

Name \_\_\_\_\_

# Summer Packet for

## Precalculus

## Algebra III

## Algebra DE

## Trig DE

This packet is for those students who plan on taking the courses listed above. This packet is a refresher of the skills you should have learned in Algebra 1, Geometry, and Algebra 2. If you do not have these skills, you will consistently get problems incorrect next year, not because you don't understand the content but because you have forgotten the Algebra involved.

The format of the questions is the format to expect for assignments during the school year. Pay close attention to what is in the parentheses: these are instructions as to how to write your answer.

The packet is due the first day of school. Do not fake your way through these problems. All work is to be shown. If you need extra paper, use it. Do not rely on sites such as Mathway, Symbolab, or other sites that provide the answers. Use sites like Khan Academy to (re)learn the content.



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Student: \_\_\_\_\_

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

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1. Write the given statement using symbols.

The sum of 22 and 53 equals 75.

\_\_\_\_\_ (Type an expression or an equation. Do not solve.)

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2. Write the given statement using symbols.

The product of 4 and y is the sum of 1 and 8.

\_\_\_\_\_ (Type an equation. Do not simplify.)

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3. Write the given statement using symbols.

The quotient x divided by 6 is 20.

The given statement using symbols is \_\_\_\_\_.  
(Type an expression or an equation. Do not solve.)

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4. Evaluate the given expression.

$$6 - [2 \cdot 3 + 9 \cdot (5 - 4)]$$

$$6 - [2 \cdot 3 + 9 \cdot (5 - 4)] = \underline{\hspace{2cm}}$$

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5. Evaluate the given expression.

$$2 - [3 - 4 \cdot 4 + (8 - 5)] \cdot 2$$

$$2 - [3 - 4 \cdot 4 + (8 - 5)] \cdot 2 = \underline{\hspace{2cm}}$$

---

6. Evaluate the given expression.

$$\frac{5}{7} \cdot \frac{14}{25}$$

$$\frac{5}{7} \cdot \frac{14}{25} = \underline{\hspace{2cm}} \text{ (Type an integer or a simplified fraction.)}$$

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7. Evaluate the given expression.

$$\frac{3}{5} + \frac{7}{3}$$

$$\frac{3}{5} + \frac{7}{3} = \underline{\hspace{2cm}} \text{ (Type an integer or a simplified fraction.)}$$

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8. Evaluate the given expression.

$$\frac{\frac{7}{22}}{\frac{13}{33}}$$

$$\frac{\frac{7}{22}}{\frac{13}{33}} = \underline{\hspace{2cm}} \text{ (Type an integer or a simplified fraction.)}$$

---

9. Use the distributive property to remove the parentheses.

$$3\left(\frac{1}{15}x - \frac{2}{3}\right)$$

$$3\left(\frac{1}{15}x - \frac{2}{3}\right) = \underline{\hspace{2cm}}$$

(Simplify your answer. Use integers or fractions for any numbers in the expression.)

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10. Use the distributive property to remove the parentheses.

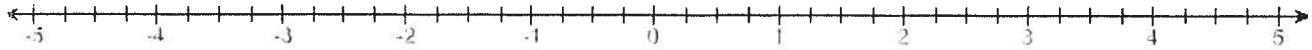
$$(x + 4)(x + 5)$$

$$(x + 4)(x + 5) = \underline{\hspace{2cm}} \text{ (Simplify your answer.)}$$

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11. On the real number line, label the points with coordinates 0, 2, -2,  $\frac{3}{2}$ , -1.5,  $\frac{11}{4}$ , and 2.25.

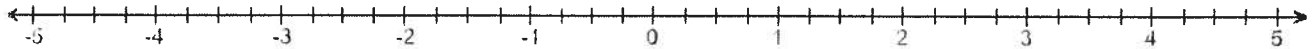
Label the point with coordinate 0.



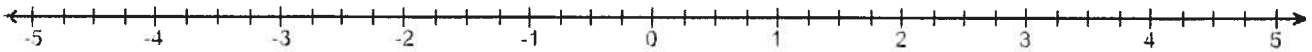
Label the point with coordinate 2.



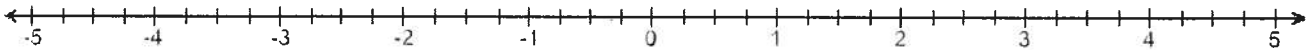
Label the point with coordinate -2.



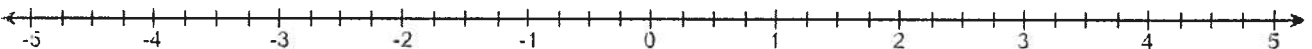
Label the point with coordinate  $\frac{3}{2}$ .



