

The following is a list of topics to know for your final. Below that are problems to complete that will you review. The chapter(s) the problem is from is given in parentheses. It is also a good idea to look at old homework, notes, videos, and quizzes to study.

Chapter 3 Topics

Determine what is a function
Determine what is even, odd, or neither
Evaluate and graph piecewise functions
Find the domain of a function
Perform function operations
Find local maximums and minimums
Find domain and range from a graph
Find the increasing and decreasing intervals of a graph
Evaluate functions
Graph base graphs and transformations

Chapter 5 Topics

Know factored and standard form of a polynomial
Graph a polynomial
Find increasing and decreasing intervals of a graph
Find zeros and multiplicity of a polynomial
Determine whether a graph crosses or touches at zeros
List all possible rational zeros
Prove zeros and factor polynomials with synthetic division
Write a polynomial in standard form given the zeros
Find a remainder
Find zeros, local max and mins from your calculator
Work with complex (imaginary) zeros
Find the degree and maximum number of turning points
Solve polynomial inequalities
Graph rational equations
Find vertical and end behavior asymptotes
Find the limits of a rational graph
Find the domain and range of a rational equation
Solve rational inequalities

Chapter 11 Topics

Know the equations of conic sections
Graph conic sections given the equation
Graph conic sections given facts
Find the equation of a conic section given graph
Find the equation of a conic section given facts
Change from general form to standard form
Determine the conic given general form
Find the focus of a paraboloid

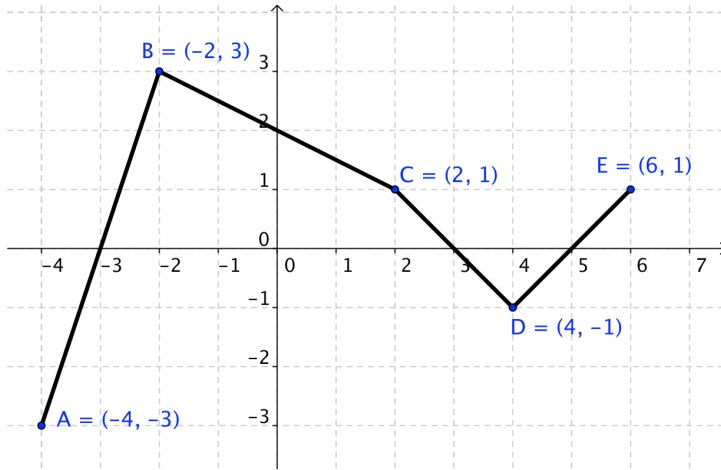
Chapter 4 Topics

Find the vertex of a quadratic equation
Find the max or min of a quadratic equation
Know vertex and standard form of a quadratic
Go between vertex and standard form.
Solve quadratic inequalities
Solve application problems (revenue, bridges, etc.)
Graph from standard and vertex form

Chapter 6 Topics

Find and evaluate a composite function
Find an inverse function
Find the domain and range of a function and inverse
Graph an inverse function
Prove two functions are inverses
Find an exponential equation given two points
Solve exponential equations
Solve logarithmic equations
Convert exponential and logarithmic expressions
Evaluate logarithms
Expand and condense logarithms
Use the compound interest formula
Use the continuous interest formula
Determine if a function is one-to-one

1. (3) Find $f(x + 1)$ given $f(x) = 3x^2 + 1$
2. (3) Determine $\frac{g}{f}(x)$ given $f(x) = x + 2$ and $g(x) = \sqrt[3]{x}$
3. (3), (5) Find the domain and range of the function $f(x) = \frac{5x+2}{x^2+5x-36}$
4. (3) Use the graph to determine:



