

MATH 098
FINAL EXAM - FORM A
Spring 2008

Name _____ (please print)

Instructor _____ Score _____

Point-values for each problem are shown at the right in parentheses. (100 + 5 bonus = 105 points)

PART I: PERFORM THE INDICATED OPERATIONS.
SIMPLIFY AS MUCH AS POSSIBLE: Show appropriate work.

1. Add: $(3x^2 + 9x - 2) + (5x^2 - 2x + 3)$ 1. _____ (2)

2. Multiply: $(2x - 5y)(3x + y)$ 2. _____ (3)

3. Reduce: $\frac{4a^4b^3}{32ab^5}$ 3. _____ (3)

4. Reduce: $\frac{2m - m^2}{18 - 9m}$ 4. _____ (3)

5. Add: $\frac{3}{5x} + \frac{2}{25y}$ 5. _____ (3)

6. Multiply: $\sqrt{m}(4\sqrt{m} - 5)$ 6. _____ (3)

7. Simplify and write using positive exponents only:
 $(5z^{-6})(3z^2)$

7. _____ (3)

8. Rewrite in simplest radical form assuming x and y are positive real numbers.

$$\sqrt{49x^5y^6}$$

8. _____ (3)

PART II: FACTOR COMPLETELY

9. $2z^3 + 10z^2 + 12z$

9. _____ (3)

10. $49a^2 - 4$

10. _____ (3)

PART III: SOLVE FOR THE INDICATED VARIABLE. CHECK SOLUTIONS WHERE NECESSARY. You must show your work to receive credit.

11. Solve for x: $-5(x-1) = 8 - 2x$

11. $x =$ _____ (3)

12. Solve for y: $\sqrt{5y+1} = 4$

12. $y =$ _____ (4)

13. Solve for a : $\frac{4}{3a-9} = \frac{2}{9}$

13. $a =$ _____ (3)

14. Solve for t . Graph the solution set on the number line provided.

$$4(3t - 2) < 9t + 4$$

14. _____ (3)

graph  (1)

PART IV: LINEAR EQUATIONS AND MODELING

Show appropriate work.

15. Consider the linear equation $2x - y = 6$

a) Find the x-intercept of this line.

a) x-intercept: (____, ____) (1)

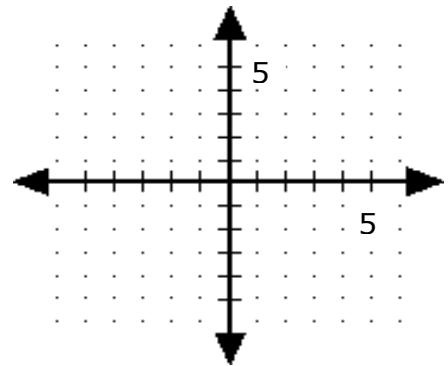
b) Find the y-intercept of this line.

b) y-intercept: (____, ____) (1)

c) Graph the line on the axes provided.

c) _____ (2)

Label any two ordered pairs on the line with their coordinates.



d) Write the equation in slope-intercept form.

d) _____ (2)

e) State the slope of the line.

e) _____ (1)

f) State the slope of a line perpendicular to this line.

f) _____ (1)

PART V: SYSTEMS OF LINEAR EQUATIONS. You must show your work to receive credit

18. Solve the following system of equations.

$$\begin{aligned}x + 3y &= -1 \\2x - y &= 5\end{aligned}$$

18. $(x, y) = (\underline{\hspace{2cm}}, \underline{\hspace{2cm}})$ (4)

19. Solve the following problem using a system of equations with two variables.

500 tickets were sold for one performance of *A Room With A View* at the Way-Off Broadway Theater. The tickets for adults sold for \$7.50 each and the tickets for children sold for \$4.00 each. The total receipts for the performance were \$3,312.50.

Let A = the number of adult tickets sold
Let C = the number of children's tickets sold

a) Write an equation involving A and C that represents the total number of tickets sold.

a) _____ (1)

b) Write an equation involving A and C that represents the total receipts for the performance.

b) _____ (1)

c) Use the two equations from above to solve for the number of adult tickets sold and the number of children's tickets sold.

c) number of adult tickets _____ (2)

number of children's tickets: _____ (2)

PART VI: SOLVE FOR THE INDICATED VARIABLE. You must show your work to receive credit.