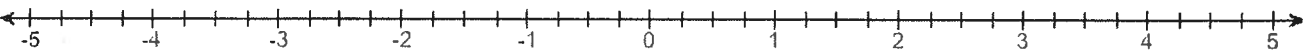
Label the point with coordinate -1.5.



Label the point with coordinate  $\frac{11}{4}$ .



Label the point with coordinate 2.25.



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12. Replace the question mark by  $<$ ,  $>$ , or  $=$ , whichever is correct.

$$\frac{7}{4} ? 0$$

$$\frac{7}{4} \underline{\hspace{2cm}} 0$$

- 
13. Replace the question mark by  $<$ ,  $>$ , or  $=$ , whichever is correct.

$$-2 ? -8$$

$$-2 \underline{\hspace{2cm}} -8$$

- 
14. Write the given statement as an inequality.

x is less than 19

What is the statement written as an inequality?

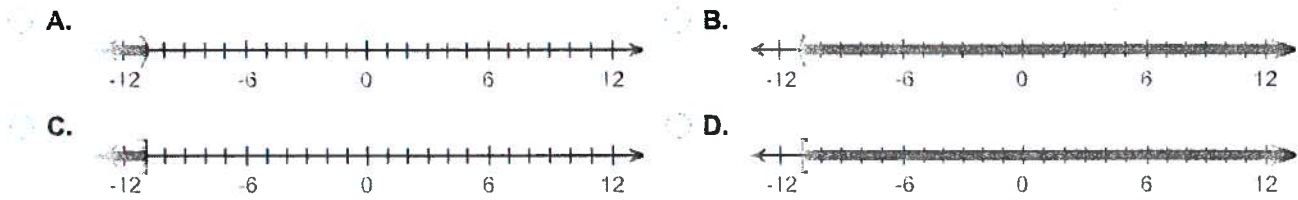
                     (Type an inequality.)

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15. Graph the numbers  $x$  on the real number line.

$$x \geq -11$$

Choose the graph that illustrates the inequality on the real number line.



16. Evaluate the expression if  $x = 1$  and  $y = -4$ .

$$5xy + 2$$

$$5xy + 2 = \underline{\hspace{2cm}} \text{ (Simplify your answer.)}$$

17. Evaluate the given expression if  $x = -2$  and  $y = 6$ .

$$\frac{6x + 4y}{6 + 3y}$$

$$\frac{6x + 4y}{6 + 3y} = \underline{\hspace{2cm}} \text{ (Type an integer or a simplified fraction.)}$$

18. Evaluate the expression if  $x = 5$  and  $y = -1$ .

$$|x| + |y|$$

$$|x| + |y| = \underline{\hspace{2cm}} \text{ (Simplify your answer.)}$$

19. Determine which of the value(s), if any, must be excluded from the domain of the variable in the expression  $\frac{x^2 - 16}{x}$ .

$x = 6$

$x = 4$

$x = 0$

$x = -4$

Select all that apply.

- $x = 6$
- $x = 4$
- $x = 0$
- $x = -4$
- None

20. Determine which of the value(s), if any, must be excluded from the domain of the variable in the expression  $\frac{x}{x^2 - 16}$ .

$x = 0$

$x = -4$

$x = -1$

$x = 4$

Select all that apply.

- $x = 0$   
  $x = -4$   
  $x = -1$   
  $x = 4$   
 None
- 

21. Determine the domain of the variable  $x$  in the given expression.

$$\frac{18}{x - 21}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A.  $\{x \mid x \neq \underline{\hspace{2cm}}\}$   
 B. The domain is all real numbers.
- 

22. Use the formula  $C = \frac{5}{9}(F - 32)$  for converting degrees Fahrenheit into degrees Celsius to find the Celsius measure of the Fahrenheit temperature.

$$F = 95^\circ$$

$$C = \underline{\hspace{2cm}}^\circ$$

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23. Evaluate the exponential expression.

$$(-9)^2$$

$$(-9)^2 = \underline{\hspace{2cm}}$$

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24. Simplify the given expression.

$$9^{-6} \cdot 9^4$$

$$a^m a^n = a^{m+n} = \underline{\hspace{2cm}} \text{ (Type an integer or a simplified fraction.)}$$

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25. Simplify the given expression.

$$\sqrt{(-2)^2}$$

$$\sqrt{(-2)^2} = \underline{\hspace{2cm}}$$

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26. Simplify the expression. Express the answer so that all exponents are positive. If an exponent is 0 or negative, assume that the base is not 0.

$$(2n^8)^3$$

$$(2n^8)^3 = \underline{\hspace{2cm}}$$

(Simplify your answer. Type your answer using exponential notation.)

