MAC 1140 EXAM 1 B NAME _____

SHOW ALL WORK ON THIS TEST OR ON SEPARATE PAPER.
TURN IN ALL WORKSHEETS. CALCULATORS ARE REQUIRED ON THIS TEST.

In 1 - 6, perform the calculations. Round to three decimal places or give scientific notation.

1. $\dfrac{4500^4}{\sqrt{0.0678}}$

2. $\dfrac{4}{2\sqrt{3} - 3\sqrt{2}}$

3. $\sqrt[3]{1234567}$

4. $\sqrt[5]{1234567}$

5. $\dfrac{1.2x10^8}{7.2x10^{-6}}$

6. $\dfrac{1.2x10^8 \cdot 5.3x10^{-20}}{1.6x10^{16} \cdot 7.2x10^{-6}}$

7. Give the domain and range. Is it a function?
{(2,-4), (3,0), (4,2), (6,0)}

8. Find the equation of the line through (-1,3) and (4,0). Show all work. If you used TI-85 describe your steps.

9. Sketch the graph of $Y = \pi X + \sqrt{3} X - 6.81(X-8.1)$ using a standard zoom. What kind of graph is it? Where is it? Sketch the graph with an appropriate window. Describe your "window."

10. Solve the radical equation $\sqrt{2X+20} = \sqrt{1-6X} - 5$ using the ISECT function with a standard zoom. Solve and draw the sketch.

11. Solve the radical equation $3\sqrt{2X+5} - 2\sqrt{7-X} = 3$ using the ROOT function. Solve and draw the sketch.

12. Solve the fractional equation $\frac{1}{X^2-4X+3} - \frac{1}{X^2+4X-5} = \frac{1}{X^2+2X-15}$ using the graphing calculator (method of your choice!). Describe the method, sketch and describe your window.

13. Solve $\frac{2X+3}{5} - \frac{3X-1}{2} \geq \frac{4X+7}{2}$ using graphing calculator methods. Describe your procedures and window.

14. Solve $1 < \frac{4X-5}{-2} < 9$ using graphing calculator methods. Describe procedures and window.

15. How many liters of 20% solution should be added to 100 liters of 80% solution in order to dilute it to 45%. (Set up an equation, and solve by any method of your choice. Show all work or describe window, etc.)

In 16 - 17, set up and solve by Cramer's Rule:

16.
$$5X+7Y=-1$$
$$6X+8Y=1$$

17.
$$X + Y + Z = 4$$
$$2X - Y + 3Z = 4$$
$$4X + 2Y - Z = -15$$

1. $1.575 \times 10^{15}$

2. $-5.138$

3. $107.277$

4. $16.531$

5. $1.667 \times 10^{13}$

6. $5.521 \times 10^{-23}$

7. $D: \{2, 3, 4, 6\}$
$R: \{-4, 0, 2\}$
$F:$ Yes.

8. $m = \frac{0-3}{4-(-1)} = -\frac{3}{5}$

$y - 0 = -\frac{3}{5}(x-4)$

$y = -\frac{3}{5}x + \frac{12}{5}$

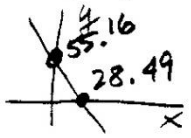
or $3x + 5y = 12$

9. $y = \pi x + \sqrt{3}x - 6.81(x - 8.1)$

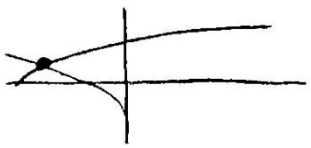
$y = (\pi + \sqrt{3} - 6.81)x + (6.81)(8.1)$

straight line $y = mx + b$.

Graph is high above standard zoom.
Use zoom-fit or Range of y such as $-10$ to 100, x from $-10$ to 100



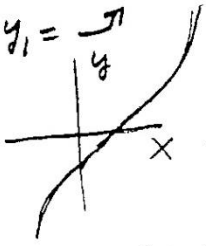

10. $y_1 = \sqrt{2x+20}$ $y_2 = \sqrt{1-6x} - 5$



$x = -8$

11. $3\sqrt{2x+5} - 2\sqrt{7-x} - 3 = 0$

$y_1 =$



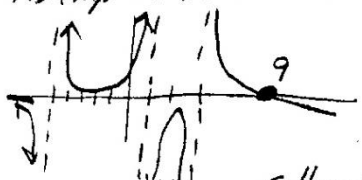

ROOT = .9752 $\approx \frac{118}{121}$

[See #37 p 147 College Alg = OneStep]
(ALGEBRAIC SOLUTION IS HARD!)

12. $\frac{1}{x^2-4x+3} - \frac{1}{x^2+4x-5} - \frac{1}{x^2+2x-15} = 0$

ROOT: $x = 9$

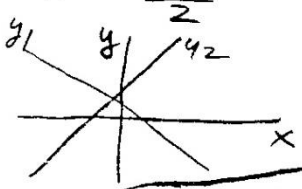
Asymptotes: $x = -5, 1, 3$




[See EX 4 p. 132 College Alg OneStep]
(ALGEBRAIC SOLUTION IS EASY!)

13. $y_1 = \frac{2x+3}{5} - \frac{3x-1}{2}$

$y_2 = \frac{4x+7}{2}$




$y_1 \geq y_2$ $(-\infty, -.7741935]$

$\frac{2x+3}{5} - \frac{3x-1}{2} \geq \frac{4x+7}{2}$,

$4x + 6 - 15x + 5 \geq 20x + 35$

$-11x + 11 \geq 20x + 35$

$-31x \geq 24$

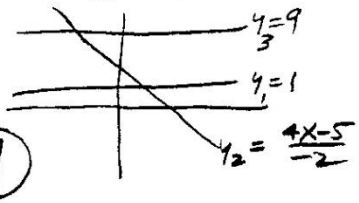
$x \leq -\frac{24}{31}$

$(-\infty, -\frac{24}{31}]$

14. $y_1 = 1$

$y_2 = \frac{4x-5}{-2}$

$y_3 = 9$




$(-3.25, -.75)$ or $(-\frac{13}{4}, \frac{3}{4})$

(Algebra is even easier!)

15.

| x | .20 | .20x |
|---|---|---|
| 100 | .80 | 80 |
| x+100 | .45 | .45(x+100) |

$.20x + 80 = .45x + 45$

$35 = .25x$

$x = \frac{35}{1/4} = 140$

16. $x = \frac{\begin{vmatrix} -1 & 7 \\ 1 & 8 \end{vmatrix}}{\begin{vmatrix} 5 & 7 \\ 6 & 8 \end{vmatrix}} = \frac{-15}{-2}$

$y = \frac{\begin{vmatrix} 5 & -1 \\ 6 & 1 \end{vmatrix}}{D} = \frac{11}{2}$

$(\frac{15}{2}, \frac{11}{2})$

17. $D = 17$ $x = \frac{-68}{17} = -4$

$XN = -68$

$YN = 51$ $y = \frac{51}{17} = 3$

$ZN = 85$ $z = \frac{85}{17} = 5$

$(-4, 3, 5)$