

**Summer Assignment (Not required, but you will be quizzed on the material)**  
**Course Title: Precalculus Intensified**

**Teacher name: JB**

**Teacher contact information:**

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**Purpose of Assignment:**

The assignment is designed to allow you to review the material previously covered in math courses so that you will be well prepared with several ideas that occur throughout the Precalculus Intensified course.

**Estimated time to complete Assignment:**

4-6 hours

**Due date and method of assessment for Assignment:**

This assignment will not be collected for a grade, but there will be a quiz covering the material during the 2<sup>nd</sup> week of the year. Only students who complete all the problems with work shown by the date of the quiz will be eligible for a retake of the quiz. **You are expected to be able to complete all of the questions without the use of a graphing a calculator (non-graphing calculators are fine) or other resources.**

**Instructions for Assignment:**

All work must be done neatly on your **own paper**. Make sure each page of your work is labeled with the corresponding Worksheet Number and Topic Name. Answers to problems must be circled to facilitate grading. Most importantly, the work should be neat! Remember this assignment is not collected for a grade, but only students who complete the assignment will be able to retake the quiz.

A resource for refreshing knowledge can be found in the [Openstax Algebra 2 Intermediate book](#). This book has many worked out examples. Some of the summer problems may look different and require new learning. Please use this book to learn new content that was not covered during the 2020-2021 Algebra 2 course.

**Even though you should be able to complete all the questions without the use of a graphing calculator it is suggested that you have your own graphing calculator (TI-83 or TI-84) for this course.**

We look forward to seeing you in September!

JB

## HBW Precalculus Intensified Summer Assignment

### Worksheet # 1 – Exponent Rules

Simplify the expression to only have positive exponents. Assume that all variables are nonzero real numbers.

1.  $x^2 \cdot x^3$

2.  $(2k^3)(-4k^4)(3k^{-2})$

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

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

5.  $(-2x^2)^3$

6.  $-(2x^2)^3$

7.  $x^{-3}$

8.  $4x^{-3}$

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

10.  $\frac{-5}{x^{-4}}$

11.  $\frac{x^8}{x^2}$

12.  $\frac{x^3}{x^6}$

13.  $\frac{x^{-3}}{4x^5}$

14.  $\frac{-10x^{15}}{5x^{-3}}$

15.  $x^2 \cdot x^{-2}$

16.  $x^0$  (see #15)

17.  $\left(\frac{4x^2}{5y}\right)^3$

18.  $(3y^2)(2y^{21})$

19.  $(4x^3y^2)(-3xy)$

20.  $(-2st^5)(-4st^{-3})$

21.  $(5a^2b^3)(a^{-2}b)$

22.  $\left(-\frac{a^{-3}}{3a^{-1}b}\right)^4$

23.  $\frac{3}{4d} \cdot \frac{(2d)^4}{c^3}$

24.  $y^0(8x^6y^{-3})^{-2}$

25.  $(5r^5)^3 \cdot r^{-2}$

26.  $\frac{(3x)^{-3}y^4}{-x^2y^{-6}}$

27.  $\frac{12x^8y^{-7}}{(-4x^2y^{-6})^2}$

28.  $\left(\frac{2f^2g^3}{3fg}\right)^4$

29.  $\frac{1}{8x^{-2}y^4}$

30.  $\frac{3}{8m^5} \cdot \left(\frac{m^4}{n^2}\right)^3$

## HBW Precalculus Intensified Summer Assignment

### Worksheet #2 – Factoring

Directions 1-10: Perform the multiplication.

- |                            |                               |
|----------------------------|-------------------------------|
| 1. $3(5x + 1)$             | 2. $-12(3w - 2)$              |
| 3. $(y - 1)(y + 5)$        | 4. $3(x - 3)^2$               |
| 5. $(2x + 9)(3x - 4)$      | 6. $(4x + 1)(4x - 1)$         |
| 7. $2(x^2 + 3)(x - 2)$     | 8. $(x - 1)(x + 1)(x - 6)$    |
| 9. $(z - 3)(z^2 + 3z + 9)$ | 10. $(2x + 3)(4x^2 - 6x + 9)$ |

Directions 11-34: Factor the expression completely

- |                                     |                              |
|-------------------------------------|------------------------------|
| 11. $15x + 3$ (hint see #1)         | 12. $8x^5 + 4x^3$            |
| 13. $y^2 + 4y - 5$ (hint: see #3)   | 14. $x^2 - 2x - 15$          |
| 15. $n^2 + 10n + 25$                | 16. $g^2 - 18g + 81$         |
| 17. $2x^2 - 4x - 30$ (hint see #14) | 18. $-3z^2 + 12z + 36$       |
| 19. $6x^2 + 19x - 36$ (hint see #5) | 20. $2w^2 - 5w - 3$          |
| 21. $2x^2 + 7x - 30$                | 22. $5x^2 - 32x + 12$        |
| 23. $12w^2 + 51w + 12$              | 24. $24y^2 + 64y + 42$       |
| 25. $16x^2 - 1$ (hint see #6)       | 26. $54x^2 - 8$              |
| 27. $x^4 - 16$                      | 28. $81y^4 - 1$              |
| 29. $x^3 - 6x^2 - x + 6$ (see #8)   | 30. $2x^3 - 8x^2 + x - 4$    |
| 31. $10x^3 + 5x^2 - 4x - 2$         | 32. $z^3 - 27$ (hint see #9) |
| 33. $125x^3 + 1$                    | 34. $64y^3 + 27$             |

## HBW Precalculus Intensified Summer Assignment

### Worksheet #3 – Rational Expressions

Simplify the expression, and list all excluded values from the domain of the expression.