- a) Local Maximum(s)
 - b) Local Minimum(s)
 - c) Increasing Interval
 - d) Decreasing Interval
 - e) Whether the function is even, odd, or neither
 - f) Where $f(x) \geq 0$
 - g) Where $f(x) < 0$
5. (3) Find the domain of the function $f(x) = \frac{x^3 - 1}{\sqrt{x+2}}$
 6. (3) Graph $f(x) = \frac{1}{2}|x - 3| + 5$
 7. (3) Graph $f(x) = \sqrt{x+1} + 3$
 8. (3) Graph the piecewise function $f(x) = \begin{cases} \frac{1}{x} & \text{if } x < 0 \\ x & \text{if } x \geq 0 \end{cases}$
 9. (4) Determine the minimum of $f(x) = 3x^2 + 24x - 1$

10. (4) The price p (in dollars) and the quantity x sold of rubik's cubes obey the demand equation:

$$p = -\frac{1}{10}x + 150$$

a) Express the revenue R as a function of x .

b) What is the revenue if 100 units are sold?

c) What quantity x maximizes revenue?

d) What is the maximum revenue?

e) What price should the company charge to maximize revenue?

11. (4), (11) Determine the equation of a parabola with vertex $(-5, -1)$ that goes through the point $(3, 1)$

12. (6) Find the inverse function of $f(x) = 7x + 2$. Then check that you have the correct inverse by proving their compositions both equal x .

13. (5) Find each zero and its multiplicity then graph $f(x) = (x + 3)^2(4x + 3)(x^2 - 4)$.

Then find where $f(x) < 0$.

14. (5) Determine all of the possible rational zeros, find each zero and its multiplicity, and then graph

$$f(x) = x^4 - 4x^3 + 9x^2 - 20x + 20$$

15. (5) Find each zero and its multiplicity, the y -intercept, the vertical asymptote(s), the horizontal asymptote,

and then graph $f(x) = \frac{x+2}{x^2-9}$

16. (5) Write an equation of a polynomial in standard form with rational coefficients and the zeros $3, 2 - i, 5i$.

17. (5) Determine the remainder of $(4x^3 - 2x^2 + 1) \div (x + 3)$

18. (5) Determine the maximum number of turning points of $f(x) = x^7 + 3x^3 - 2x^2 + 1$

19. (6) Solve the equation $7^x = 20$

20. (6) Solve the equation $2 \log_3(x + 4) = 9$

21. (6) Solve the equation $\log(x - 2) + \log(x - 3) = 2$

22. (6) Rewrite $\ln\left(\frac{x^3 y^2}{z^5}\right)$ using the sum or difference of logarithms with powers expressed as factors

23. (6) Rewrite $2 \log_3 x - \log_3 4 + 3 \log_3(2y)$ as a single logarithm

24. (6) Evaluate the logarithms without a calculator.

a.) $\log_4 256$

b.) $\log_2 \frac{1}{8}$

25. (6) If Bob deposits \$300 at 3.7% interest compounded daily, how much will he have after two years?

26. (6) If Sally invests \$400 at 7% interest compounded continuously, how long will it take the account to reach \$700?

27. (11) Find the vertex, focus, directrix, and then graph $y = \frac{1}{8}(x + 1)^2 - 1$

28. (11) Find the vertex, focus, directrix, and then graph $x = 2(y - 2)^2 + 5$

29. (11) Put the equation into standard form and state the coordinates of the vertex $4y^2 - 3x - 8y - 5 = 0$

30. (11) Determine the equation of the parabola given a vertex of $(2, 3)$ and focus $(4, 3)$

31. (11) Determine the equation of the parabola given a focus of $(6, -2)$ and directrix $y = 0$

32. (11) Find the center, foci, and vertices, then graph $\frac{(x-1)^2}{25} + \frac{(y+4)^2}{64} = 1$

33. (11) Find the center, foci, and vertices, then graph $\frac{(y+2)^2}{9} - \frac{(x-3)^2}{16} = 1$

34. (11) Determine the equation of the ellipse or hyperbola given foci $(-3, 4)$ & $(-3, 2)$ and vertices $(-3, 5)$ & $(-3, 1)$

35. (11) Determine the equation of the ellipse or hyperbola given center $(2, 7)$; focus $(5, 7)$; and vertex $(4, 7)$

36. (11) Put the equation in standard form and state the center for $4x^2 - 9y^2 + 40x - 72y - 19 = 0$