

## Summer Assignment for Precalculus, College Preparatory\*

This short packet is designed for you to practice and review necessary skills to enable you to be as successful as possible in Precalculus in September. If needed, recommended websites to help are Khan Academy, Mathbits.com (notebook for Algebra II), Coolmath.com, and Purplemath.com.

### I. Exponents & Radicals

**Rewrite in Radical Notation.**

1.  $7^{\frac{1}{5}}$  \_\_\_\_\_

2.  $10^{\frac{2}{3}}$  \_\_\_\_\_

**Rewrite in Exponential Notation**

3.  $\sqrt[3]{3}$  \_\_\_\_\_

4.  $(\sqrt[4]{8})^3$  \_\_\_\_\_

**Evaluate.**

5.  $25^{\frac{1}{2}}$  \_\_\_\_\_

6.  $8^{\frac{2}{3}}$  \_\_\_\_\_

7.  $(-4)^{\frac{1}{2}}$  \_\_\_\_\_

8.  $\sqrt[4]{768}$  \_\_\_\_\_

9.  $25^{-\frac{4}{3}}$  \_\_\_\_\_

10.  $\sqrt[3]{1540}$  \_\_\_\_\_

**Simplify using exponential notation .**

11.  $\frac{5^{\frac{1}{6}}}{5^{\frac{2}{3}}}$  \_\_\_\_\_

12.  $(2^{\frac{1}{4}} \cdot 2^{\frac{1}{4}})^2$  \_\_\_\_\_

**Simplify using radical notation.**

13.  $\sqrt[3]{4} \cdot \sqrt[3]{2}$  \_\_\_\_\_

14.  $\frac{\sqrt[3]{6}}{\sqrt[3]{2}}$  \_\_\_\_\_

15.  $\frac{\sqrt[3]{9} \cdot \sqrt[3]{81}}{\sqrt[3]{3}}$  \_\_\_\_\_

16.  $\sqrt[3]{\frac{1}{3}}$  \_\_\_\_\_

Simplify if necessary, and then combine if possible

17.  $\sqrt[3]{2} + 7\sqrt[5]{2} - 4\sqrt[5]{2}$  \_\_\_\_\_ 18.  $\sqrt{12} + \sqrt{48}$  \_\_\_\_\_

Simplify. Assume all variables are positive.

19.  $(x^{\frac{1}{3}})(x^{\frac{1}{4}})$  \_\_\_\_\_ 20.  $\sqrt[3]{64x^{12}}$  \_\_\_\_\_

21.  $\left(\frac{y^{25}}{x^{20}}\right)^{\frac{4}{5}}$  \_\_\_\_\_ 22.  $(x^{\frac{2}{5}}y^{\frac{1}{3}})^{15}$  \_\_\_\_\_

Solve for x. Check for extraneous solutions.

23.  $(6x+15)^{\frac{1}{3}} = 3$  x = \_\_\_\_\_ 24.  $\frac{1}{4}(7x+8)^{\frac{3}{2}} = 54$  x = \_\_\_\_\_

**II. Factoring (Show work & answers on separate sheet of paper)**

**Factor completely. Remember to look for "Specials."**

25.  $x^2 + x - 12$                       26.  $x^2 + 21x + 98$                       27.  $9x^2 - 81$   
28.  $49x^2 + 56x + 16$                       29.  $5x^2 - 25x + 30$                       30.  $42x^3 + 35x^2 + 7x$   
31.  $3x^3 - x^2 + 9x - 3$                       32.  $x^3 + 5x^2 - 9x - 45$                       33.  $4x^3 - 36x^2 + 81x = 0$

**Solve by Factoring**

34.  $9x^2 + 12x = 8x + 13$                       35.  $4x^2 - 16 = 0$                       36.  $x^2 = 64$

37.)  $(x + 3)^2 - 16 = 0$  (use difference of 2 squares)

### III. Complex Numbers

Simplify each and write as an imaginary or complex number in standard form

37.  $\sqrt{-27}$  \_\_\_\_\_

38.  $-\sqrt{-12}$  \_\_\_\_\_

39.  $1 + \sqrt{-100}$  \_\_\_\_\_

40.  $4 - \sqrt{-13}$  \_\_\_\_\_

41.  $3 - \sqrt{-16}$  \_\_\_\_\_

Add or subtract.

42.  $(3 + 3i) - (4 - 6i) =$

43.  $(3 - 2i) + (6 + 2i) =$

Multiply or Divide Each and write as a complex number in standard form.

44.  $(2 - 3i)(2 + 3i) =$

45.  $i(2i^2 + 8i) =$

46.  $(2 + 4i)(5 + 10i) =$

47.  $-\frac{8}{i} =$

48.  $\frac{8 + 3i}{2 + i} =$

49.  $\frac{3 - 2i}{4 - i} =$

Solve the following quadratic equations by using square roots and simplify to a complex number  
(Show work & answers on separate sheet of paper)

50.  $2x^2 - 12 = 0$

51.  $x^2 - 18x + 81 = 2$

### Compositions

62.  $f(x) = 3x + 2$      $g(x) = x + 1$      $f \circ g$  \_\_\_\_\_  $g \circ f$  \_\_\_\_\_

63.  $f(x) = x^2 - 9$      $g(x) = x - 1$      $f \circ g$  \_\_\_\_\_  $g \circ f$  \_\_\_\_\_

### Find the Inverse Algebraically

64.  $f(x) = \sqrt[3]{2x - 4}$  \_\_\_\_\_

65.  $f(x) = -x^5$  \_\_\_\_\_

66.  $f(x) = \frac{-2}{3x}$  \_\_\_\_\_

### Rational Expressions (Show work on separate sheet of paper)

67.  $\frac{7x^2}{6x} \cdot \frac{12x^2}{2x}$  \_\_\_\_\_

68.  $\frac{x+6}{2x} \div \frac{x^2}{2x}$  \_\_\_\_\_

69.  $\frac{x^2+x-3}{x^2+4x} \div \frac{x-1}{x+4}$  \_\_\_\_\_

70.  $\frac{6x+36}{6x} \cdot \frac{x^2}{x^2-36}$  \_\_\_\_\_

71.  $\frac{x^2+3x+2}{x^2+7x+12} \div \frac{x^2+5x+4}{x^2+5x+6}$  \_\_\_\_\_

**Simplify the Complex Fraction**

72. 
$$\frac{\frac{9}{x} + \frac{3}{2x}}{\frac{9}{x} + \frac{3}{2x}}$$

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73. 
$$\frac{\frac{16}{x-3} - \frac{4}{x-4}}{\frac{16}{x^2} - \frac{x-4}{x-3}}$$

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\*Portions of the above were used from the following website:

<https://drive.google.com/file/d/15XX-cHsbrd5Lmmo8fc0VcHGzlhk1u9PE/view>