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MAC 1140 FINAL EXAM B NAME _____

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

1. Calculate each of the following (round to nearest thousandth or give scientific notation):

a) $\dfrac{8.43 \times 10^{13} \cdot 6.59 \times 10^{8}}{7.25 \times 10^{16} \cdot 8.38 \times 10^{7}}$ b) $\dfrac{\sqrt[3]{500}}{\sqrt{0.0036}}$ c) $\dfrac{50!}{25!}$

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

3. Combine your knowledge of algebraic functions with the graphing calculator to graph each of the following. Sketch and label your graphs:

a) $Y = X^4 - 29X^2 + 100$ b) $Y = X^4 - 20X^3 + 100X^2$

4a) Find point(s) of intersection for $Y = X^3 + 3X^2$ and $Y = 4X + 12$. Draw the graph.

4b) Solve the inequalities: $X^3 + 3X^2 > 4X + 12$ and $X^3 + 3X^2 < 4X + 12$

5. Find ALL roots of $Y = X^4 + 2X^3 - 6X^2 - 32X - 160$.

6. Solve the equation algebraically AND graphically.
Sketch the graph.

$$(X+4)^{\frac{1}{2}} + 5X\,(X+4)^{\frac{3}{2}} = 0$$

7. Find all real or complex roots of $X^3 = 125$

8. Use the calculator to find:

a) $(3 - 5i)^4$ b) $\dfrac{7 - 4i}{4 + i}$ (Express in fractional form.)

9. Solve the system: Show work or describe method used.

$$\begin{aligned} 4X + 5Y - 3Z &= -5 \\ 2X - 3Y - 2Z &= 1 \\ 7X + 4Y - 4Z &= 1 \end{aligned}$$

10a) $\sum_{i=1}^{100} (3i + 5)$

b) $\sum_{j=1}^{30} 2^j$

11. Expand: $(2X - Y)^6$

12. Solve for X: $6^{(2 - X)} = 2^{(3X + 1)}$

13. Find the compound amount if \$2000 is invested at 6% annual interest rate for 20 years if the interest is compounded

a) semiannually b) quarterly c) continuously

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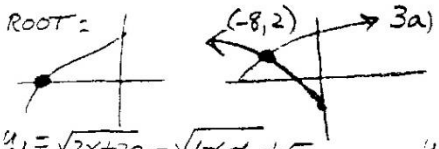
MAC 1140 FINAL EXAM B Solutions – Not necessarily the best solutions. Always be creative, try to find a better way!

1a) 9.14×10^{13}

b) 132.28

c) 1.96×10^{39}

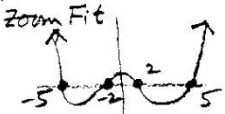
2. ROOT:



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

$x=-8$

3a) Zoom Fit

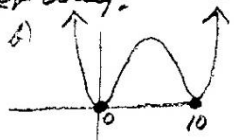


$y=(x^2-4)(x^2-25)$

$=(x-2)(x+2)(x-5)(x+5)$

$x=2,-2,5,-5$

b)



$y=x^2(x^2-20x+100)$

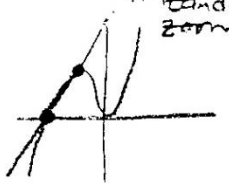
$=x^2(x-10)^2$

$x=0,10$

4a) $y_1=x^3+3x^2$

$y_2=4x+12$

Standard zoom:



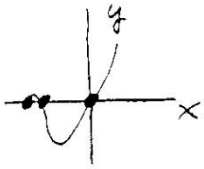
(-3,0) (-2,4) (2,20)

b) $x^3+3x^2>4x+12$

$(-3,-2)\cup(2,\infty)$

c) $x^3+3x^2<4x+12$

$(-\infty,-3)\cup(-2,2)$



$x^3+3x^2=4x+12$

$x^2(x+3)-4(x+3)=0$

$(x+3)(x^2-4)=0$

$x=-3 \quad x=\pm2$

5. $y=x^4+2x^3-6x^2-32x-160$

degree = 4.

Enter coefficients.

$x=4,-4,-1+3i,-1-3i$

6. $(x+4)^{1/2}+5x(x+4)^{3/2}=0$

$(x+4)^{1/2}\left[1+5x(x+4)\right]=0$

$(x+4)^{1/2}(5x^2+20x+1)=0$

$x=-4 \quad x=-.0506 \quad x=-3.94$ ROOT

$x=\dfrac{-20\pm\sqrt{400-4(5)(1)}}{2(5)}$

$=\dfrac{-20\pm\sqrt{380}}{10}=\dfrac{-20\pm2\sqrt{95}}{10}$

$=\dfrac{-10\pm\sqrt{95}}{10}$

7. $x^3-125=0$

$(x-5)(x^2+5x+25)=0$

$x=5 \quad x=\dfrac{-5\pm\sqrt{25-4\cdot25}}{2}$

$x=5 \quad x=\dfrac{-5\pm\sqrt{-75}}{2}$

$x=5,\ x=\dfrac{-5\pm5i\sqrt{3}}{2}$

8a) $(3-5i)^4$

$=-644+960i$

b) $(7-4i)-(4+i)=$

FRAC $=\dfrac{24}{17}-\dfrac{23}{17}i$

9. CRAMER'S Rule –

$x=\dfrac{\begin{vmatrix}-5&5&-3\\1&-3&-2\\4&-4&\end{vmatrix}}{\begin{vmatrix}4&5&-3\\2&-3&-2\\7&4&-4\end{vmatrix}}=\dfrac{-111}{-37}=3$

$y=\dfrac{\begin{vmatrix}4&-5&-3\\2&1&-2\\7&1&-4\end{vmatrix}}{-37}=\dfrac{37}{-37}=-1$

$z=\dfrac{\begin{vmatrix}4&5&-5\\2&-3&1\\7&4&1\end{vmatrix}}{-37}=\dfrac{-148}{-37}=4$

$(3,-1,4)$

10a) $\sum_{i=1}^{100}$

$=5050$

b) sum, seq 2^x, 1, 30, 1)

$2,147,483,646$

11. $(2x-y)^6$

$=(2x)^6-\binom{6}{1}(2x)^5(y)+\binom{6}{2}(2x)^4(y)^2-\binom{6}{3}(2x)^3(y^3)+\binom{6}{4}(2x)^2y^4-\binom{6}{5}2xy^5+y^6$

$=64x^6-192x^5y+240x^4y^2-160x^3y^3+60x^2y^4-12xy^5+y^6$

Use Root

$2^{2-x}=6^{3x+1}$

$(2-x)\ln6=(3x+1)\ln2$

$2\ln6-x\ln6=3x\ln2+\ln2$

$2\ln6-\ln2=3x\ln2+x\ln6$

$2\ln6-\ln2=x(3\ln2+\ln6)$

$x=\dfrac{2\ln6-\ln2}{3\ln2+\ln6}$

$=.7466$

13a) $A=P(1+\frac{.06}{2})^{20\cdot2}$

$=2000(1.03)^{40}$

$=\$6524.08$

b) $2000(1+\frac{.06}{4})^{80}$

$=\$6581.33$

13c) $A=Pe^{rt}=2000\,e^{.06(20)}$

$=\$6640.23$