

Precalculus Summer Work

Dear students,

The problems in this assignment cover material that you should have learned in prior math courses, and it is considered pre-requisite knowledge for precalculus. It will also alert you to any areas where you may need some extra help before the school year begins. Your summer work will count as 3 homework grades, and in addition, there will be a quiz over this material in the first full week of school.

There are six sections to your summer work. All of the work should be done in a notebook with all work clearly shown. I would recommend 1 section per week in the 6 weeks leading up to the start of school. Calculators are not allowed (unless specified on a problem, but not until topic 6). Work should be clearly labeled, and the final answer should be boxed.

You will turn in your notebook on the first day of school to receive the homework portion of the grade.

Contents

Unit 1: Basic math review	2
Operations with fractions, work with exponents, and simplify variable expressions.	2
Unit 2: Algebra Review	3
Expressions, properties of numbers, simplifying variable expressions, exponents and radicals.	3
Unit 3: Algebra 2 review	5
Linear equations, inequalities and problem solving, absolute value equations and inequalities.....	5
Unit 4: Algebra 1 and 2 review	7
Graphing, slope, linear equations, functions, domain/range, transformations of non-linear functions.....	7
Unit 5: Algebra 1 and 2 review	9
Systems of equations, polynomials, factoring, and solving equations	9
Unit 6: Mixed review	11
Rational equations, radical equations, Pythagorean theorem, special right triangle, right triangle trig definitions.	11

Online Resources:

- [Wyzant Algebra help](#): offers assistance on various algebra topics
- [Khan Academy](#): click on algebra and there are lessons on various algebra topics that are followed by practice problems

I look forward to seeing you next year!

Mrs. Fox

Precalculus Summer Work

Unit 1: Basic math review

Operations with fractions, work with exponents, and simplify variable expressions.

1-6: Perform the indicated operations/ Simplify

$$1) \frac{11}{16} - \left(-\frac{3}{4}\right)$$

$$4) \frac{25}{16} \div \left(\frac{35}{4}\right)$$

$$2) -\frac{5}{8} - \left(-\frac{3}{40}\right)$$

$$5) \frac{0}{12}$$

$$3) \frac{5}{16} \left(-\frac{3}{4}\right)$$

$$6) 8\left(-\frac{5}{16}\right)$$

7-8: Evaluate the following expressions

$$7) -2^2$$

$$8) (-7)^2$$

9-11: Evaluate the following variable expressions when given values for x and y.

$$9) 5x - 3y \text{ when } x = 5, y = -2$$

$$10) \frac{\sqrt{x}}{y} - \frac{y}{x} \text{ when } x = 9, y = -7$$

$$11) \frac{y^3 + \sqrt{x-4}}{|2x-y|} \text{ when } x = 40, y = -5$$

Precalculus Summer Work

Unit 2: Algebra Review

Expressions, properties of numbers, simplifying variable expressions, exponents and radicals.

1-2: Write an algebraic expression to model the given situation

- 1) Two numbers have a sum of 197. If one number can be represented by the variable b , then write the other number as an algebraic expression in terms of b .
- 2) Two angles are supplementary if the sum of their measures is 180° . If the measure of one angle is $5x$, represent the measure of its supplement as an algebraic expression in terms of x .

3-4: Set up and solve an algebraic equation to answer each question below

- 3) When 6 is added to four times a number, the result is 50. Find the number.
- 4) On an Algebra 2 test, the highest grade was 42 points higher than the lowest grade. The sum of the two grades was 138. Find both grades.

5-7: Use the distributive property to find the following products.

5) $-2(3x - 3y + 7)$

6) $(2x - 3)(3x + 5)$

7) $(2x + 3y - 4)(3x - 2y + 5)$

Precalculus Summer Work

8- 15: Simplify the following expressions

8) $-3(yz + 3) - 9yz + 1 + y^2$

9) $\frac{5}{12}a - \frac{2}{3} - \frac{4}{5}a + \frac{3}{4}$

10) $-12y^0$

11) $\frac{x^4y^6}{x^2y^6}$

12) $\left(\frac{x^{-4}y^6}{x^3y^{12}}\right)^{-2}$

13) $\sqrt{\frac{3}{2}}$

14) $\frac{\sqrt{3}}{\sqrt{12x^2y^4}}$

15) $\frac{12}{\sqrt{5}-\sqrt{6}}$

Precalculus Summer Work

Unit 3: Algebra 2 review

Linear equations, inequalities and problem solving, absolute value equations and inequalities.

1-2: Solve the following linear equations

1) $6y + 19 = 3y - 2$

2) $\frac{x-1}{8} + \frac{x+3}{3} = \frac{9}{8}$

3-5: Solve the following inequalities. Sketch the solutions on a number line, and put your final answer in interval notation.

3) $-4x + 6 \leq -6$

4) $3(x-4) < 2(2x-1)$

5) $-7 \leq 3x - 10 \leq 2$

- 6) David has scores of 95, 85, 97, and 75 on his algebra tests. Set up and solve an inequality to find the minimum score he can make on the final exam to pass the course with an 87 or higher given that the final exam counts as 3 tests.

