25 \times 5 \\ | \\ 125\end{array}$$

3

Name:

Christian Perez

Perm:

7947662

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  $b$ .

$$2x + 3y = a$$

$$x + y = b$$

$$\begin{array}{r} 2x + 3y = a - 2x \\ \hline -2x \end{array}$$

$$\frac{3y}{3} = \frac{a - 2x}{3}$$

$$\begin{array}{l} x + y = b \\ \hline \end{array}$$

$$y = \frac{a - 2x}{3}$$

$$x + y = b$$

$$x = b - y$$

$$x = \boxed{b - y}$$

$$y = \boxed{\frac{a - 2x}{3}}$$

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

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

$$\frac{a^{-3}b^{-2}}{x^2y^2} \rightarrow \frac{x^2y^2}{a^3b^2} \cdot \frac{a^{-1}b}{b^0 xy^{-4}} \rightarrow \frac{xy^4}{ab} \cdot \frac{x^2y^2}{a^3b^2} \rightarrow \frac{x^3y^6}{a^4b^3}$$

$$\boxed{\frac{x^3y^6}{a^4b^3}}$$

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

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

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

$$\cancel{a^5} \cancel{- a^4b} \cancel{+ a^3b^2} \cancel{- a^2b^3} \cancel{+ ab^4} \cancel{+ a^4b} \cancel{- a^3b^2} \cancel{+ a^2b^3} \cancel{- ab^4} \cancel{+ b^5}$$

$$a^5 + b^5 - a^4b + a^4b + 2a^3b^2 + a^2b^3 - ab^4 + ab^4$$

$$(x^5 + 2b^5)(a^5 + b^5 + 2a^3b^2)$$

$$\cancel{a^6} \cancel{+ a^5b} \cancel{+ 2a^4b^2} \cancel{+ a^4b} \cancel{+ b^6} \cancel{+ 2a^3b^3} \cancel{- 2a^5b} \cancel{- 2b^6} \cancel{- 4a^3b^3}$$

$$b^6 - 2b^6 + a^6 = 2a^5b + a^5b + ab^5 + 2a^4b^2 + 2a^3b^3 - 4a^3b^3$$

$$-b^6 + a^6 - a^5b + ab^5 + 2a^4b^2 - 2a^3b^3$$

$$\boxed{-b^6 + a^6 - a^5b + ab^5 + 2a^4b^2 - 2a^3b^3}$$

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  $450^\circ$ . You notice that at exactly 8:13PM, the oven's temperature is  $90^\circ$ . You check back at exactly 8:17PM and the oven's temperature is now  $330^\circ$ . Using linear extrapolation, at what time do you estimate will the oven will be preheated to  $450^\circ$ ?

$$\begin{array}{r} 213 \\ - 90 \\ \hline 240 \end{array}$$

$$@ 8:13, = 90^\circ.$$

$$@ 8:17, = 330^\circ.$$

$$@ ?, = 450^\circ$$

after 4 min, temp rises by  $240^\circ$ ,

or  $60^\circ/\text{min}$  ( $4.60^\circ = 240^\circ$ )

$$so, 450 - 330 = 120^\circ$$

$$\frac{60x = 120}{60} \rightarrow \frac{2}{1} = x$$

After 2 min, oven is @  $450^\circ$ .

8:19 PM

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.

$$\text{Cost} = 33x + 350$$

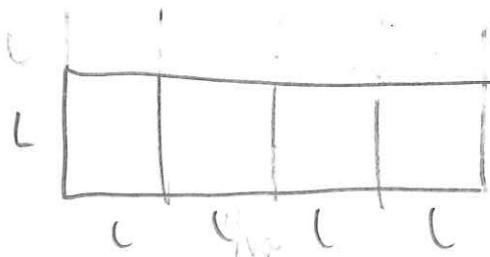
$$\frac{P}{2} = \cancel{2L} + \cancel{2W}$$

$$\frac{P}{2} = L + W$$

$$\frac{P}{2L} = W$$

$$P = L + \frac{P}{2L}$$

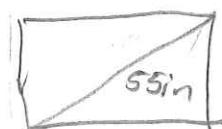
$$33\left(L + \frac{P}{2L}\right) + 350$$



Fencing Cost = \$  $33\left(L + \frac{P}{2L}\right) + \$350$

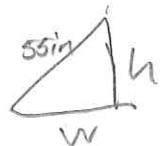
6. (5 points) You are considering the purchase of a 55in TV (TV sizes are measured by the diagonal, not the length or width). You know that the aspect ratio of a screen is the ratio of the width to the height. However, the manufacturer will only disclose the height of the TV, not the width. Express the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

$$w:h = \text{aspect ratio}$$



$$2w + 2h = P$$

or



$$r(h) =$$

$$\frac{w^2 + h^2}{h^2} = \frac{55\text{in}}{h^2}$$

$$\sqrt{w^2} = \sqrt{\frac{55\text{in}}{h^2}}$$

$$r(h) = \sqrt{\frac{55\text{in}}{h^2}}$$

Aspect Ratio =

$$\sqrt{\frac{55\text{in}}{h^2}}$$

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

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

60 - 5

55

55

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

$\frac{7}{8}$

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

$\frac{10(2)^2+2}{-7(2)} \Rightarrow \frac{40+2}{-14}$

$-\infty$

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8)$

2.2.2  
↙  
4

3

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

-2

(c)  $\log_5(125)$

3

Name: Rhuanne Apostol

Perm: 9493664

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  $b$ .