1.  $\frac{3}{5} + \frac{5}{6}$

2.  $\frac{3}{x+2} + \frac{5}{x+4}$

3.  $\frac{7}{12} - \frac{2}{5}$

4.  $\frac{7}{x-6} - \frac{1}{x+3}$

5.  $\frac{3}{2} + \frac{5}{4} - \frac{7}{5}$

6.  $\frac{2}{x^2-4} - \frac{x}{x+2} + \frac{5x}{x-2}$

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

8.  $\frac{3}{x^2-3x-10} - \frac{2}{x^2+3x+2}$

9.  $\frac{-18}{6x^2-x-1} + \frac{3x}{2x-1} - \frac{4x}{3x+1}$

10.  $\frac{3}{x-1} + \frac{5}{x+3} - \frac{7}{x-6}$

11.  $\frac{12}{36}$

12.  $\frac{x^3-x^2-42x}{2x^2-20x+42}$

11.  $\frac{3}{5} \cdot \frac{5}{6}$

12.  $\frac{x+6}{x+5} \cdot \frac{5}{x+6}$

13.  $\frac{4}{x^2-1} \cdot \frac{x+1}{x+6}$

14.  $\frac{3x^2+18x}{x+6} \cdot \frac{6x^2}{3x}$

15.  $\frac{8x^2-24x}{16x^3-48x^2} \cdot \frac{40x^3+56x^2}{5x^2-43x-70}$

16.  $\frac{20x^2-100x}{x-1} \cdot \frac{1}{16x^3-80x^2}$

17.  $\frac{3}{5} \div \frac{6}{5}$

18.  $\frac{x-4}{x^2-2x-8} \div \frac{1}{x-5}$

19.  $\frac{x^2-2x-15}{8x+20} \div \frac{2}{4x+10}$

20.  $\frac{3x^2-25x-18}{27x+18} \div \frac{5x-3}{5x^2-33x+18}$

21.  $\frac{10x^2-28x+16}{2x-4} \div \frac{25x^2-25x+4}{5x^2-41x+8}$

22.  $\frac{10x^2+42x+36}{6x^2-2x-60} \div \frac{40x+48}{3x^2-13x+10}$

## HBW Precalculus Intensified Summer Assignment

### Worksheet #4 – Solving

Solve the equation and give all solutions (real and complex). If no solutions are possible, then write no solutions. Some equations may require the quadratic formula. Give all solutions in simplest radical form.

1.  $27 = 3c - 3(6 - 2c)$

2.  $40 + 14j = 2(-4j - 13)$

3.  $-3 = 12y - 5(2y - 7)$

4.  $\frac{m}{5} = \frac{m-6}{4}$

5.  $-\frac{2}{3} = \frac{4v+1}{2v+14}$

6.  $\frac{c-8}{-2} = \frac{11-4c}{11}$

7.  $|4c+5| = 7$

8.  $|14-m| = 6$

9.  $-3|5g+1| - 6 = -9$

10.  $|9-4n| = 5$

11.  $3x^2 - 27 = 0$

12.  $7c^2 = 100$

13.  $x^2 = 12x - 36$

14.  $-10 = r^2 - 10r + 12$

19.  $6z^2 = 2z^2 + 7z + 5$

20.  $-4y^2 - 3y + 3 = 2y + 4$

21.  $3g^2 - 6g - 14 = 3g$

22.  $2x^2 - 7 = x$

23.  $(x+13)^2 = 25$

24.  $3(x+3)^2 = 27$

25.  $4(x+5)^2 + 20 = 12$

26.  $x^4 + 4x^2 - 5 = 0$

27.  $x^4 - 5x^2 - 14 = 0$

28.  $15x^4 + 7x^2 = 2$

## HBW Precalculus Intensified Summer Assignment

### Worksheet #5 – Application and Modeling

Solve the equation and give all solutions (real and complex). If no solutions are possible, then write no solutions. Some equations may require the quadratic formula.

1. Consider the collection of all rectangles that have length 1 cm more than three times the width  $w$ .
  - a. Find the possible widths (in cm) of these rectangles if their perimeters are less than or equal to 150 cm.
  - b. Find the possible widths (in cm) of these rectangles if their areas are greater than  $1500 \text{ cm}^2$ .
  
2. A commercial airliner climbs at takeoff with slope of  $m = 4/9$ . How far in the horizontal direction will the airplane fly to reach an altitude of 20,000 ft above the takeoff point?

This worksheet is based on W&L PreCalc Summer Course by Brandon Wright.