

Algebra II-Honors

CONICS

1. Find the center and radius of $x^2 + y^2 + 4x - 8 = 0$

2. Give the vertex, direction of opening, focus, and the equation of the directrix

For the parabola with the opening $x = \frac{-1}{2}(y+3)^2 - 7$

Vertex: _____

Direction of opening: _____

Focus: _____

Directrix: _____

Identify the conic, put in standard form, state the vertices, foci, length of major and minor axis, then graph.

3. $4(x-2)^2 + 2(y+3)^2 = 16$

4. $9y^2 + 18y = 25x^2 + 216$

5. $4y^2 - 8y - 12 = -x^2$

6. Find the equation of the parabola with vertex at (6, -1) and focus at (3,-1).

7. Find the equation of the ellipse whose foci are at (3,8) and (3,-6) and whose major axis is 18 units long.

8. Given the center at (3, -5) and radius = 3, write the equation of the circle.

State the shape of the conic with the equation listed below.

9. $7x^2 + 9y^2 = 63$

10. $2x^2 + 2y^2 - 12x + 17y = 2$

11. $x^2 - y + 12x - 8y = 0$

12. $5y^2 - 13x^2 = 81$

Polynomial functions and Compositions

Given that $p(x) = x^2 - 2x$, find:

13. $p(-1)$

14. $p(2x-3)$

15. Given that $f(x) = x^2 + 2$, find $5[f(x+1)]$.

16. Find all the roots of $0 = x^3 + x^2 - 4x - 4$

17. For the equation $x^3 - 7x^2 + 16x - 112 = 0$, if $(x - 7)$ is a factor find the remaining factors.

18. What are all the zeros of $f(x) = x^4 - 6x^3 + 12x^2 + 6x - 13$, if $(3+2i)$ is a factor.

For questions 19, write the polynomial function of least degree with the integral coefficients that has:

19. $3 + i, -1$ as roots

20. State all of the rational zeros for $f(x) = x^4 - 2x^3 - 4x^2 + 11x - 6$.

21. For the function $f(x) = 6x^3 + 5x^2 - 9x + 2$

- a) Zeros
- b) Relative Maxima
- c) Relative Minima

22. Find all zeros of the function: $f(x) = x^4 + 2x^3 - 11x^2 + 8x - 60$

For questions 23 – 25, solve the equations

23. $y - 8\sqrt{y} + 7 = 0$

24. $x^{\frac{4}{3}} - 29x^{\frac{2}{3}} + 100 = 0$

25. $x^4 - 5x^2 + 4 = 0$

If $f(x) = x^2 + 5$ and $g(x) = 9x - 1$, find:

26. $f \circ g$

27. $f(g(x))$

28. $[g \circ f](2x+1)$

Find the inverse of :

29. $f(x) = x^2 - 9$.

30. $f(x) = \frac{5x-7}{2}$

Rational Functions

State the vertical and horizontal asymptote, for questions 31 and 32 then graph.

31. $y = \frac{-2x+6}{x-1}$

32. $y = \frac{3}{x-4}$

33. If y varies jointly as x and z and $y = 5$ when $x = -4$ and $z = -2$, find y when $x = -6$ and $z = -3$.

34. If y varies directly as x and $y = 45$ when $x = 2.5$, find y when $x = 4$.

35. r varies inversely as x and $r = -2$ when $x = 25$.

Find x when $r = -40$

Simplify.

36. $\frac{x+5}{4x+20}$

37. $\frac{3x}{2y} \cdot \frac{8y^3}{6x^2}$

38. $\frac{\frac{x^2-2x-8}{x^2-3x-10}}{\frac{x^2-x-12}{x^2-2x-15}}$

39. $\frac{3}{x+4} + \frac{2x}{x^2-x-20}$

40. $\frac{x-3}{x+2} - \frac{x+1}{x^2-4}$

41. $\frac{b-1}{b} + \frac{b}{b+1}$

Solve.

$$42. \frac{1}{x-1} = 1 + \frac{x}{x-1}$$

$$43. \frac{3}{x-2} + \frac{4}{x} = 1$$

Exponential Equations and Logarithms

44. Express $\log_{16} 4 = \frac{1}{2}$ in exponential form.

Solve.

$$45. \log_2 x = 3$$

$$46. 4^{2x} = 8^{x-1}$$

$$47. \log_4 x = \frac{1}{3} \log_4 64$$

$$48. \log_6 (x - 2) - \log_6 5 = \log_6 8$$

$$49. \log_x 81 = 4$$

$$50. \log_3 x = \log_3 25 - 5 \log_3 2$$

$$51. \log_2 (x + 1) + \log_2 (x - 5) = 4$$

$$52. \log_3 x = -3$$

$$53. \log_{\sqrt{5}} 125 = x$$

54. Approximate the solution of $4^x = 6^{x-3}$

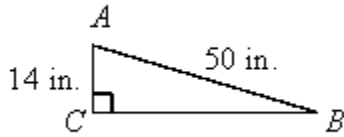
55. Amanda plans to invest \$500 at 8.25% interest, compounded continuously. Use the formula $A = Pe^{rt}$ to calculate how long it would take for her money to triple.

56. Jessica bought a car for \$250,000. She said she would never own a car that was worth less than \$100,000. So if the car depreciates at 12% per year, how long would she own the car?
Use the formula $V_n = P(1 + r)^n$

Trigonometry

57. Define sine, cosine, tangent, secant, cosecant, and cotangent.

58. Find the values of the six trigonometric ratios for $\angle A$.



Express each angle in radians.

Express each angle in degrees

59. 135°

60. 240°

61. $\frac{-5\pi}{3}$

62. $\frac{-7\pi}{6}$

Find the exact value of each:

63. $\tan \frac{5\pi}{6}$

64. $\csc 240^\circ$

65. $\sec 600^\circ$

66. $\sin\left(\frac{-2}{3}\pi\right)$

67. Solve the right triangle that has $B = 18^\circ$, $a = \sqrt{15}$

68. Solve triangle ABC given that $A = 58^\circ$, $B = 57^\circ$, and $b = 12$.

69. Find all solutions for the triangle with $e = 8$, $f = 8$, $E = 56^\circ$. If no solutions exist, write *none*. Round to the nearest tenth.

70. Given a triangle with $b = 6$, $c = 9$, and $A = 47^\circ$, what is the length of a ? Round to the nearest tenth.

Graphing Trigonometry

Graph :

71. $y = 2\sin \theta$

72. $y = -3\cos \theta$

73. $y = \tan \theta$

74. Write the equation of the sine graph that has an amplitude of 4 and period of π

75. Write the equation of the cosine graph that has an amplitude of 2 and period of $\frac{1}{3}\pi$