Chapter 5 and Spiral 10 Review

ALL PROBLEMS MUST BE DONE ON SEPARATE PAPER OTHERWISE; THE REVIEW WILL NOT BE GRADED.
SHOW ALL WORK FOR CREDIT.   REVIEW IS DUE ON TEST DAY.

Graph the equation.

1) $(x - 4)^2 + y^2 = 9$

Find the center (h, k) and radius r of the circle with the given equation.

2) $x^2 + y^2 + 4x - 2y = 76$

Find the vertex, focus, and directrix of the parabola.   Graph the equation.

3) $y^2 = -8x$

Find the equation of the parabola described.

4) Vertex at $(7, -6)$;   focus at $(8, -6)$ 5) Vertex at $(1, 7)$;   focus at $(1, 5)$

Find the vertex, focus, and directrix of the parabola. Graph the equation.

6) $(x + 1)^2 = (y + 2)$

Find an equation for the ellipse.

7) Center at $(0, 0)$;   focus at $(3, 0)$;   vertex at $(8, 0)$

Find the center, foci, and vertices of the ellipse.

8) $2x^2 + 4y^2 - 12x + 56y + 206 = 0$ 9) $\dfrac{(x+1)^2}{36} + \dfrac{(y-2)^2}{9} = 1$

Find an equation for the ellipse described.

10) Center at $(2, 6)$;   focus at $(5, 6)$;   vertex at $(7, 6)$

Find an equation for the hyperbola described. Graph the equation.

11) Center at $(0, 0)$; focus at $(\sqrt{65}, 0)$; vertex at $(4, 0)$

Find the center, transverse axis, vertices, foci, and asymptotes of the hyperbola.

12) $\dfrac{(x+3)^2}{25} - \dfrac{(y+4)^2}{36} = 1$

13) $(x - 4)^2 - 25(y + 3)^2 = 25$

Find the asymptotes of the hyperbola.

14) $x^2 - y^2 + 4x - 6y - 30 = 0$

Find a rectangular equation for the plane curve defined by the parametric equations.

15) $x = 2t, y = t + 4; -2 \le t \le 3$

Graph the curve whose parametric equations are given.

16) $x = 2t - 1, y = t^2 + 3; -4 \le t \le 4$

Use transformations to graph the function.   Determine the domain, range, and horizontal asymptote of the function.

17) $f(x) = 4^{(x+4)} - 1$ 18) $f(x) = 5^{-x} + 2$

Solve the equation.

19) $4^{7-3x} = \dfrac{1}{16}$

Graph the function.

20) $f(x) = 2 - e^{-x}$

Solve the equation.

21) $3^{-x} = \dfrac{1}{81}$ 22) $4^{x-1} = 32^{3x}$ 23) $27^{4x+3} = 9^{5x}$

Change the exponential expression to an equivalent expression involving a logarithm.

24) $7^3 = 343$

Change the logarithmic expression to an equivalent expression involving an exponent.

25) $log_2 \dfrac{1}{8} = -3$

Find the exact value of the logarithmic expression.

26) $log_3 9$ 27) $log_4 \dfrac{1}{64}$

Find the domain of the function.

28) $f(x) = log(x + 4)$

Graph the function.

29) $f(x) = log_4(x + 1)$

Solve the equation.

30) $log_3 x = 2$ 31) $log_8(x^2 - 7x) = 1$

Use the properties of logarithms to find the exact value of the expression. Do not use a calculator.

32) $\log_9 9^{16}$

Write as the sum and/or difference of logarithms. Express powers as factors.

33) $\log_2 \left(\frac{x^3}{y^7} \right)$

Express as a single logarithm.

34) $2\log_b q - \log_b r$

Use the Change-of-Base Formula and a calculator to evaluate the logarithm. Round your answer to three decimal places.

35) $\log_8 8 \, \log_8 78.71$

Solve the equation.

36) $\log_5 (x - 3) = 3$

Solve the exponential equation. Use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution.

37) $2^{x+8} = 4$ 38) $e^{x+6} = 2$

Solve the problem.

39) Austin invested $12,000 in an account at 12% compounded quarterly. Find the amount in Austin's account after a period of 6 years.

Solve the problem. Round to the nearest cent.

40) What principal invested at 6%, compounded continuously for 3 years, will yield $1500? Round the answer to two decimal places.

Solve the problem. Round your answer to three decimals.

41) What annual rate of interest is required to double an investment in 8 years?

Solve the problem.

42) The size P of a small herbivore population at time t (in years) obeys the function $P(t) = 500e^{0.2t}$ if they have enough food and the predator population stays constant. After how many years will the population reach 2000? Round to the nearest hundredth.

43) The logistic growth model $P(t) = \dfrac{990}{1 + 27.29e^{-0.348t}}$ represents the population of a bacterium in a culture tube after t hours. When will the amount of bacteria be 690?

Write the partial fraction decomposition of the rational expression.

44) $\dfrac{x}{x^2 - 3x + 2}$

45) $\dfrac{-3x^2 - 11x - 11}{(x + 2)(x + 1)^2}$

46) Conservationists tagged 120 black-nosed rabbits in a national forest in 2009. In 2012, they tagged 240 black-nosed rabbits in the same range. If the rabbit population follows the exponential law, how many rabbits will be in the range 5 years from 2009?