27. Simplify the following expression. Whenever an exponent is 0 or negative, assume that the base is not 0.

$$\frac{x^2 y}{x y^4}$$

$$\frac{x^2 y}{x y^4} = \underline{\hspace{2cm}}$$
 (Type exponential notation with positive exponents.)

28. Simplify the given expression. Express the answer so that all exponents are positive. Whenever an exponent is 0 or negative, we assume that the base is not 0.

$$\left(\frac{2x^{-7}}{5y^{-6}}\right)^{-2}$$

$$\left(\frac{2x^{-7}}{5y^{-6}}\right)^{-2} = \underline{\hspace{2cm}}$$
 (Simplify your answer. Use positive exponents only.)

29. Use a calculator to evaluate the given expression.

$$(-8.57)^{-2}$$

$$(-8.57)^{-2} \approx \underline{\hspace{2cm}}$$
 (Round to three decimal places as needed.)

30. The weekly production cost  $C$  of manufacturing  $x$  watches is given by the formula  $C = 3000 + 2x$ , where the variable  $C$  is in dollars.

- (a) What is the cost of producing 1000 watches?  
(b) What is the cost of producing 2000 watches?

(a) The cost of producing 1000 watches is \$                     .

(b) The cost of producing 2000 watches is \$                     .

31. The lengths of the legs of a right triangle are given. Find the hypotenuse.

$$a = 16, b = 30$$

The length of the hypotenuse,  $c$ , is                     .

32. The lengths of the sides of a triangle are given. Determine if the triangle is a right triangle. If it is, identify the hypotenuse.

$$27, 36, 45$$

Select the correct choice below and, if necessary, fill in the answer box(es) to complete your choice.

- A. It is a right triangle. The hypotenuse is the side that is of length                     .
- B. It is not a right triangle.



33. Find the area  $A$  of a rectangle with length 7 inches and width 5 inches.

The area of the rectangle is \_\_\_\_\_ square inches.

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34. Find the volume  $V$  and surface area  $S$  of a rectangular box with length 9 feet, width 2 feet, and height 8 feet.

The volume of the rectangular box is \_\_\_\_\_ cubic feet.

The surface area of the rectangular box is \_\_\_\_\_ square feet.

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35. The lengths of the legs of a right triangle are given. Find the hypotenuse.

$$a = 3, b = 4$$

The length of the hypotenuse,  $c$ , is \_\_\_\_\_.

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36. In the given expression, calculate as indicated. Express your answer as a single polynomial in standard form.

$$(3x^3 - 8x^2 + 2x + 4) - (6x^2 - 8x + 9)$$

$$(3x^3 - 8x^2 + 2x + 4) - (6x^2 - 8x + 9) = \underline{\hspace{2cm}}$$

---

37. In the given expression, calculate as indicated. Express your answer as a single polynomial in standard form.

$$(7x^5 + 2x^3 + 3x) + (4x^4 - 2x^3 + 8x^2)$$

$$(7x^5 + 2x^3 + 3x) + (4x^4 - 2x^3 + 8x^2) = \underline{\hspace{2cm}}$$

---

38. Multiply as indicated. Express your answer as a single polynomial in standard form.

$$-2x^2(2x^4 + 9)$$

$$-2x^2(2x^4 + 9) = \underline{\hspace{2cm}}$$

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39. Multiply the given polynomial using the FOIL method. Express your answer as a single polynomial in standard form.

$$(2x + 2)(x - 4)$$

$$(2x + 2)(x - 4) = \underline{\hspace{2cm}}$$

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40. Multiply the polynomials using the special product formulas. Express your answer as a single polynomial in standard form.

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

$$(5x + 2)(5x - 2) = \underline{\hspace{2cm}}$$

---

41. Multiply the polynomials using a special product formula. Express your answer as a single polynomial in standard form.

$$(3x - 4)^2$$

$$(3x - 4)^2 = \underline{\hspace{2cm}}$$

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42. Factor the given polynomial by removing the common monomial factor.

$$8x + 56$$

Select the correct choice below and fill in any answer boxes within your choice.

- A.  $8x + 56 =$  \_\_\_\_\_
- B. The polynomial is prime.
- 

43. Factor the polynomial by removing the common monomial factor.

$$x^7 + x^6 + x$$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

- A.  $x^7 + x^6 + x =$  \_\_\_\_\_
- B. The polynomial is prime.
- 

44. Factor the polynomial completely.

$$x^2 - 36$$

Select the correct choice below and fill in any answer boxes within your choice.

- A.  $x^2 - 36 =$  \_\_\_\_\_
- B. The polynomial is prime.
- 

45. Factor the difference of two squares.

$$9x^2 - 25$$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

- A.  $9x^2 - 25 =$  \_\_\_\_\_
- B. The polynomial is prime.
- 

46. Factor the polynomial completely.

$$x^3 - 216$$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

- A.  $x^3 - 216 =$  \_\_\_\_\_
- B. The polynomial is prime.
- 

47. Factor by grouping.

$$4x^2 + 12x + 5x + 15$$

$4x^2 + 12x + 5x + 15 =$  \_\_\_\_\_ (Factor completely.)