$$2x + 3y = a$$

$$x + y = b$$

$$\frac{a-3b}{5} + y = b$$

$$y = b - x$$

$$y = b - \frac{a-3b}{5}$$

$$2x + 3(b-x) = a$$

$$2x + 3b - 3x = a$$

$$\frac{2(a-3b)}{5}$$

$$3b + 5x = a$$

$$5x = \frac{a-3b}{5}$$

$$x = \frac{a-3b}{25}$$

$$x = \boxed{\frac{a-3b}{5}}$$

$$y = \boxed{b - \frac{a-3b}{5}}$$

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

$$\frac{b}{xy^2} \cdot \frac{a^{-1}b}{b^{-1}x^1y^{-2}}$$

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

$$\sqrt{a^2}$$

$$\left(\frac{b}{xy}\right)^{-2}$$

$$\frac{a^{-3}b^{-1}}{x^1y^{-1}} \cdot \frac{a^{-1}b}{b^1x^1y^{-2}}$$

$$\frac{a^{-3}b^{-2}}{x^{-2}y^{-2}} \cdot \frac{a^{-1}b}{b^1x^1y^{-1}}$$

$$\frac{b^{-2}}{x^1y^{-2}a^2} \cdot \frac{b^1y^2}{a^1x}$$

$$\frac{a^{-4}b^{-1}}{y^{-3}}$$

$$\frac{a^{-3}b^{-2}}{x^{-2}y^{-2}} \cdot \frac{a^{-1}b}{b^{-1}x^1y^{-2}} \quad \frac{a^{-3}b^{-2}}{x^{-1}}$$

$$\frac{x^2y^2a^2}{b^2} \cdot \frac{b^2y^2}{a^1x}$$

$$\frac{xy^0}{a^0} \quad \boxed{axy^4}$$

$$(y^4x^1a^1)$$

$$\left(\frac{y^3}{a^4b^1}\right)$$

$$\frac{ax^1y^4b^1}{b^0}$$

$$\frac{a^2b^2}{x^2y^2} \cdot \frac{a^{-1}b}{b^{-1}x^1y^{-2}} = \frac{ab^{-1}}{x^{-1}y^{-4}b^{-1}}$$

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

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

$$(xa^4 - xa^3b + xa^2b^2 - xab^3 + xb^4)(x - 2b)$$

$$\begin{aligned} &x^2a^4 - x^2a^3b + x^2a^2b^2 - x^2ab^3 + x^2b^4 \\ &- 2bx^3a^4 - 2x^3b^2 - 2xa^2b^3 - 2xb^4 - 2x^5 \end{aligned}$$

$$\begin{aligned} &x^3a^4 - x^2a^3b + x^2a^2b^2 - x^2ab^3 + x^2b^4 \\ &- 2x^2a^4b - 2x^2a^3b^2 - 2x^2a^2b^3 + 2x^2ab^4 + 2x^2b^5 \end{aligned}$$

$$\boxed{\begin{aligned} &x^2a^4 - x^2a^3b + x^2a^2b^2 - x^2ab^3 + x^2b^4 \\ &- 2x^2a^4b - 2x^2a^3b^2 - 2x^2a^2b^3 + 2x^2ab^4 \\ &+ 2x^2b^5 \end{aligned}}$$

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  $450^\circ$ . You notice that at exactly 8:13PM, the oven's temperature is  $90^\circ$ . You check back at exactly 8:17PM and the oven's temperature is now  $330^\circ$ . Using linear extrapolation, at what time do you estimate will the oven will be preheated to  $450^\circ$ ?

$$\begin{array}{r} 330 \\ - 90 \\ \hline 240 \end{array}$$

ph  $450^\circ$

8:13PM  $90^\circ$

8:17PM  $330^\circ$

8:19PM  $450^\circ$

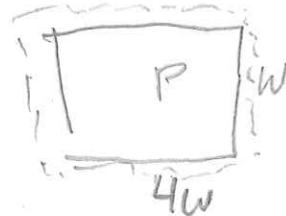
$$\begin{array}{r} 450 \\ - 330 \\ \hline 120 \end{array}$$

$$\frac{4\text{min}}{2} \quad \frac{240^\circ}{2}$$

$$\frac{240}{4} = 6$$

8:19 PM

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.



$$4w = l$$

\$33 per foot

$$2l + 2w$$

$$2(4w) + 2(w)$$

$$33(8w + 2w) + 350$$

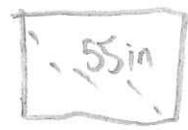
$$33(10w) + 350$$

$$330w + 350$$

Fencing Cost = \$

330w + 350

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.



$W \text{ och}$

$$55\text{in} = \frac{W}{h}$$

$55h \text{ och}$

Aspect Ratio =

$55h \propto h$

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

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

106 - 5

60 - 5

54

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

$$\frac{14(1,000)^{+4}}{16(1,000)^{+3}} = \frac{14,000^{+4}}{16,000^{+3}} = \frac{14,004}{16,003}$$

1

16,003,  $\sqrt{14,004}$

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

$$\frac{\cancel{x}(10x+1)}{-7x} = \frac{\cancel{x}+1}{-7}$$

no limit

$10(10,000)^{+100}$

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8)$

$100,000^{+100}$

$2^x = 8$

$\frac{100,100}{-700}$

2.2.2

$\frac{100,100}{-700}$

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

$\frac{700}{3010}$   
 $\underline{-2800}$   
2100

$10^{(x)} = .01$

.01

3

-3

(c)  $\log_5(125)$

$5^x = 125$

5.5.5

$\frac{25}{25}$

3

Name: Jasmine Jackson

Perm: 4659892

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  $b$ .

