

MATH 115
Final Exam review

Directions: Show all algebraic steps to simulate test-taking expectations. Check your work.
Write the equation (a) in standard form and (b) in slope-intercept form for each line described.

Solve the following equations or inequalities.

1) $7/x^2 + 19/x = 6$

1) _____

2) $x^2 - 7x + 10 > 0$

2) _____

3) $|3x - 4| \leq 2$

3) _____

Use the compound interest formula to determine the time. Round to the nearest tenth.

4) \$1,000 to grow to \$2000 at 1.7% compounded quarterly

4) _____

5) \$4000 to triple at 2% compounded continuously

5) _____

Solve equation #4 using the quadratic formula and equation #5 using completing the square.

6) $-6x^2 = 3x + 2$

6) _____

7) $-3x^2 + 9x = 7$

7) _____

Solve the problem.

8) Suppose the amount of a radioactive element remaining in a sample of 100 milligrams after x years can be described by $A(x) = 100e^{-0.01175x}$. How much is remaining after 114 years? Round the answer to the nearest hundredth of a milligram.

8) _____

9) The growth in the population of a certain rodent at a dump site fits the exponential function $A(t) = 537e^{0.029t}$, where t is the number of years since 1979. Estimate the population in the year 2000.

9) _____

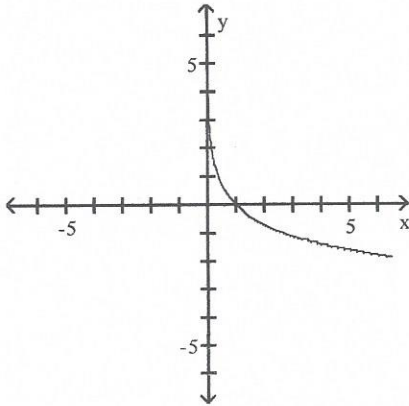
10) Zachary wants to buy a rug for a room that is 12 feet wide and 15 feet long. He wants to leave a uniform strip of floor around the rug. He can afford to have 108 ft² of carpeting. What directions should the rug have?

10) _____

Determine whether the graph is that of a function. If it is, use the graph to find its domain and range, the intercepts, if any, and any symmetry with respect to the x-axis, the y-axis, or the origin.

11)

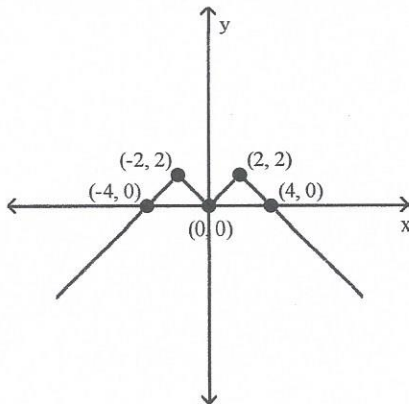
11) _____



Provide an appropriate response.

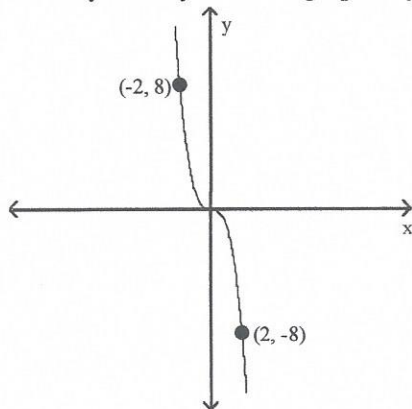
12) What symmetry does the graph of $y = f(x)$ exhibit?

12) _____



13) What symmetry does the graph of $y = f(x)$ exhibit?

13) _____



For the given functions f and g , find the requested composite function.

14) $f(x) = 7x + 12$, $g(x) = 3x - 1$; Find $(f \circ g)(x)$.

14) _____

15) $f(x) = 4x^2 + 2x + 8$, $g(x) = 2x - 6$; Find $(g \circ f)(x)$.

15) _____

Solve the following equations or inequalities.

16) $4^x - 2 = 8^{4x}$

16) _____

Solve the equation.

17) $\log_2(3x - 2) - \log_2(x - 5) = 4$

17) _____

18) $\log_4(x - 5) + \log_4(x - 11) = 2$

18) _____

Use a calculator to find the logarithm. Give an approximation to four decimal places.

19) $\log 254$

19) _____

20) $\log 2.62$

20) _____

21) $\log 0.0686$

21) _____

22) $\ln 174$

22) _____

23) $\ln 0.982$

23) _____

Solve the problem. Round your answer to the nearest tenth, when appropriate. Use the formula $\text{pH} = -\log [\text{H}_3\text{O}^+]$, as needed.

24) Find the pH if $[\text{H}_3\text{O}^+] = 1.0 \times 10^{-2}$.

24) _____

Use the properties of logarithms to rewrite the logarithm if possible. Assume that all variables represent positive real numbers.

25) $\log_6 10x$

25) _____

26) $\log_{10} xy$

26) _____

27) $\log_{16} \frac{19\sqrt{r}}{s}$

27) _____

Use the product, quotient, and power rules of logarithms to rewrite the expression as a single logarithm. Assume that all variables represent positive real numbers.

28) $\log_4 6 - \log_4 a$

28) _____

29) $7 \log_m p - 5 \log_m z^2$

29) _____

Use the change-of-base rule to find the logarithm to four decimal places.

30) $\log_6 32.43$

30) _____

31) $\log_3 0.700$

31) _____

Determine whether the function is even, odd, or neither.

32) $f(x) = 5x^2 - 4$

32) _____

33) $f(x) = (x + 1)(x + 3)$

33) _____

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

34) _____

Determine whether the graph of the given function is symmetric with respect to the y-axis, symmetric with respect to the origin, or neither.

35) $f(x) = 2x^2 + 5$

35) _____

36) $f(x) = -4x^3$

36) _____

37) $f(x) = 5x^4 - 2x + 6$

37) _____

Write an equation (a) in slope-intercept form and (b) in standard form for each line described.

38) Through (3, -2) and parallel to $2x - y = 5$

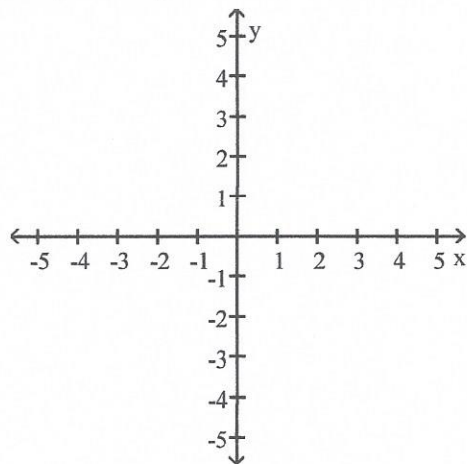
38) _____

39) Through (-2, 0) and perpendicular to $8x - 3y = 7$

39) _____

40) Graph the equation $f(x) = -3(x - 2)^2 + 1$

40) _____



41) Give the equations of any vertical, horizontal, or oblique asymptotes for the graph of the rational function $f(x) = (3x^2 - 6x - 24)/(5x^2 - 26x + 5)$

41) _____

42) Find the half-life of tritium, a radioactive type of hydrogen, which decays according to the function $A(t) = Ae^{-0.00043t}$ where t is time in years.

42) _____

43) Solve the equation. $\sqrt{6x + 7} - 9 = x - 7$

43) _____

44) State the transformation of $h(x)$ if $f(x) = |x|$ is vertically shrunk by a factor of $1/2$, reflected over the x -axis, shifted to the right 3 units, and vertically shifted downward two units.

44) _____