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48. Factor completely the given polynomial.

$$(x + 18)^2 - 14(x + 18)$$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

- A.  $(x + 18)^2 - 14(x + 18) =$  \_\_\_\_\_
- B. The polynomial is prime.
- 

49. Factor completely the given polynomial.

$$x(x + 10) - 20(x + 10)$$

Select the correct choice below and fill in any answer boxes within your choice.

- A.  $x(x + 10) - 20(x + 10) =$  \_\_\_\_\_
- B. The polynomial is prime.
- 

50. Reduce the rational expression to lowest terms.

$$\frac{x^2 + 3x}{2x + 6}$$

$$\frac{x^2 + 3x}{2x + 6} = \underline{\hspace{2cm}}$$

(Simplify your answer. Use integers or fractions for any numbers in the expression.)

---

51. Perform the indicated operation and simplify the result. Leave your answer in factored form.

$$\frac{9x + 9}{6x^6} \cdot \frac{x}{x^2 - 1}$$

$$\frac{9x + 9}{6x^6} \cdot \frac{x}{x^2 - 1} = \underline{\hspace{2cm}}$$

(Simplify your answer. Type your answer in factored form. Use integers or fractions for any numbers in the expression.)

---

52. Perform the indicated operation and simplify the result. Leave your answer in factored form.

$$\frac{\frac{3 - x}{3 + x}}{\frac{3x}{x^2 - 9}}$$

$$\frac{\frac{3 - x}{3 + x}}{\frac{3x}{x^2 - 9}} = \underline{\hspace{2cm}}$$

(Simplify your answer. Type your answer in factored form. Use integers or fractions for any numbers in the expression.)

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53. Perform the indicated operation and simplify the result. Leave your answer in factored form.

$$\frac{8}{x-4} - \frac{6}{x+3}$$

$$\frac{8}{x-4} - \frac{6}{x+3} = \underline{\hspace{2cm}}$$

(Simplify your answer. Type your answer in factored form. Use integers or fractions for any numbers in the expression.)

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54. Simplify the square root, if possible.

$$\sqrt{240}$$

$$\sqrt{240} = \underline{\hspace{2cm}}$$

(Type an exact answer, using radicals as needed.)

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55. Simplify the expression. Assume that all variables are positive.

$$\sqrt{196x}$$

$$\sqrt{196x} = \underline{\hspace{2cm}} \quad (\text{Simplify your answer. Type an exact answer, using radicals as needed.})$$

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56. Simplify the given expression. Assume that all variables are positive.

$$\sqrt{8x^2} \sqrt{18x}$$

$$\sqrt{8x^2} \sqrt{18x} = \underline{\hspace{2cm}} \quad (\text{Type an exact answer, using radicals as needed.})$$

---

57. Simplify the given expression.

$$6\sqrt{2} + 8\sqrt{2}$$

$$6\sqrt{2} + 8\sqrt{2} = \underline{\hspace{2cm}} \quad (\text{Type an exact answer, using radicals as needed.})$$

---

58. Simplify the given expression.

$$(\sqrt{2} + 3)(\sqrt{2} - 4)$$

$$(\sqrt{2} + 3)(\sqrt{2} - 4) = \underline{\hspace{2cm}} \quad (\text{Type an exact answer, using radicals as needed.})$$

---

59. Rationalize the denominator of the expression.

$$\frac{1}{\sqrt{5}}$$

$$\frac{1}{\sqrt{5}} = \underline{\hspace{2cm}}$$

(Type a simplified fraction. Type an exact answer, using radicals as needed.)

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60. Rationalize the denominator of the expression.

$$\frac{-\sqrt{5}}{\sqrt{11}}$$

$$\frac{-\sqrt{5}}{\sqrt{11}} = \underline{\hspace{2cm}}$$

(Type a simplified fraction. Type an exact answer, using radicals as needed.)

---

61. Rationalize the denominator of the given expression.

$$\frac{7 - \sqrt{6}}{6 + 3\sqrt{6}}$$

$$\frac{7 - \sqrt{6}}{6 + 3\sqrt{6}} = \underline{\hspace{2cm}}$$

(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

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62. Simplify the given expression.

$$64^{2/3}$$

$$64^{2/3} = \underline{\hspace{2cm}} \text{ (Type an integer or a simplified fraction.)}$$

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63. Simplify the given expression.

$$125^{2/3}$$

$$125^{2/3} = \underline{\hspace{2cm}} \text{ (Type an integer or a simplified fraction.)}$$