$$2x + 3y = a$$

$$x + y = b$$

$$x = b - y$$

$$2(b - y) + 3y = a$$

$$2b - 2y + 3y = a$$

$$x + (b - 2y) = b$$

$$x = b - (b - 2y)$$

$$x = 2y$$

$$\boxed{x = 3b - 9}$$

$$2b + y = a$$

$$\boxed{y = a - 2b}$$

$$x =$$

$$\boxed{3b - 9}$$

$$y =$$

$$\boxed{a - 2b}$$

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

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

$$= 2 \cdot (a^1 b)$$

$$= \frac{a^{-1}b}{xy} \cdot \frac{16^1 x^{-2}}{y^{-2}}$$

$$= \frac{2a^{-2}b}{a^1 b^{-1} x^{-2}} = \frac{2a^{-1}b}{a^1 y^2} = \frac{2a^{-1}b}{y^3} = \frac{2a^{-1}b}{y^3} \cdot \frac{3}{3} = \frac{6a^{-1}b}{y^6}$$

$$= \frac{6a^{-1}b}{y^6} = \frac{6ab}{y^6}$$

$$\boxed{\frac{6ab}{y^6}}$$

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

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

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

$$a^5 - a^4b + a^3b^2 - a^2b^3 + ab^4 \cdot (-a - b - 2b)$$

$$a^5b - a^4b^2 + a^3b^3 - a^2b^4 + b^5 - a^5b - 3ab^4 - 3b^5$$

$$(a^5 + b^5)(-a - 3b)$$

$$-a^6 - 3ba^5 - ab^5 - 3b^6$$

$$-a^6 - 3ba^5 - ab^5 - 3b^6$$

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  $450^\circ$ . You notice that at exactly 8:13PM, the oven's temperature is  $90^\circ$ . You check back at exactly 8:17PM and the oven's temperature is now  $330^\circ$ . Using linear extrapolation, at what time do you estimate will the oven will be preheated to  $450^\circ$ ?

Pieheat  $450^\circ$

$$8:13\text{pm} \rightarrow 90^\circ (3, 90) \quad \frac{330-90}{7-3} = \frac{240}{4} = [60-\text{m}]$$

$$8:17\text{pm} \rightarrow 330^\circ (7, 330)$$

$$\cancel{90 = 60(13) + b}$$

$$\cancel{90 = 780 + b}$$

$$\cancel{780 = b}$$

$$(3, 90)$$

$$(7, 330)$$

$$\frac{330-90}{7-3} = \frac{240}{4}$$

$$450 = 60(x) - 60$$

$$450 = 60$$

$$1140 = 60x$$

$$\frac{1140}{60} = x$$

$$19 = x$$

$$60(19) - 60$$

$$1140 = x$$

$$1080 = x$$

$$90 = 60(3) + b$$

$$90 = 180 + b$$

$$-90 = b$$

$$450 = 60x - 90$$

$$540 = 60x$$

$$90 = 60x$$

$$1.5 = x$$

$$60(1.5) - 90$$

$$90 = 60x$$

$$1.5 = x$$

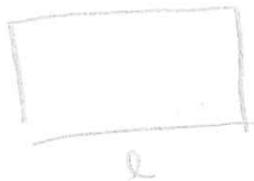
~~90 = 60(1.5) - 90~~  
~~1.5 = x~~  
~~60(1.5) - 90~~  
~~90 = 60x~~  
~~1.5 = x~~  
~~60(1.5) - 90~~  
~~90 = 60x~~  
~~1.5 = x~~

about 8:19pm

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.

$$P(x) = ?$$

W



$$W = 4l$$

$$\text{Fencing} = \$350 + \$33/\text{ft}$$

$$A = 8lw$$

$$P = 2l + 2w$$

$$P(l) = 2(4l) + 2l$$

$$P(l) = 10l$$

$$\text{Cost } P(l) = 350 + 10(33l)$$

$$\boxed{\text{Cost } P(l) = 330l + 350}$$

Fencing Cost = \$

$$\boxed{330l + 350}$$

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.

width



$$55^2 = w^2 + h^2$$

$$55^2 = w^2 + h^2$$

$$55^2 - h^2 = w^2$$

$$\sqrt{55^2 - h^2}$$

Aspect Ratio =

$$\sqrt{55^2 - h^2}$$

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

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

-5

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

$$\frac{14,000,000 + 4}{16,000,003} \approx 1.33$$
 approaching  $\frac{14}{16}$

.75

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

$$\frac{x(10x+1)}{-7x}$$

1

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8)$

4

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

$$\log(.01) = \log(10^{-2}) = -2$$

-2

(c)  $\log_5(125)$

$5^3 = 125$

3

Name: Yesenia (71)

Perm: 5005109

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  $b$ .

$$\begin{array}{l} 2x + 3y = a \quad x = b - y \\ x = \frac{a - 3y}{2} \\ \hline 2x + 3y = a \\ x + y = b \\ x + y = b \\ x = b - y \\ \hline x + y = b \\ x + (a - 2b) = b \\ -a + 2b \quad b - a + 2b \\ x = b - a + 2b \end{array}$$

$$\begin{array}{l} x + y = b \\ x + y = b \\ 2b - 2y = a - 3y \\ -2b + 3y \quad -3y \\ lg = a - 2b \end{array}$$

$$x = \boxed{b - a + 2b}$$

$$y = \boxed{a - 2b}$$

2

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

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

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

$$\frac{a^2b^{-2}}{x^{-2}y^{-2}} \cdot \frac{a^{-1}b}{b^{-1}x^1y^{-2}}$$

$$\frac{a^{\cancel{2}}x^{\cancel{2}}y^{\cancel{2}}}{\cancel{b^2}} \cdot \frac{b^{\cancel{1}}y^{\cancel{2}}}{\cancel{b^{-1}x^1}}$$

