MAC 1140 EXAM 1 A NAME 1

Show all work on this test or on separate paper.
Turn in all work sheets. (CIRCLE) ANSWERS!

Perform the calculations. Round to three decimal places or give scientific notation.

1. $\dfrac{53{,}000^4}{\sqrt{0.042}}$

2. $\dfrac{(4.3\times10^{12})(6.3\times10^{-8})}{(9.5\times10^{-24})(8.7\times10^{16})}$

3. $\dfrac{\sqrt[5]{48000}}{\sqrt[3]{825}}$

4. $\sqrt{\dfrac{\sqrt{85}}{\sqrt{5}}}$

5. $\dfrac{7^4+32}{7^4-200}$

6. $32^{-3/5}$

7. $\dfrac{4+3\sqrt{3}}{4}$

8. $\sqrt[3]{75+3\sqrt{80}}$

9. Rationalize the denominator

$$\frac{5}{2\sqrt{10}-5}$$

10. Simplify the radical:

$$\sqrt{\frac{\sqrt{85}}{\sqrt{5}}}$$

In 11-14, factor completely:

11. $x^2-13x+42$

12. $8x^3+125$

13. $x^3+5x^2-25x-125$

14. $x^2(x^2+1)^{-1/2}+(x^2+1)^{1/2}$

15. Find the distance and slope from $(-1,2)$ to $(-5,4)$

$d =$ $\qquad$ $m =$

16. Find the equation of the line (in slope-intercept form) from $(-1,2)$ to $(-5,4)$

17. What functions must be entered into the calculator to graph the circle $x^2+y^2=25$?

18. Sketch the graph of $y = 100\sqrt{25-x^2}$ with the RANGE:
Xmin = −8 Xmax = 8 Xscl = 1 Ymin = −2000 Ymax = 2000 Yscl = 500

19. Reset Range to ZSTD, and sketch $y = x^2 - 144$. When nothing appears on the graph, zoom out until you can "see" the graph. Sketch the graph and give x & y intercepts.

In 20 – 22, solve the equations using graphical methods. In each case, explain what you did and sketch.

20. $x^3 + 2x^2 - 13x + 10 = 0$

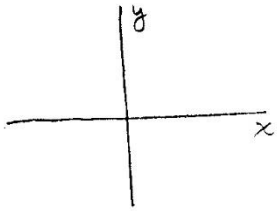
21. $\frac{1}{x-3} + \frac{1}{x+3} = \frac{10}{x^2-9}$

22. $\sqrt{4x+7} = \sqrt{2x+3} + 1$

23. Find the points of intersection graphically (3 decimal places!)

$y = 4 - x^2$

$y = 2x - 1$



24. Solve for r:

$S = \frac{rL - a}{r - 1}$

25. If a 3 foot stick casts a shadow of 2.6 feet, how tall is a tree that casts a shadow of 87.3 ft

MAC 1140 EXAM 1A Solutions

1. $\frac{53{,}000^4}{\sqrt{0.042}} = 3.850 \times 10^{19}$

2. $\frac{(4.3\times10^{12})(6.3\times10^{-8})}{(9.5\times10^{-24})(8.7\times10^{16})} = 3.278\times10^{11}$

3. $\frac{\sqrt[5]{48000}}{\sqrt[3]{825}} = 0.921$

4. $\sqrt{\frac{\sqrt{85}}{\sqrt{5}}} = 2.031$

5. $\frac{7^4+32}{7^4-200} = 1.105$

6. $32^{-3/5} = \frac{1}{8} = 0.125$

7. $\frac{4+3\sqrt{3}}{4} = 2.299$

8. $\sqrt[3]{75+3\sqrt{80}} = 4.670$

9. $\frac{5}{(2\sqrt{10}-5)} \cdot \frac{(2\sqrt{10}+5)}{(2\sqrt{10}+5)}$
$= \frac{5(2\sqrt{10}+5)}{4\cdot10-25} = \frac{2\sqrt{10}+5}{3}$

10. $\sqrt{\frac{\sqrt{85}}{\sqrt{5}}} = \sqrt{\sqrt{17}} = \sqrt[4]{17}$

11. $x^2-13x+42$
$(x-7)(x-6)$

12. $8x^3+125$
$(2x+5)(4x^2-10x+25)$

13. $x^3+5x^2-25x-125$
$= x^2(x+5)-25(x+5)$
$= (x+5)(x^2-25) = (x+5)^2(x-5)$

14. $x^2(x^2+1)^{-1/2}+(x^2+1)^{1/2}$
$= (x^2+1)^{-1/2}\left[x^2+(x^2+1)\right]$
$= \frac{2x^2+1}{\sqrt{x^2+1}}$

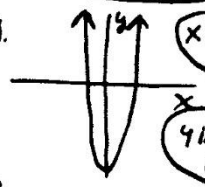
15. $(-1,2)\ (-5,4)$
$d = \sqrt{4^2+2^2} = \sqrt{20} = 2\sqrt{5}$
$m = \frac{4-2}{-5-(-1)} = -\frac{1}{2}$

16. $y-y_1 = m(x-x_1)$
$y-2 = -\frac{1}{2}(x+1)$
$y-2 = -\frac{1}{2}x-\frac{1}{2}$
$y = -\frac{1}{2}x+\frac{3}{2}$

17. $x^2+y^2=25$
$y^2 = 25-x^2$
$y = \pm\sqrt{25-x^2}$
$y_1 = \sqrt{25-x^2}$; $y_2 = -\sqrt{25-x^2}$

18.

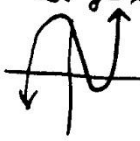
19.



x int: $(\pm12, 0)$

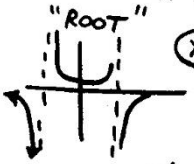
y int $(0, -144)$

20. $x^3+2x^2-13x+10=0$
Let $y = x^3+2x^2-13x+10$



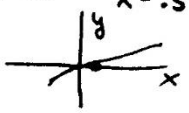
"ROOT"
$x = 1, 2, -5$

21. Let $y = \frac{1}{x-3}+\frac{1}{x+3}-\frac{10}{x^2-9}$



"ROOT"
$x = 5$

22. Let $y = \sqrt{x+7}-\sqrt{2x+3}-1$
"ROOT" $x = .5$

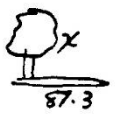


23. $y = 4-x^2$
$y = 2x-1$
Use "ISECT"

$(1.449, 1.899)$
$(-3.449, -7.899)$

24. $S = \frac{rL-a}{r-1}$
$Sr-S = rL-a$
$Sr-rL = S-a$
$r(S-L) = S-a$
$r = \frac{S-a}{S-L}$

25.



$\frac{x}{87.3} = \frac{3}{2.6}$ or $\frac{x}{3} = \frac{87.3}{2.6}$
$x = \frac{3(87.3)}{2.6} = 100.731'$