

1-3: a) Factor Completely b) Determine the zeros

1. $f(x) = 6x^2 - 5x + 1$

2. $f(x) = 4x^4 + 12x^3 - 16x^2$

3. $f(x) = x^4 - 5x^2 + 4$

4-7: Solve for x.

4. $|2x + 3| = 4$

5. $\sqrt{2x + 3} = 2$

6. $|6x - 5| = 2\sqrt{x + 3}$

7. $\frac{x}{x-4} + \frac{2}{x+6} = \frac{5x+20}{x^2+2x-24}$

8-13: Solve the following inequalities. State answers in interval notation.

8. $|2x + 3| < 9$

9. $2|5x - 1| \geq 16$

10. $(x - 5)^2(x + 2)(x - 1) \leq 0$

11. $\frac{2x(x - 4)}{5x + 3} > 0$

12. $\frac{x}{6} \geq 2 - \frac{x}{18}$

13. $49 \geq x^2$

14. Find the center and radius of the circle and then graph the circle.

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

15. Determine whether $f(x) = 2x^2 - 4x + 1$ opens up or down, find its vertex, axis of symmetry, y-intercept, and x-intercepts, if any.16. For the function f defined by $f(x) = x^2 - 4x + 1$, find $\frac{f(x+h) - f(x)}{h}$, $h \neq 0$.17. Find the average rate of change of $f(x) = x^2 + 3x + 1$ from 1 to 2. Use the result to find the equation of the secant line containing $(1, f(1))$ and $(2, f(2))$.

- Describe the test to do (work to show) for each type of symmetry listed below:
 - x -axis
 - y -axis
 - origin
 - even
 - odd
- If $f(x) = |x|$, find $g(x)$ after the following transformations are applied in order.
 - reflection over the x -axis
 - vertical compression by a factor of $1/2$
 - horizontal shift right 3
 - vertical shift up 4

3-6: a) Find the domain and range. b) State the asymptotes. c) State all intercepts.

3. $f(x) = \frac{4}{2-x}$

4. $f(x) = \frac{2x^2 - 5x - 3}{x^2 + x - 12}$

5. $f(x) = 4 - \sqrt{49 - x^2}$

6. $f(x) = \frac{\sqrt{x+3}}{x^2 - 49}$

7-11: Write the equation for the indicated polynomial.

- Linear with $f(2) = 7$ and $f(-1) = -4$.
- Quadratic with vertex $(-4, 8)$ and contains the point $(-6, 5)$
- Cubic with zeros of $4+i$ and 6 .
- Linear that is perpendicular to $4x - 7y = 12$ and contains the point $(3, 6)$.
- Cubic with zeros of $-2, 4$, and 1 and contains the point $(-1, -30)$.

12-14: Write the following answers in standard $a + bi$ form.

12. $6(3-2i) - 4(1+i)$

13. $(5-i)^2$

14. $\frac{5-2i}{3+4i}$

- Describe what you know about multiplicities of zeros and how they affect the graph of a polynomial/rational function.

Know what all of the basic library of functions look like as well as exponential and logarithmic functions so you can use them in transformations and piecewise function graphs.

1-4: Graph the following functions using transformations.

1. $f(x) = -\sqrt{x} + 2$

2. $f(x) = 2^{-x} - 3$

3. $f(x) = 4 - x^2$

4. $f(x) = 2(x-1)^3 + 4$

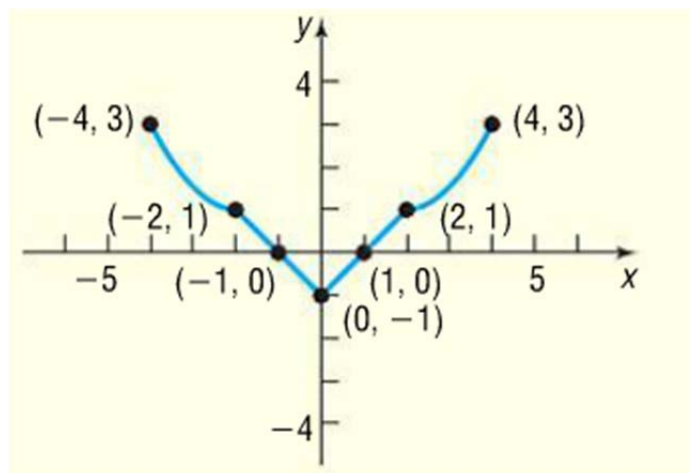
5-7: Graph the following piecewise functions. Then state whether they are continuous or discontinuous of its domain.