$$axy^4$$

$$\boxed{axy^4}$$

2

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

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

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

$$\cancel{a^5 - a^4b + a^3b^2 - a^2b^3 + ab^4} \\ \cancel{+ a^4b - a^3b^2 + a^2b^3 - ab^4 + b^5}$$

$$(a^5 + b^5)(a+b-2b)$$

$$\cancel{a^6 + a^5b - 2ba^5 + ab^5 + b^6 - 2b^6}$$

$$a^6 - a^5b + ab^5 - b^6$$

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

$$\cancel{a^5 - a^4b + a^3b^2 - a^2b^3 + ab^4} \\ \cancel{+ a^4b - a^3b^2 + a^2b^3 - ab^4 + b^5}$$

$$(a^5 + b^5)(a-b)$$

$$(a+b-2b)$$

$$a^6 - a^5b + ab^5 - b^6 \quad (a-b)$$

$$a^6 - a^5b + ab^5 - b^6$$

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°?

$$8:13 \text{ PM} : 90^\circ$$

$$8:17 \text{ PM} : 330^\circ$$

$$(13 = 0)$$

$$(0, 90^\circ)$$

$$(4, 330^\circ)$$

$$450^\circ = ?$$

$$\begin{array}{r} 2 \\ 3 \\ - 90 \\ \hline 240 \end{array}$$

$$\begin{array}{r} 240 \\ 4 \overline{)240} \\ - 240 \\ 0 \end{array}$$

$$y = 60(x - 0) + 90 - \frac{240}{4} = 60 - 240$$

$$60x + 90$$

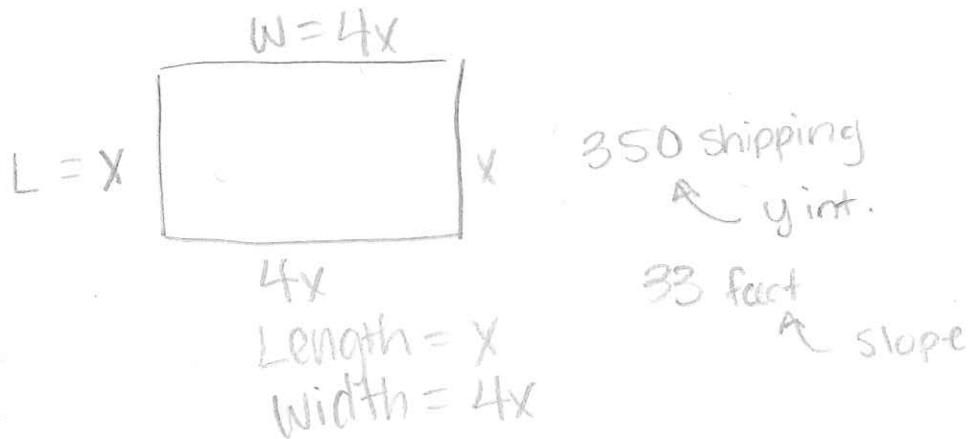
$$450 = 60x + 90 - 90$$

$$\begin{array}{r} 360 \\ - 60 \\ \hline 60 \end{array}$$

$$x = 6 + 8:13 = 8:19$$

8:19 PM

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.



$$\text{Fencing Cost} = 350 + 33(8x + 2x)$$

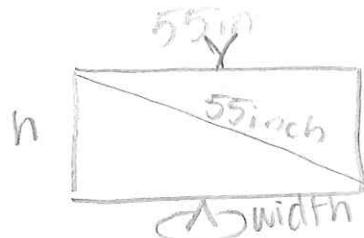
$$350 + 33(10x)$$

$$\begin{array}{r} 70 \\ 190 \\ \hline 150 \\ 150 \\ \hline 0 \end{array}$$

25

Fencing Cost = \$  $330x + 350$

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.



$$a^2 + b^2 = c^2$$

$$\text{Aspect Ratio} = \frac{\text{width}}{\text{height}}$$

$$\text{height} = h$$

$$\text{width} = w$$

$$w^2 + h^2 = 55^2$$

$$w^2 = (55^2 - h^2)$$

$$w = \sqrt{(55^2 - h^2)}$$

$$\begin{aligned} 3^2 + 4^2 &= 5^2 \\ 9 + 16 &= 25 \\ \sqrt{25} &= 5 \end{aligned}$$

$$\text{Aspect Ratio} =$$

$$\frac{\sqrt{(55^2 - h^2)}}{h}$$

--

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

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

00-5  
55

55

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

~~$\frac{14(100)+4}{16(100)+3}$~~  too small  
 ~~$\frac{1400}{1600}$~~  to be significant

$\frac{14}{16}$

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

$\frac{10(100)+1}{-7} = \frac{1000}{-7} = -\frac{x(10x+1)}{-7x} = \frac{10x+1}{7}$   
 $\boxed{\frac{10}{-7}} + \cancel{\frac{1}{7}}$   
 $\frac{1100}{-70} \quad x = -$

undefined

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8)$

2.2.2

2

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

-2

-2

(c)  $\log_5(125)$

5.5  
25.5  
125

3

Name: Andrew Lin

Perm: 4348439

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  $b$ .

