

MATH 099
FINAL EXAM - FORM A
Winter 2010

Name _____

Instructor _____ Score _____

Point-values are shown at right in parentheses.

I. SIMPLIFY AS MUCH AS POSSIBLE.

Show appropriate work.

1. $\frac{15a^{-4}b^{-6}}{3a^7b^{-10}}$ (Write your answer using only positive exponents.) 1. _____ (3)

2. $(81x^8)^{1/4}$ 2. _____ (3)

3. $\frac{2x^2 + 4x}{x - 5} * \frac{x^2 - 4x - 5}{x + 2}$ 3. _____ (3)

4. $\frac{x + 4}{x^2 - 36} + \frac{5}{x + 6}$ 4. _____ (3)

5. $\sqrt[3]{54m^9n^5}$ (Write your answer using radical notation.) 5. _____ (3)

6. $3\sqrt{2x} - \sqrt{75} + \sqrt{12} + \sqrt{50x}$ 6. _____ (3)

7. Factor completely: $2x^2y - 5xy - 12y$ 7. _____ (3)

8. Rewrite the equation in exponential form: $\log_p T = 3$ 8. _____ (3)

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II. SOLVE AS INDICATED.

Show appropriate work.

9. Solve for h : $V = \frac{1}{3}\pi \cdot r^2 \cdot h$ 9. _____ (3)

10. Solve for r : $\sqrt[3]{2r - 4} = 2$ 10. _____ (3)

11. Solve for x : $x + 2 = \frac{24}{x}$ 11. _____ (3)

12. Solve for x : $x^2 + 1 = 3x$ (Write answer in simplified radical form.) 12. _____ (3)

13. Solve for w : $7^w = 135$ (Answer rounded to hundredths place.) 13. _____ (3)

14. Solve for x : $\log(x) = -1$ 14. _____ (3)

Show appropriate work.

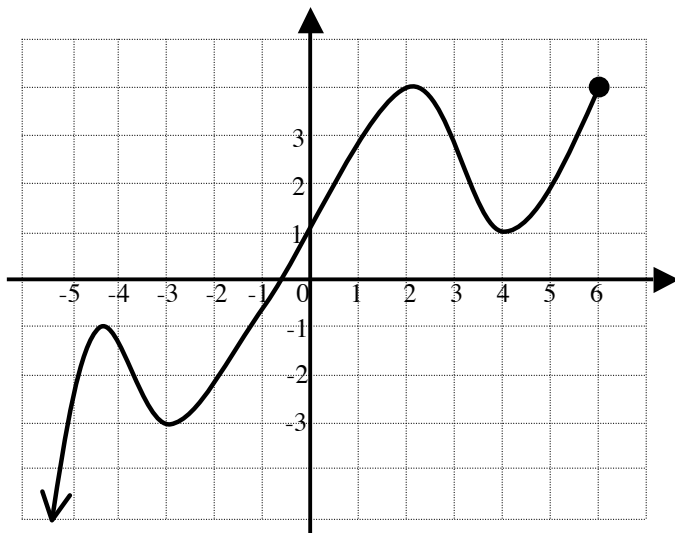
15. Find the intersection of the lines $y = 3x + 4$ and $x + 2y = 1$.

15. _____ (3)
 Write answer as an ordered pair

16. The time (T) it takes to travel a certain distance is inversely proportional to the speed (R) at which you drive. If you drive at 40 mph it takes 3 hours. Find the relation between T and R .

16. _____ (3)

17. Use the graph to approximate answers for the following questions.



a. $g(4) = \underline{\quad ? \quad}$

a. _____ (2)

b. For how many values of x is $g(x) = -1$?

b. _____ (2)

c. Give the DOMAIN of the function.

c. _____ (2)

d. Give the RANGE of the function.

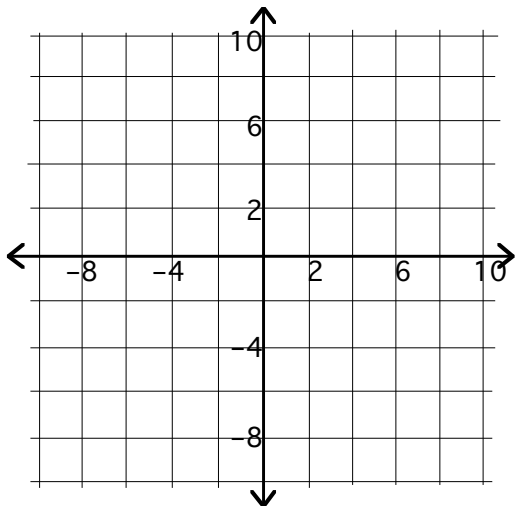
d. _____ (2)

Show appropriate work.

18. Given, $h(x) = \sqrt{x+5}$ a. Find $h(5)$. a. _____ (2)

b. Find x such that $h(x) = 2$. b. _____ (2)

19. Graph the following functions in the standard window of your graphing calculator:



$$f(x) = x^3 + 2x^2 - 3x + 3$$

a. Sketch the results (2)

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

c. The x -intercept: (_____, _____) (2)
 (Answer rounded to hundredths place.)

20. Given the quadratic function $f(x) = -x^2 + 4x - 3$, find the following:

a. Vertex (____, _____) (2)

b. y -intercept (_____, _____) (2)

c. x -intercepts (_____, _____) and (_____, _____) (2)

21. Suppose that y is a linear function of x .

a. Complete the table of values below. (2)

x	0	3	6	
y	4	10		24

b. Write a linear equation expressing y in terms of x .

$y =$ _____ (3)

Show appropriate work.

22. A hardboiled egg is put into a sink to cool. Its temperature T (in degrees Celsius) t minutes later is given by $T(t) = 18 + 80 * 2^{-0.404t}$.

a. Find the temperature of the egg after 10 minutes. (Round to the nearest tenth of a degree.)

a. _____ (2)
units

b. How long will it take for the temperature of the egg to reach 20.1 degrees Celsius? (Round to the nearest minute.)

b. _____ (3)
units

23. Find the equation of the line that passes through $(-2, 5)$ and is perpendicular to the line $2x + y = 5$. Write your answer in slope-intercept form.

$y =$ _____ (4)

24. The loudness of a sound is measured in decibels D by

$$D(x) = 10 * \log(10^{16} x)$$

where x is the intensity of its sound waves (in watts per square meter).

a. The sound of rustling maple leaves generates about 10^{-13} watts per square meter. Find the number of decibels for the sound of rustling maple leaves.

a. _____ (2)
units

b. A noisy restaurant registers at about 70 decibels. What is the intensity of its sound waves?

b. _____ (3)
units

Show appropriate work.

25. The area of a rectangle with a perimeter of 20 feet is given by $A(w) = 10w - w^2$ where w is the width of the rectangle.

a. What is the area if the width of the rectangle is 3 feet?

a. _____ (2)
units

b. What width will yield the greatest area of the rectangle?

b. _____ (2)
units

c. What is the largest area that the rectangle can have?

c. _____ (2)
units

26. Write the letter of the graph corresponding to each equation. If none of the graphs, G – O match the equation, then respond “none”.

a. $y = 1 - x^2$

a. _____ (1)

b. $y = 3$

b. _____ (1)

c. $y = 2^x$

c. _____ (1)

d. $y - 2x = -4$

d. _____ (1)