5. $f(x) = \begin{cases} x-4 & \text{if } x < 0 \\ \sqrt{x} & \text{if } x > 0 \end{cases}$

6. $f(x) = \begin{cases} 2x-3 & \text{if } x < 2 \\ x^2-3 & \text{if } x \geq 2 \end{cases}$

7. $f(x) = \begin{cases} 2x+1 & \text{if } -3 < x < 2 \\ -3x+4 & \text{if } x \geq 2 \end{cases}$

8. For the graph f , pictured to the right,
- Find the domain and range of f .
 - Find the intercepts.
 - Is the graph of f symmetric with respect to the x -axis, the y -axis, or the origin?
 - Find $f(2)$.
 - For what value(s) of x is $f(x) = 3$?



1-4: Solve the following quadratics by the method indicated and express answers as indicated.

1. $x^2 + 8x = 10$ (completing the square; simplified radical form)
 2. $4x^2 - 12x - 6 = 0$ (completing the square; nearest hundredth)
 3. $5x^2 - 3x - 3 = 0$ (quadratic formula; simplified radical form)
 4. $2(3x^2 - 4) = 7x - 1$ (quadratic formula; nearest hundredth)
5. Find all complex zeros for $f(x) = x^3 - 4x^2 + 13x + 50$.

6-9: Use the following functions to find $(f \circ g)(x)$ and give its domain.

6. $f(x) = x^2 + 2$ and $g(x) = \sqrt{x-7}$
7. $f(x) = \frac{2}{x-4}$ and $g(x) = \frac{2x+1}{x-5}$
8. $f(x) = \sqrt{x-1}$ and $g(x) = x^2 - 3$
9. $f(x) = 2x + 3$ and $g(x) = \frac{3x}{x+1}$

10-12: Find $f^{-1}(x)$ and state the domain of $f^{-1}(x)$.

10. $f(x) = 3x + 7$
11. $f(x) = x^2 - 4$
12. $f(x) = \frac{4x+6}{3x-1}$

	$f(x) = \frac{2x^2 - 5x - 3}{x^2 + x - 12}$	$f(x) = \frac{4}{x^2 + 5}$	$f(x) = \frac{2x^2 - 5x + 2}{x - 4}$
Domain			
Range			
x-intercept(s)			
y-intercept			
Inc/dec behaviors			
Symmetry (odd/even/Neither)			
Extrema			
Vertical Asymptote(s)			
End Behavior Asymptotes			
Limits of Vertical Asymptotes			
Limits of End Behavior Asymptotes			

You should be able to do the bold items without calculator. For some functions (like parabolas), you should be able to do everything without a calculator.

1. Your Fair Isaacs Corporation (FICO) credit score is used to determine your creditworthiness. It is used to help determine whether you qualify for a mortgage or credit, and is even used to determine insurance rates. FICO scores have a range of 300-850, with a higher score indicating a better credit history. The data below represent the interest rate (in percent) a bank would offer on a 36-month auto loan for various FICO scores.

Credit Score, x	Interest Rate (percent), y
545	18.982
595	17.967
640	12.218
675	8.612
705	6.680
750	5.150

- Find a linear regression equation for the data. (4 decimal places)
 - Use the linear regression equation to predict the interest rate on a 36-month auto loan for an individual with a credit score of 720. (3 decimal places)
2. The amount of water (in gallons) in a leaky bathtub is given in the table below.

t (in minutes)	0	1	2	3	4	5	6	7
V (in gallons)	20	26	45	63	86	94	90	67

- Using a graphing utility, fit the data to a third degree polynomial (or a cubic). Round each coefficient to 3 decimal places.
- Use the equation to approximate the time at which there is maximum amount of water in the tub. Round answer to the nearest tenth if necessary.
- Use the equation to estimate the time when the water runs out of the tub. Round answer to the nearest tenth if necessary.

There will also be application type problems. You should go over all of the word problems on your with calculator quizzes and tests. Logarithms will also be included on the final, but we did not include it on the review since that was the last chapter we finished.