$$2x + 3y = a$$

$$x + y = b$$

$$x + a - 2b = b$$

$$x + a = 3b$$

$$x = 3b - a$$

$$x = b - y$$

$$2(b - y) + 3y = a$$

$$2(3b - a) + 3(a - 2b) = a$$

$$2b - 2y + 3y = a$$

$$2b + y = a$$

$$6b - 2a + 3a - 6b$$

$$y = a - 2b$$

$$x = \boxed{3b - a}$$

$$y = \boxed{a - 2b}$$

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

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

$$(b^{-4}x^4y^{-8})^{\frac{1}{4}}$$

$$\frac{2}{\frac{a^{-1}b}{xy}}$$

$$2xy \cdot \sqrt[4]{b^{-4}x^4y^{-8}}$$

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

$$2xy \cdot b^{-1}x^4y^{-2}$$

$$2xy \cdot \frac{1}{b} \cdot x \cdot \frac{2}{x}$$

$$2x \cdot \frac{1}{b} \cdot x \cdot 2$$

$$\frac{2x}{b} \cdot \frac{x}{1} \cdot \frac{2}{1}$$

$$\boxed{\frac{4x^2}{b}}$$

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

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

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

$$\cancel{a^5} - \cancel{a^4b} + \cancel{a^3b^2} - \cancel{a^2b^3} + \cancel{ab^4} + \cancel{a^4b} - \cancel{a^3b^2} + \cancel{a^2b^3} - \cancel{ab^4} + b^5$$

$$(a^5 - a^2b^3 + a^2b^4 + b^5)(a-b)$$

$$a^6 - a^5b - a^3b^3 + a^2b^4 + a^3b^4 - a^2b^5 + ab^5 - b^6$$

$$\cancel{a^5} - \cancel{a^4b} + \cancel{a^3b^2} - \cancel{a^2b^3} + \cancel{ab^4} + \cancel{a^4b} - \cancel{a^3b^2} + \cancel{a^2b^3} - \cancel{ab^4} + b^5$$

$$(a^5 + b^5)(a-b)$$

$$a^6 - a^5b + ab^5 - b^6$$

$$a^6 - a^5b + ab^5 - b^6$$

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°?

let  $x$  be mins after 8:00 pm

$$\frac{330 - 90}{17 - 13}$$

$$\frac{240}{4} = 60$$

$$(13, 90)$$

$$(17, 330)$$

$$(x, 450)?$$

$$y = 60x + b$$

$$450 = 60x + b$$

$$1140 = 60x$$

$$x = 19$$

$$90 = 60(13) + b$$

$$90 = 780 + b$$

$$-690 = b$$

$$\begin{array}{r} 19 \\ \hline 60 \sqrt{1140} \\ \underline{-60} \\ 540 \\ \underline{-540} \\ 0 \end{array}$$

$$\begin{array}{r} 60 \\ \times 13 \\ \hline 180 \\ 600 \\ \hline 780 \end{array}$$

$$\begin{array}{r} 6780 \\ - 90 \\ \hline 690 \end{array}$$

8:19 pm

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.

$$w = \frac{L}{4}$$

$$2L + 2w = x$$

$$4w = L$$

$$2L + 2\left(\frac{L}{4}\right) = x$$

$$33x + 350$$

$$2L + \frac{2L}{4} = x$$

express cost in terms of L

$$2L + \frac{1}{2}L = x$$

$$33(2.5L) + 350 = C$$

$$2.5L = x$$

$$82.5L + 350$$

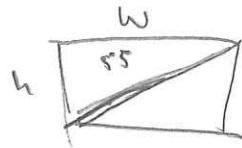
$$\begin{array}{r} 33 \\ \times 2.5 \\ \hline 165 \\ 660 \\ \hline 82.5 \end{array}$$

Fencing Cost = \$

$$82.5L + 350$$

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.

wih



$$h^2 + w^2 = 55^2$$

$$w^2 = 55^2 - h^2$$

$$w = \sqrt{55^2 - h^2}$$

Aspect Ratio =

$$\sqrt{55^2 - h^2}$$

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

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

$10(6) - 5$

55

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

$\frac{14}{16} = \frac{7}{8}$

$\frac{7}{8}$

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

$\frac{10(1000)^2 + 1000}{-7(1000)}$

$\frac{10(\infty)^2 + \infty}{-7(\infty)}$

$-\frac{1}{7}$

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8)$

2 · 2 · 2

3

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

$10^{-3}$

-3

(c)  $\log_5(125)$

$\cancel{5} \sqrt[3]{125}$   
→ 5  
25

25

Name:

Perm:

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  $b$ .

$$2x + 3y = a$$

$$x + y = b$$

$$\begin{array}{rcl} 2x + 3y = a & & \cdot 2x \\ x + y = b & & \\ \hline -3y & & \\ \hline x & = & \frac{a - 3y}{2} \\ 2\left(\frac{a - 3y}{2}\right) + 3y & & x = \frac{a - 3y}{2} \\ 2\left(\frac{a}{2}\right) + \frac{2a}{4} & & a = l \end{array}$$

$$x = \boxed{\quad}$$

$$y = \boxed{\quad}$$

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

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

$$\begin{aligned} & \frac{a^2b^2}{xy} \cdot \frac{a^{-1}b}{b^0x^4y^{-2}} \\ & \frac{(a^2b^2)(a^{-1}b)}{b^0x^2y} \\ & a + ab^2 + b^2a + b \\ & 2a + ab^2 + b^2a + b \end{aligned}$$

$$\boxed{2a + ab^2 + b^2a + b}$$

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

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

$$\begin{aligned} & (a+b)(a^4 - a^3b + a^2b^2 - ab^3 + b^4)(a+b-2b) \\ & (a^5 + b^5 - a^4 + b^2 + a^3 + b^3 - a^2 + b^4)(a+b-2b) \\ & (a-b) \end{aligned}$$

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°?

450 =

8:13	14 min	8:17	In 4 mins the oven increased 240°
$90^\circ$		$330^\circ$	
		$\frac{-240}{240}$	
		$\frac{-150}{210}$	
		$\frac{-150}{210}$	$30^\circ$

$\frac{240}{240}$

$\frac{-150}{210}$

$\frac{-150}{210}$

$30^\circ$

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.

