MATH 128 - 129 Practice for Final Exam

Name____________________________________

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Evaluate.
1) Given that \( \log x = 4 \) and \( \log y = 5 \), find \( \log xy^2 \).
   A) 18    B) 100    C) 40    D) 14

Find the slope of the line through the given pair of points.
2) (3, -2) and (3, -6)
   A) \(-\frac{4}{3}\)    B) \(\frac{2}{3}\)    C) 0    D) undefined

Find an equation in slope–intercept form for the nonvertical lines. Write the vertical lines in the form \( x = h \).
3) Passing through (1, 9) and (-4, 0)
   A) \( y = 2x + 8 \)    B) \( y = -2x + 8 \)    C) \( y = \frac{9}{5}x + \frac{36}{5} \)    D) \( y = -\frac{9}{5}x + \frac{36}{5} \)

Find the coordinates of the midpoint of the line segment PQ.
4) P(0,5, -0,4), Q(-0.4, 1.9)
   A) (0.9, -2.3)    B) (0.05, 0.75)    C) (0.1, 1.5)    D) (0.45, -1.15)

Solve the problem.
5) A family is driving from Algebraville to Geometry City to Trig Town. With reference to the origin, Algebraville is located at (2, 4), Geometry City at (5, 12), and Trig Town at (15, 4), all numbers being in 1000-mile units. Find the distance traveled by the family. If necessary, round your answer to the nearest whole number.
   A) 12,806 mi    B) 21 mi    C) 8544 mi    D) 21,350 mi

Use the change-of-base formula and a calculator to evaluate each logarithm.
6) \( \log_5 64.60 \)
   A) 1.8970    B) 7.1778    C) 0.5271    D) 1.8102

Write the quadratic function in the form \( y = a(x - h)^2 + k \).
7) \( y = -2x^2 - 16x - 30 \)
   A) \( y = (x + 4)^2 + 2 \)    B) \( y = -2(x + 4)^2 + 2 \)
   C) \( y = -2(x - 4)^2 + 2 \)    D) \( y = 2(x + 4)^2 + 2 \)

Solve the problem.
8) How long will it take for $4400 to grow to $44,000 at an interest rate of 9.3% if the interest is compounded continuously? Round the number of years to the nearest hundredth.
   A) 24.76 yr    B) 2.48 yr    C) 2475.9 yr    D) 0.25 yr

Find the composite function for the given functions.
9) \( g \circ f \) for \( f(x) = 4x^2 + 5x + 4 \) and \( g(x) = 5x - 5 \)
   A) \( 20x^2 + 25x + 25 \)    B) \( 4x^2 + 5x - 1 \)    C) \( 4x^2 + 25x + 15 \)    D) \( 20x^2 + 25x + 15 \)
Find the distance between P and Q.
10) P(-5, -7), Q(4, -1)
   A) 3√13       B) 45√5       C) 3           D) 45

Solve the problem.
11) A certain radioactive isotope has a half-life of approximately 850 years. How many years to the nearest year would be required for a given amount of this isotope to decay to 65% of that amount?
   A) 298 yr       B) 528 yr       C) 463 yr       D) 1287 yr

Solve the logarithmic equation.
12) log₅(x + 4) + log₅(x - 4) = 1
   A) √21       B) 5           C) 81/5       D) 21

Find the zeros of the polynomial function and state the multiplicity of each.
13) f(x) = -5x²(x - 9)(x + 3)³
   A) x = -3, multiplicity 3; x = 0, multiplicity 2; x = 9, multiplicity 1
   B) x = -3, multiplicity 3; x = 0, multiplicity 2; x = 3, multiplicity 1; x = 9, multiplicity 1
   C) x = -3, multiplicity 3; x = 9, multiplicity 1
   D) x = -3, multiplicity 1; x = 3, multiplicity 1; x = 9, multiplicity 1

Solve the equation by multiplying both sides by the LCD.
14) \( \frac{7}{x - 4} = 1 + \frac{9}{x + 4} \)
   A) [8, -10]       B) {10}       C) [-8, 10]       D) {-9, 10}

Solve the inequality by the test-point method. Write the solution in interval notation.
15) x² + 6x + 9 ≤ 0
   A) (-∞, -3) ∪ [-3, ∞)       B) [3, ∞)
   C) [-3]       D) [3]

Factor the polynomial completely. If a polynomial cannot be factored, state that it is prime.
16) 98y⁴ - 18y²
   A) 2(7y² + 3)(7y² - 3)       B) 2y²(7y + 3)(7y - 3)
   C) 2y²(7y - 3)²       D) prime

Solve the inequality.
17) |3x - 5| ≥ 1
   A) \( \left( \frac{4}{3}, 2 \right] \)       B) [2, ∞)
   C) (-∞, -2] ∪ [1, ∞)       D) \( \left[-\frac{4}{3}, 2 \right] \) ∪ [2, ∞)

Solve the mixture problem.
18) How many liters of a 20% alcohol solution must be mixed with 80 liters of a 70% solution to get a 40% solution?
   A) 20 L       B) 200 L       C) 12 L       D) 120 L
Solve the problem.

19) Mardi received an inheritance of $40,000. She invested part at 12% and deposited the remainder in tax-free bonds at 8%. Her total annual income from the investments was $4400. Find the amount invested at 12%.
   A) $35,600  B) $29,000  C) $15,000  D) $30,000

Use the rules of exponents to simplify the expression. Use positive exponents to write the answer.

20) \( \left( \frac{3p^{2-q}}{2^{1-m^3}} \right)^2 \)
   A) \( \frac{6q^2}{m^6p^2} \)  B) \( \frac{36q^2}{m^6p^4} \)  C) \( \frac{6}{m^6p^4} \)  D) \( \frac{36q^4}{m^6} \)

Find the requested value.

21) Find \( f(4) \) for
   \( f(x) = \begin{cases} 
   7x + 1, & \text{if } x < 1 \\
   4x, & \text{if } 1 \leq x < 9 \\
   x, & \text{if } x \geq 9 
   \end{cases} \)
   A) 8  B) -4  C) 19  D) 16

Graph the function.

22) \( f(x) = \begin{cases} 
   x + 2, & \text{if } x > 0 \\
   3, & \text{if } x \leq 0 
   \end{cases} \)
Find the slope and the y-intercept from the equation of the line. Sketch a graph of the equation.

23) 2x + 4y = 18

A) m = -\frac{1}{2}; \ y-intercept = \frac{9}{2}

B) m = \frac{1}{2}; \ y-intercept = \frac{9}{2}
Graph the function.

24) \[ f(x) = \begin{cases} 
5x + 2 & \text{if } x < -2 \\
-2 & \text{if } -2 \leq x \leq 3 \\
4x - 1 & \text{if } x > 3 
\end{cases} \]