

**Math 161**  
**Functions and Equations: Zeros and Solutions Worksheet**

Solve:

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

2. In a triangle ABC, angle B is twice as large as angle A. Angle C measures  $20^\circ$  more than angle A. Find the measure of each angle.

Simplify:

3.  $\frac{3 + 2i}{i - 3} - \frac{4 - 6i}{2 - i}$

4.  $(2i)^4$

Solve using the quadratic formula:

5.  $x^2 + 3x = 15$

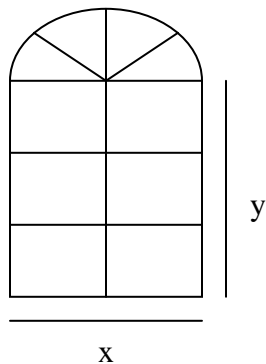
Solve:

6.  $(2x + 1)^2 + 4(2x + 1) + 3 = 0$

Graph, find the vertex, determine the domain and range, find the increasing and decreasing interval of the function:

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

8. A Norman window is a rectangle with a semicircle on top as seen below. Sky Blue Windows Inc. is designing a Norman window that requires 288 in of trim. What dimensions will allow the maximum amount of light to enter a house?



9. The number of children who were educated at home in the U.S. in various years is shown in the following table:

Year	Number of home-educated children (in thousands)
1984	93
1988	225
1992	703
1995	1060
1997	1347

- Make a scatterplot of the data, letting  $x$  represent the number of years since 1984.
- Determine what type of function fits the data.
- Find the function that fits the data.
- Graph the equation over the scatterplot.
- Predict the number of children that will be home-educated in 2005, and 2010.

Solve:

$$10. \frac{5x}{x-4} - \frac{20}{x} = \frac{60}{x^2-4x}$$

$$11. \sqrt{x+1} - \sqrt{x-2} = 5$$

$$12. \left| \frac{1}{3}x + 4 \right| = 2$$

Solve, graph and write solution in interval notation:

$$13. -\frac{5}{6}x + \frac{3}{2} > 2x - 1$$

$$14. -3 \leq 2x - 4 < 8$$

$$15. \left| 3x + 5 \right| \leq 3$$