UXAISWIL ASITSIMG.

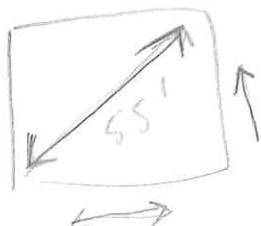


L W

$$33 \cdot x = \$50$$

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.



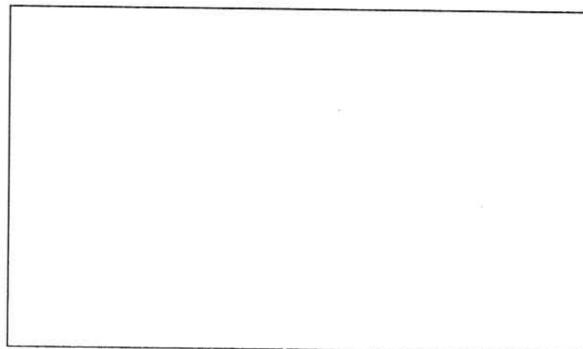
$w \cdot h$

$\times \cdot 55h$

$55 \cdot 55h \cdot 55$

$55 \times$

Aspect Ratio =



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

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

$10(6) - 5$

$60 - 5$

55

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

$\frac{14x+4}{16x+3}$

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

$(5x^2 + 1)(2x)$

$10x^2$

$100$

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8)$

3

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

$5^5$   
 $225$   
 $+ 5$   
 $\overline{125}$

-1

(c)  $\log_5(125)$

$\sqrt{125}$   
5

2

Name: Richard Montes Lemus

Perm: 1709999

Math 34A Midterm 1, Summer 2022



$$\sqrt{100} = \frac{1}{10}$$

$$\sqrt{x} = x^{-2}$$

$$100^{-1} = \frac{1}{100}, 0.01$$

10^1

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

$$2(b-y) + 3y = a$$

$$2x + 3y = a$$

$$(3b-a) + y = b$$

$$2b - 2y + 3y = a$$

$$x + y = b$$

$$-3b + a$$

$$2b + 1y = a - 2b$$

$$x = b - y$$

$$y = -2b + a$$

$$y = a - 2b$$

$$x + (a - 2b) = b$$

$$x + a - 2b = b$$

$$\left(\frac{a}{b}\right)^{-1}$$

$$x = 3b - a$$

$\frac{1}{a}$

$$x = \boxed{3b - a}$$

$$y = \boxed{a - 2b}$$

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

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

$$a^{-1} = \frac{1}{a}$$

$$\frac{1}{2}(x^2)$$

$$\sqrt[3]{ } = \frac{1}{2}$$

$$\sqrt[3]{ } = \frac{1}{3}$$

$x^1$

$$\frac{a^2b^{-2}}{x^2y^2}$$

$$\left(\frac{1}{a} \cdot b\right) \left(\frac{b^{-4} \cdot x^4 \cdot y^{-8}}{1}\right)^{\frac{1}{4}}$$

$$\frac{a^2 \cdot b^{-2}}{x^2 y^2} \cdot \frac{a^{-1} b}{b^{-1} \cdot x \cdot y^{-2}}$$

$$b^{-\frac{4}{4}} \cdot x^{\frac{4}{4}} \cdot y^{-\frac{8}{4}}$$

$$\frac{a \cdot b^{-1}}{b^{-1} \cdot x^{-1} \cdot y^{-4}}$$

$$b^{-1} \cdot x \cdot y^{-2}$$

$$\frac{\frac{1}{4} \cdot \frac{1}{b}}{\frac{b}{1} \cdot \frac{1}{b}}$$

$$x \cdot \frac{a}{\frac{1}{x} \cdot \frac{1}{y^4}} \cdot y^4$$

$$a \cdot x \cdot y^4$$

$$\boxed{a \cdot x \cdot y^4}$$

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

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

$$\begin{aligned} & a+b \left( a^4 - a^3b + a^2b^2 - ab^3 + b^4 \right) (a+b - 2b) \\ & \left( a^5 + a^4b - a^4b - a^3b^2 + a^3b^2 + a^2b^3 - a^2b^3 - ab^4 + ab^4 + b^5 \right) (-2ab - 2b^2) \\ & (a^5 + b^5) (-2ab - 2b^2) \end{aligned}$$

$$-2a^6b - 2a^5b^2 - 2ab^6 - 2b^7$$

$$\boxed{-2a^6b - 2a^5b^2 - 2ab^6 - 2b^7}$$

$$\begin{array}{r} 240 \\ \times 4 \\ \hline 960 \end{array}$$

$$41 \sqrt{240}$$

$$\begin{array}{r} 213 \\ 330 \\ -90 \\ \hline 240 \end{array}$$

9:17 PM

$$\begin{array}{r} 60 \\ \times 4 \\ \hline 240 \end{array}$$

$$\begin{array}{r} 90 \\ +60 \\ \hline 150 \\ +40 \\ \hline 210 \\ +60 \\ \hline 270 \\ +60 \\ \hline 330 \\ +60 \\ \hline 390 \\ +100 \\ \hline 490 \end{array}$$

$$450^\circ$$

$$x_1 = 90^\circ$$

$$8:17 = 330^\circ$$

$$x = 450^\circ$$

$$\begin{array}{r} 960 \\ -900 \\ \hline 60 \end{array}$$

$$\begin{array}{r} 36 \\ 48 \\ \times 3 \\ \hline 18 \\ 18 \\ \hline 00 \end{array}$$

$$2 \sqrt{96}$$

$$\begin{array}{r} 213 \\ 330 \\ -90 \\ \hline 240 \end{array} \leftarrow 4$$

$$150 - 370$$

$$\begin{array}{r} 130 \\ 60 \\ \hline 13 \end{array}$$

$$60 + 60$$

$$\frac{330 - 90}{17 - 13} = \frac{240 \div 4}{4 \div 4} = \frac{60}{1}$$

$$y = 60x + b$$

$$90 = 60(13) + b$$

$$90 = 780 + b$$

$$b = -690$$

$$450 = 60(x) - 690$$

$$+690$$

$$x = 36$$

8:36

$$\begin{array}{r} 330 \\ +60 \\ \hline 390 \\ +60 \\ \hline 450 \end{array} \therefore 72$$