Precalculus Summer Work

7-8: Solve the following absolute value equations. (Still no calcs! You can do that decimal division in your head!)

7) $|3x| = 18.6$

8) $|5n + 5| + 15 = 8$

9-10: Solve the following absolute value inequalities. Sketch your results on the number line, and write your final answer in interval notation.

9) $|x| < 8$

10) $|6x - 7| + 2 \geq 7$

Precalculus Summer Work

Unit 4: Algebra 1 and 2 review

Graphing linear equations, parent functions, domain/range, transformations of non-linear functions

1-5: Find the requested information for the following linear equations

1) Find the x-and y-intercepts of $x + 3y = -9$

2) Sketch the graph of $x = -7$

3) Sketch the graph of $y + 1 = 0$

4) Find the slope of the line that goes through (5, 9) and (-3, 6)

5) Determine whether the pair of lines is parallel, perpendicular, or neither.

a. $-8x + 2y = 5$

b. $3x + 6y = 4$

$4x - y = 5$

$-2x + 4y = 8$

6-8) Find the equations of the lines based on the given information

6) Slope: $-4/3$, through (0, -12)

7) Slope: $-3/4$, through (-4, -1)

8) Passing through (2, 5), and (6, 7)

Precalculus Summer Work

9-12: On a separate sheet of paper, sketch the parent function labeling 4-5 points. State the domain and range of each function.

9) $f(x) = |x|$ (5 points)

10) $g(x) = x^2$ (5 points)

11) $h(x) = \sqrt{x}$ (4 points)

12) $j(x) = x^3$ (5 points)

13-16: On a separate sheet of paper, sketch the given transformations of the above parent functions. State the domain and range of each function.

13) $y = 2|x + 3| - 4$

14) $y = -(x - 4)^2 - 2$

15) $y = -3\sqrt{x + 5}$

16) $y = (x - 3)^3 + 1$

Precalculus Summer Work

Unit 5: Algebra 1 and 2 review

Systems of equations, polynomials, factoring, and solving equations

1-2: Solve the following systems with either substitution or elimination. Use each method exactly once.

1) $x + y = 7$
 $x - 9y = 27$

2) $2x + 8y = 24$
 $3x + 12y = 36$

3-6: Perform the indicated operation on the given polynomials

3) If $P(x) = x^2 + x + 2$, find $P(-8)$

4) $(7y^2 - 5y + 8) - (6y^2 - 5y + 4)$

5) $(3x + 2)^2$

6) $(8-9x)(x^3 - x - 1)$

7-10: Factor the given polynomials

7) $20xy - 16x - 5y + 4$

8) $27a^4b^7 + 9ab^3 - 63ab^7$

9) $5c^2 - 65c + 180$

10) $25x^2 - 64$

Precalculus Summer Work

11-15: Solve

$$11) x^2 - 5x - 24 = 0$$

$$12) x^2 = 3x + 3$$

$$13) x^2 + 3x - 10 = 0$$

$$14) 2x^2 + 7x = 15$$

$$15) 6x^2 - 4x = -15x + 10$$

Precalculus Summer Work

Unit 6: Mixed review

Rational equations, radical equations, Pythagorean theorem, special right triangle, right triangle trig definitions.

1-4: Solve each rational equation. Be sure to check for extraneous solutions

$$1) \frac{7}{2} + \frac{3}{x} = 3$$

$$2) \frac{3}{2} + \frac{4}{x-1} = \frac{x+1}{x-1}$$

$$3) \frac{3x}{x+1} - \frac{5}{2x} = \frac{3x}{2x}$$

$$4) \frac{5x}{x-2} = 7 + \frac{10}{x-2}$$

5-8: Solve the following radical equations. Be sure to check for extraneous solutions

$$5) x - 6 = \sqrt{3x}$$

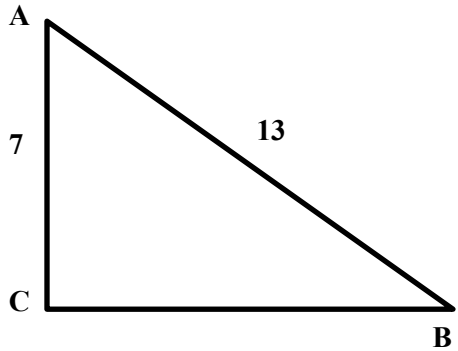
$$6) \sqrt{21x + 1} = x + 5$$

$$7) \sqrt{4x + 1} = \sqrt{x + 10}$$

$$8) \sqrt{2x + 3} + 2 = \sqrt{6x + 7}$$

Precalculus Summer Work

- 9) Use the Pythagorean theorem and right-triangle trig to find sine, cosine, and tangent of angle B. Make sure your answers are in simplest radical form.



- 10- 15: Use properties of special right triangles (30-60-90 and 45-45-90) to find x and y.

