Algebra II Review
Chapters 9-11

Chapter 9

1. Suppose z varies directly as x and inversely as the square of y. When x= 35 and y = 7, the value of z is 50. Write the function that models the relationship and find z when x = 5 and y = 10.

2. If p and q vary inversely, and p = 10 when q = -4, what is q when p = -2?

3. Describe the horizontal asymptotes:

$$y = \frac{2x^2 + 3}{x^2 + 2}$$

4. Sketch the graph of $y = \frac{1}{x}$

5. Describe the vertical asymptotes: $y = \frac{x+3}{(2x+3)(x-1)}$

6. State any restrictions on the variable: $\frac{x^2 + x - 6}{x^2 + 3x}$

7 Simplify: $\frac{x^2 + x - 6}{x^2 + 3x}$

8. Divide: $\frac{y^2 + 5y + 4}{y^2 - 49} \div \frac{2y^2 + 5y - 12}{y^2 + 9y + 14}$

9. Simplify: $\frac{m}{m+3} - \frac{6m}{m^2 - 9}$

10. Simplify: $\dfrac{\dfrac{2y}{2y+1} - 1}{1 - \dfrac{2y}{2y-1}}$

Solve the following:

11. $\dfrac{4}{3x+3} = \dfrac{12}{x^2-1}$

12. $\dfrac{1}{4x} - \dfrac{3}{4} = \dfrac{7}{x}$

13. $\dfrac{3}{x+5} + \dfrac{-2}{x-5} = \dfrac{-4}{x^2-25}$

Chapter 10

**Identify each conic section as a parabola, circle, ellipse, or hyperbola.
Then write each equation in standard form.**

14. $y^2 + 2x^2 - 8y + 4x = 12$

15. $3x^2 - 6x = 9y^2 + 24$

16. $7x^2 + 14x - y = 3$

17. $y^2 + 2y + x^2 - 6 = 0$

18. Write the equation of a parabola with a directrix $y = -3$ and the vertex at the origin.

19. Write the equation of a parabola with a focus $(-2, 0)$ and a directrix $x = 2$.

20. Identify the vertex, focus, and directrix of $x = -\dfrac{1}{8}(y-2)^2 + 4$. Then graph.

21. Write the equation of a circle with a center $(-5, 7)$ and a radius $r = 5$.

22. Find the center and radius of $(x-2)^2 + (y-3)^2 = 4$. Then graph.

23. Write the equation of an ellipse with a center $(-1, 2)$, vertical major axis of length 8 and minor axis of length 6.

24. Find the foci of the ellipse $\dfrac{(x-3)^2}{25} + \dfrac{(y-2)^2}{16} = 1$. Then graph.

25. Write the equation of a hyperbola with vertices of (-2, 3) & (-2, -3) and foci of (-2, 5) & (-2, -5).

26. Find the foci and slope of the asymptotes of the hyperbola $\dfrac{x^2}{25} - \dfrac{y^2}{9} = 1$. Then graph.

Solve each system of equations.

27. $\begin{array}{l} x^2 + y^2 = 25 \\ 3x^2 - y^2 = 11 \end{array}$

28. $\begin{array}{l} x^2 + y^2 = 20 \\ y = x + 2 \end{array}$

Chapter 11

29. Find the 25th term of the arithmetic sequence: 26, 13, 0, -13, ...

30. Find the missing term of the arithmetic sequence: 8, _, 20

31. Is the given sequence geometric? If so, name the common ratio and the next two terms.   2, 1, 0.5, 0.25, ...

32. Find the missing term for the geometric sequence: 3, _, 48

33. Identify the sequence as arithmetic or geometric, and then find the common difference or ratio.   15, 30, 45, 60,.....

34. Evaluate: $\displaystyle\sum_{n=3}^{8}(7-n)$

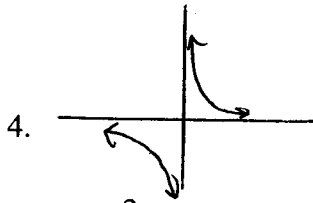35. Evaluate the series to the given term: $120 + 60 + 30 + 15 +.....;\ S_8$

36. Generate the first five terms of the geometric sequence: $a = 5, r = -3$

Answers

1. $z = \dfrac{70x}{y^2}; 3.5$

2. 20

3. $y = 2$

4.

5. $x = -\dfrac{3}{2}$ and $x = 1$

6. $x \neq -3, 0$

7. $\dfrac{x-2}{x}$

8. $\dfrac{y^2 + 3y + 2}{2y^2 - 17y + 21}$

9. $\dfrac{m^2 - 9m}{m^2 - 9}$

10. $\dfrac{2y - 1}{2y + 1}$

11. $x = 10$

12. $x = -9$

13. $x = 21$

14. Ellipse $\dfrac{(x+1)^2}{15} + \dfrac{(y-4)^2}{30} = 1$
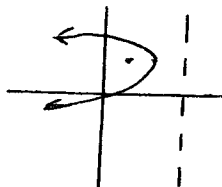
15. Hyperbola $\dfrac{(x-1)^2}{9} - \dfrac{y^2}{3} = 1$

16. Parabola $y = 7(x + 1)^2 - 10$
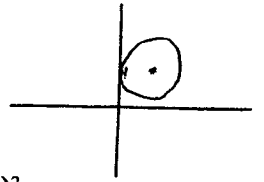
17. Circle $x^2 + (y + 1)^2 = 7$

18. $y = \dfrac{1}{12}x^2$
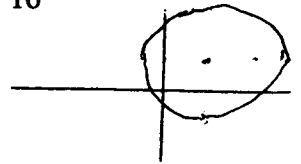
19. $x = -\dfrac{1}{8}y^2$

20. V(4,2), F(2,2), D: x = 6,
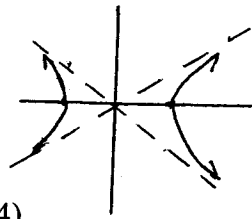
21. $(x = 5)^2 + (y - 7)^2 = 25$

22. C(2,3), r = 2

23. $\dfrac{(x+1)^2}{9} + \dfrac{(y-2)^2}{16} = 1$

24. F(0,2),(6,2)

25. $\dfrac{y^2}{9} - \dfrac{(x+2)^2}{16} = 1$

26. $F\left(\pm\sqrt{34}, 0\right); m = \pm\dfrac{3}{5}$

27. (3,4),(3,-4),(-3,4),(-3,-4)

28. (-4,-2),(2,4)

29. -286

30. 14

31. yes, r = .5   .125,.0625

32. 12

33. d = 15

34. 9

35. 239.0625

36. 5, -15, 45, -135, 405