8:19 pm

$$\begin{array}{r} 2(4 \cdot l) \\ 2(8) \\ 16 \end{array}$$

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.

$$\begin{array}{c} \text{cost} \quad \text{feet of fencing} \\ \downarrow \quad \downarrow \\ C = 33f + 350 \end{array}$$

$$4 \cdot l = w$$



$$P = 2l + 2w$$

$$P = 2l + 2(4 \cdot l)$$

$$P = 2l + 8l$$

$$\xrightarrow{\text{cost}} C = \text{for perimeter in terms of } l \quad 66(41)$$

$$C = 33(2l + 8l) + 350$$

$$C = 66l + 264l + 350$$

$$\begin{array}{r} 33 \\ \times 8 \\ \hline 264 \end{array}$$

$$\begin{array}{r} 12 \\ \times 21 \\ \hline 100 \\ 24 \\ \hline 252 \end{array}$$

Fencing Cost = \$

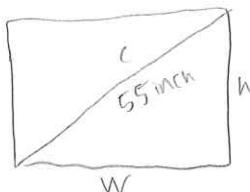
$$66l + 264l + 350$$

$$5^2 = 3^2 + b^2 \quad \sqrt{16} = \sqrt{b^2} \quad \neq 16^2$$

$$25 = 9 + b^2 \quad b = 4 \quad = 4^2$$

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.

$$\begin{array}{r} 55 \\ \times 55 \\ \hline 275 \\ 2750 \\ \hline 3025 \end{array}$$



$$\text{Aspect Ratio} = \frac{w}{h} \leftarrow \text{in terms of } h$$

$$a^2 + b^2 = c^2$$

$$h^2 + w^2 = c^2$$

$$h^2 + w^2 = 3025$$

$$\sqrt{w^2} = \sqrt{3025 - h^2}$$

$$w = \sqrt{3025 - h^2}$$

$$w = 55\sqrt{-h^2}$$

$$w^2 = \sqrt{55^2 - h^2}$$

$$w = \sqrt{55^2 - h^2}$$

$$a^2 + b^2 = c^2$$

$$h^2 + w^2 = 55^2$$

$$\sqrt{w^2} = \sqrt{55^2 - h^2}$$

$$w = \sqrt{55^2 - h^2}$$

Aspect Ratio =

$$\frac{\sqrt{55^2 - h^2}}{h}$$

$$55\sqrt{-3^2}$$

$$T \cdot 9$$

$$55 \cdot 3$$

$$54$$

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

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

$$10(6) - 5$$

$$\begin{array}{r} 60 - 5 \\ \hline 55 \end{array}$$

55

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

$$\begin{array}{r} 14x + 4 \\ 16x + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \div 2 \\ 16 \div 2 \\ \hline 7 \\ 8 \end{array}$$

$\frac{7}{8}$

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

$$\frac{10(\infty)^2 + \infty}{-7\infty}$$

$$-\infty$$

$-\infty$

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8)$

$$\begin{array}{r} 2 \\ | \\ 8 \end{array}$$

$$\begin{array}{r} 2 \\ | \\ 8 \\ \times 2 \\ \hline 16 \\ | \\ 8 \\ \times 2 \\ \hline 16 \\ | \\ 8 \end{array}$$

