

## **Precalculus Maintenance Assignment**

Welcome to Precalculus! In order to ensure success in this course, there is a mandatory summer assignment packet. This packet is due on the first day of your math class whether it occurs in first or second semester. While it is best to not put the assignment off to the last minute, you want to complete the assignment close enough to the start of your course so that the ideas are fresh. There will be an assessment on this material the first week of class, after the packet has been reviewed.

All topics in this assignment should be a review. You should not only be familiar with the topics but you should know them well enough to be tested on them. This is material that will not be taught in the course. It is expected that you come in with a strong understanding of these topics. If you are unsure of how to do these problems, feel free to seek help with them. There are many websites with helpful videos including Khan Academy, YouTube, [mathisfun.com](http://mathisfun.com), [purplemath.com](http://purplemath.com), [shmoop.com](http://shmoop.com), and [algebrahelp.com](http://algebrahelp.com).

Give us your best work while giving yourself the opportunity to get off to a great start! We look forward to having you in class!!

Sincerely,  
The Math Department

**ALL WORK SHOULD BE DONE ON A SEPARATE SHEET OF LOOSE LEAF WITH ALL WORK SHOWN**

Use properties of exponents to simplify each expression.

1.)  $\frac{x^4 y^3}{x^2 y^5}$       2.)  $\frac{(3x)^2 y^4}{3y^2}$       3.)  $\left(\frac{2}{xy}\right)^{-3}$       4.)  $\frac{4^2 u^3 v^{-4}}{8u^{-2}v}$

5.)  $\frac{(x^{-3}y^2)^{-4}}{(y^6x^{-4})^{-2}}$       6.)  $\left(\frac{4a^3b}{a^2b^3}\right)\left(\frac{3b^2}{2a^2b^4}\right)$

Solve the following equations.

7.)  $\frac{2}{3}x = \frac{4}{5}$       8.)  $3(5x-3) - 4(2x+1) = 5x-2$       9.)  $|x-2| + 3 = 13$

Solve the following inequalities and graph on a number line.

10.)  $x$  is at least 11 and at most 34.      11.)  $y$  is at most 45.

12.)  $9x - 8 \leq 7x + 16$       13.)  $-19 < 3x - 17 \leq 34$       14.)  $|x + 4| < 1$

Find the distance between the points. Leave answers in simplest radical form when necessary.

15.)  $(-3, -8)$  and  $(5, -2)$       16.)  $(-3, 4)$  and  $(1, 0)$

Find the midpoint between the following points.

17.)  $(-3, -8)$  and  $(5, -2)$       18.)  $(-3, 4)$  and  $(1, 0)$

Solve the following questions about circles.

19.) Find the standard form equation of a circle with center  $(-4, 1)$  and radius 8.

20.) Find the center and radius of the circle with equation  $(x-2)^2 + (y+1)^2 = 16$ .

Solve the following questions about lines. Give answers in slope-intercept form **AND** point-slope form.

21.) Find the equation of the line through the point  $(-3, -4)$  with slope 2.

22.) Find the equation of the line through the points  $(-4, 5)$  and  $(4, 3)$ .

23.) Find the equation of the line through the point  $(4, 3)$  parallel to the line  $4x + 2y = 8$ .

24.) Find the equation of the line through the point  $(4, 3)$  perpendicular to the line  $4x + 2y = 8$ .

Solve the following equations by factoring.

25.)  $x^2 - 12x + 36 = 0$

26.)  $5x^4 - 12x^3 = 0$

27.)  $25x^2 - 81 = 0$

28.)  $2x^2 + 21x + 10 = 0$

29.)  $x^3 - x^2 + 2x - 2 = 0$

Solve the following equations by using the appropriate algebraic method.

30.)  $x^3 - 125 = 0$

31.)  $(x + 4)^2 = 18$

32.)  $\sqrt{3x - 2} = 4 - x$

33.)  $3x^2 + 5x - 7 = 0$

Simplify the following radical expressions by extracting perfect squares.

34.)  $\sqrt{50}$

35.)  $\sqrt{320} - \sqrt{125}$

36.)  $\sqrt[3]{500}$

37.)  $\sqrt{108x^4y^9}$

38.)  $\sqrt[4]{16x^9y^{15}}$

Rationalize the following denominators.

39.)  $\frac{2}{\sqrt{5}}$

40.)  $\frac{1}{\sqrt{20}}$

41.)  $\frac{1}{3 - \sqrt{2}}$

Simplify the following expressions by factoring and cancelling.

42.)  $\frac{2x^2 + 11x - 21}{x^3 + 2x^2 + 4x} \cdot \frac{x^3 - 8}{x^2 + 5x - 14}$

43.)  $\frac{2y^2 + 9y - 5}{y^2 - 25} \div \frac{2y^2 - y}{y - 5}$

Simplify the following fractional expressions by finding a common denominator first.

44.)  $\frac{x}{3x - 2} + \frac{3}{x - 5}$

45.)  $\frac{2}{x^2 - 2x} + \frac{1}{x} - \frac{3}{x^2 - 4}$

46.)  $\frac{2x + \frac{13x - 3}{x - 4}}{2x + \frac{x + 3}{x - 4}}$

Identify for what values of  $x$  the following functions are undefined (in other words, for what values of  $x$  will the function not exist?).

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

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

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

50.)  $f(x) = \frac{x - 3}{x^2 - 9}$