

Goal: To use internet resources to solve equations.

There are websites that will solve equations and inequalities for us. We will look at one today: [www.wolframalpha.com](http://www.wolframalpha.com). To extend the lesson you may find others and include on your worksheet what they are with examples. It is important to know how to enter equations properly, so you may need to do some searching on how to enter certain mathematical operations such as exponents and absolute value (often this will be very similar to your graphing calculator).

When you go to the website, the first page should look like this.



To solve an equation, type it in the box and press the Enter key or click on the = button. For example, to solve the equation  $5x - 12 = 15$  the screen should look like this.

The screenshot shows the WolframAlpha website in a Windows Internet Explorer browser window. The address bar displays <http://www.wolframalpha.com/>. The page has an orange background. At the top center is the WolframAlpha logo, which includes a red starburst icon and the text "WolframAlpha" followed by "computational knowledge engine" in smaller text. Below the logo is a search input field with the text "Enter what you want to calculate or know about". To the right of the input field are two buttons: "Examples" and "Random". The search input field contains the equation  $5x-12=15$  and a red equals sign button. Below the search area, there is a link: "Introducing the latest Wolfram Reference Apps: Wolfram Words & Mortgage Calculator". At the bottom of the page, there is a navigation menu with links: "About", "Products", "Mobile Apps", "Business Solutions", "For Developers", "Resources & Tools", "Blog", "Forum", "Participate", "Contact", and "Connect" (with social media icons for Facebook, Twitter, and RSS). The footer contains the text: "© 2011 Wolfram Alpha LLC—A Wolfram Research Company | Terms | Privacy | Entity Index". The browser's status bar at the bottom shows "(1 item remaining) Downloading picture http://www.wolframcdn.com/homepage/oran", "Internet | Protected Mode: Off", and the system tray with the date and time "11:27 AM 10/27/2011".



When you click the = button you will see a screen that looks like this.

The screenshot shows the WolframAlpha website interface. At the top, the browser address bar displays `http://www.wolframalpha.com/input/?i=5x-12%3D15`. The main content area features the WolframAlpha logo and a search input field containing the equation  $5x-12=15$ . Below the input field, the text "Input:  $5x - 12 = 15$ " is shown. A graph titled "Plot:" displays two lines: a blue line representing  $y = 5x - 12$  and a red horizontal line representing  $y = 15$ . The intersection point is marked with a red dot at  $x = 27/5$  and  $y = 15$ . The x-axis ranges from -1 to 6, and the y-axis ranges from -15 to 20. Below the graph, the text "Alternate forms:" is visible. On the right side of the page, there is a social media prompt: "Like Wolfram|Alpha?" with a heart icon and the text "You'll love Mathematica »".

Scroll down to see the solution of  $27/5$ . You will also see some other information about your equation. The graphs are done as if each side was equal to  $y$ . So the blue one is  $y=5x - 12$  and the other one is  $y=15$ . The  $x$ -coordinate of the intersection point is the solution of the equation. The program also gives alternate forms of the equation which are equations that have the same solution as your equation. There is even a number line displaying the solution.

Your assignment is to use [www.wolframalpha.com](http://www.wolframalpha.com) to solve the equations and answer the questions on the following worksheet. You may print the worksheet and turn it in when we return to school. If you do not have a printer, you may write the questions and your solutions on a piece of paper and turn that in when we return.

# ALGEBRA II / PRECALCULUS

## eDay Lesson 1 – Equations

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Use [www.wolframalpha.com](http://www.wolframalpha.com) to solve the following equations or inequalities.

1.  $x^2 - 5 = 20$

2.  $\frac{1}{7}y = \frac{13}{20}$

3.  $x^4 = 8(x^2 - 2)$

4.  $x^3 > 4x$

5.  $x^2(x^2 + 4) \leq 4x^3$

6.  $\frac{y(2y-1)}{4} + \frac{3}{10} = \frac{y(y+2)}{5}$

7.  $\frac{\frac{1}{x^2} - x^2}{\frac{1}{x} + x} = \frac{3}{2}$

8.  $\left(\frac{t+3}{t-1}\right)^2 = 2 + \frac{t+3}{t-1}$

9.  $\sqrt{n+6} - \sqrt{n} = 6$

10.  $|4x^2 - 3| < 7$

11.  $3e^{2x} = 8$

12.  $2\ln x = \ln(x+1)$

13.  $2\sin 2\theta = 2\sin \theta$

14.  $\sin 4x = \cos 2x$

Answer the following questions, related to solving equations using [www.wolframalpha.com](http://www.wolframalpha.com). You may need to try different examples than those given above.

- When fractional answers result, does wolframalpha give the results as mixed numbers, improper fractions, or decimals? (Provide an example of an equation different than the ones above that demonstrates the accuracy of your answer and provide the solution of your equation.)
- How are exponents entered in wolframalpha?
- Wolframalpha attempts to give exact answers. Find the decimal equivalent to the number  $5 + \sqrt{3}$  to the nearest millionth.
- Approximate  $\pi$  to 15 decimal places.