20. Solve for z : $2z^2 = 5z - 2$

20. $z = \underline{\hspace{2cm}}$ $z = \underline{\hspace{2cm}}$ (4)

21. Solve for x using the **quadratic formula**, $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.
Round your answer to the nearest **hundredth**.

$$3x^2 + 4x - 1 = 0$$

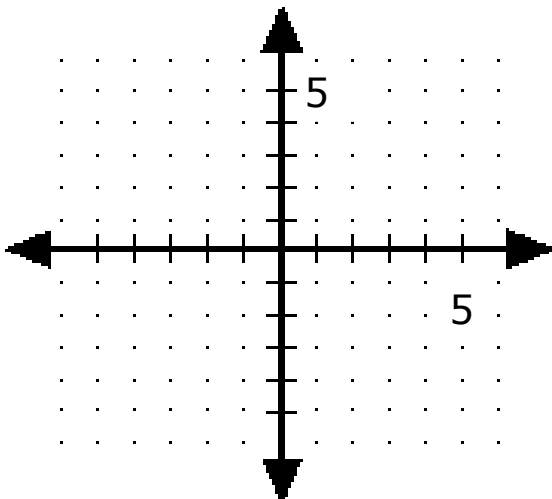
21. $x = \underline{\hspace{2cm}}$ $x = \underline{\hspace{2cm}}$ (4)

22. Solve for m : $2^{9-3m} = 8$

22. $m = \underline{\hspace{2cm}}$ (4)

PART VII: NONLINEAR EQUATIONS AND MODELING. Show appropriate work.

23. Given the function $y = x^2 - 6x + 5 = (x - 5)(x - 1)$, find the EXACT coordinates of the vertex, y intercept, x intercepts, and draw the graph.



a) Vertex: (_____ , _____) (2)

b) y-intercept: (_____ , _____) (1)

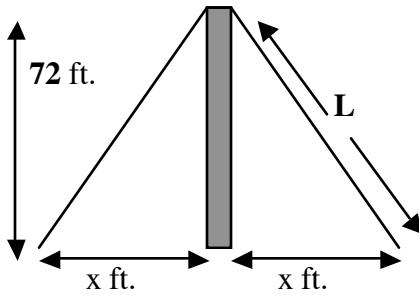
c) x-intercepts: (_____ , _____) (1)

(_____ , _____) (1)

d) Draw the graph in the grid at the left. (1)

Show appropriate work.

24. A cellular phone technician needs to run two stabilizing cables from the top of a 72-foot tower. The technician intends to anchor each wire x feet from the base of the tower.



a) Write an equation for L^2 , the square of one section of the cable (from the top of the tower to the ground on one side) in terms of its distance, x from the base of the tower,

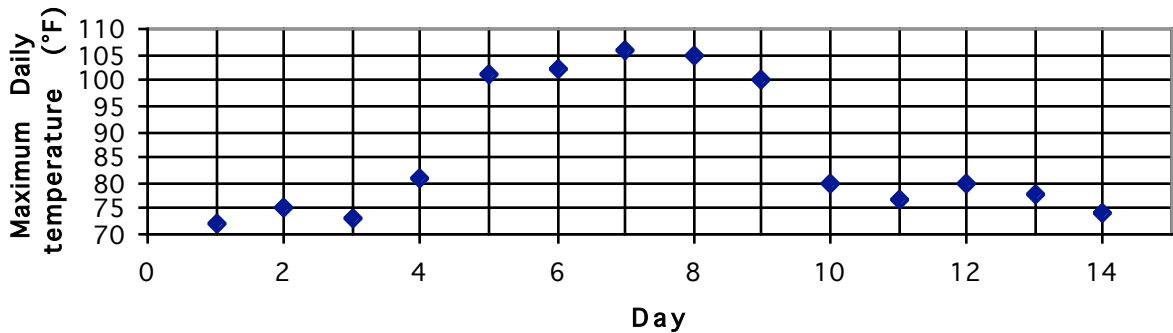
a) $L^2 =$ _____ (3)

b) If the supporting cables are each anchored 45 feet from the base of the tower, find the TOTAL length of cable that the technician will need to complete this job. **Round** your answer to the nearest **tenth**

b) _____ (2)
number units

25. **BONUS QUESTION**

The figure below shows a graph of the maximum daily temperature over a two-week period at a resort in Palm Springs.



a) List all days on which the temperature was less than 80 °F. a) _____ (1)

b) Over what interval of days did a heat wave hit the resort? b) _____ (1)

c) By approximately how many degrees did the maximum daily temperature increase when the heat wave hit? c) _____ (1)
number units

d) Approximate the average temperature at this resort over the two-week period. Round answer to the nearest tenth. d) _____ (2)
number units