

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) $\frac{(x+1)^2}{36} + \frac{(y-2)^2}{9} = 1$

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

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

Graph the curve whose parametric equations are given.

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

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

Graph the function.

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

Solve the equation.

21) $3^{-x} = \frac{1}{81}$ 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) $\log_2 \frac{1}{8} = -3$

Find the exact value of the logarithmic expression.

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

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) $\log_8 78.71$

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.

$$P(t) = \frac{990}{1 + 27.29e^{-0.348t}}$$

43) The logistic growth model 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) a) $\frac{x}{x^2 - 3x + 2}$

b) $\frac{x}{x^2 - 7x + 12}$

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

b) $\frac{2x^2 - x + 4}{x^3 + 4x}$

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?