3

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

$$\begin{array}{r} .01 \\ | \\ 10^{-2} \end{array}$$

$$\frac{1}{100}$$

-2

(c)  $\log_5(125)$

$$\begin{array}{r} 5 \\ | \\ 125 \\ 25 \\ | \\ 25 \\ 25 \\ | \\ 25 \end{array}$$

$$5^3 = 125$$

3

Name: Franci Adjangba

Perm: S8A4S0-6

Math 34A Midterm 1, Summer 2022



208

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

$$2x + 3y = a$$

$$x + y = b$$

$$\cancel{2x+3y}$$

$$3x + 4y = a + b - 4y$$

$$-4y \quad 3$$

$$\cancel{2x+3y} =$$

$$3x + 4y = a + b - 3x$$

$$-3x \quad 4$$

$$\cancel{2x+3y} = \frac{a - 3y}{2}$$

$$\frac{a + b - 4y}{3}$$

$$x + y$$

$$x =$$

$$\boxed{\cancel{x - 3y}}$$

$$y = \boxed{\frac{a + b - 3x}{4}}$$

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

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

$$-b^x$$

$$\frac{2}{a^{-b}} \\ xy$$

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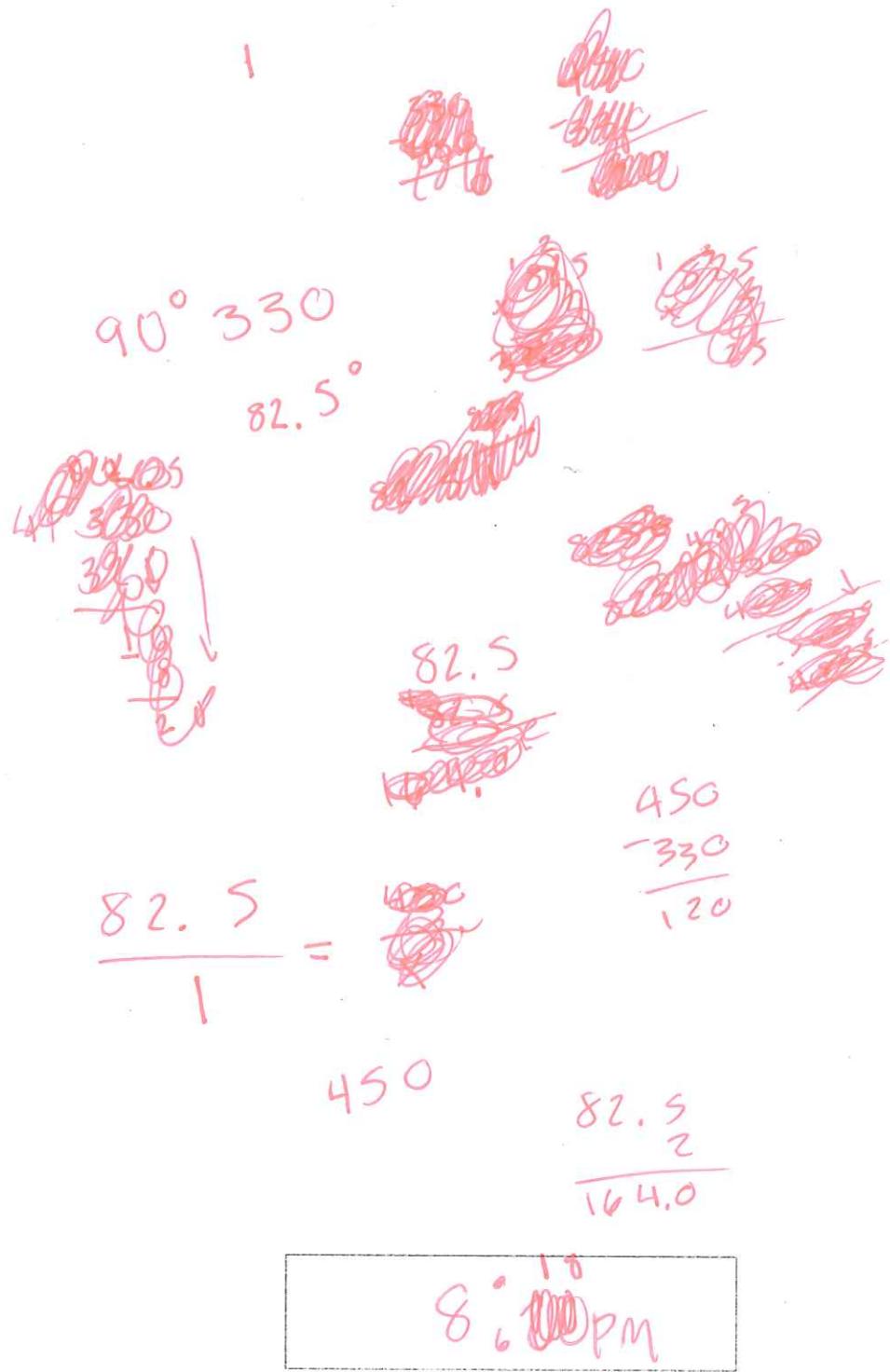
3. (2pts) Substitute  $x = a + b$  into the expression below and simplify completely. There should be no parentheses in your answer.

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

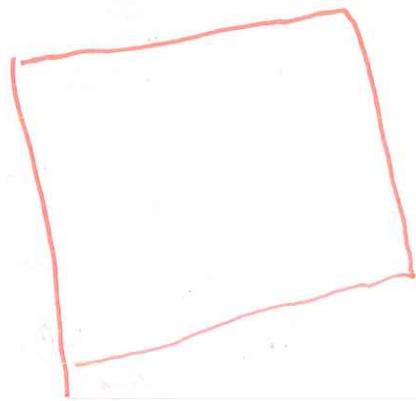
$$(a+b)(a^4 - a^3b + a^2b^2 - ab^3 + b^4)$$

$$(a+b)(a+b-2b)$$

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  $450^\circ$ . You notice that at exactly 8:13PM, the oven's temperature is  $90^\circ$ . You check back at exactly 8:17PM and the oven's temperature is now  $330^\circ$ . Using linear extrapolation, at what time do you estimate will the oven will be preheated to  $450^\circ$ ?



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.



$$\begin{array}{r} 33 \\ \times 8 \\ \hline 264 \end{array}$$

$$4L = W$$

~~$$8L = 2W$$~~

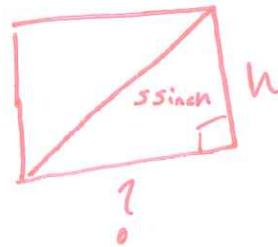
$$350 + ((8L) \cdot 33) + 2L(33)$$
$$264L + 46L + 350$$

350 +

Fencing Cost = \$

350 + 330L

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.



$$\frac{w}{h} = \text{aspect ratio}$$

$$a^2 + b^2 = 55^2$$

$$\begin{array}{r} 55 \\ \times 55 \\ \hline 275 \\ + 250 \\ \hline 3025 \end{array}$$

$$\begin{array}{r} 3025 \\ - h^2 \\ \hline ? \end{array}$$

$$\sqrt{?} = \sqrt{3025 - h^2}$$

$$\frac{55-h}{h}$$

Aspect Ratio =

$$\frac{55-h}{h}$$

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

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

55

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

~~1/2~~ 1

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

?

-2

8. (3 points) Compute the logarithms below.

(a)  $\log_2(8)$

4?

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

-2

(c)  $\log_5(125)$

25?