

## **Summer Work for Precalculus Classes**

**Mr. Killheffer (Honors: complete all problems)**

**Miss Prosser (CP: complete all ODD problems)**

The following pages are a review of the materials covered in Algebra I and Algebra II. You need to have a handle on this material prior to starting Precalculus.

My expectation is that if you do not know how to do something, you do something about it yourself. You have many resources other than me to gain understanding about how to solve problems. Please use the Internet as a resource if you do not know how to do any of the problems. A couple of resources you may find helpful are

**[Khanacademy.org](https://www.khanacademy.org)**

**[Larsonprecalculus.com](https://www.larsonprecalculus.com)**

but feel free to use any site you find helpful. There are also many helpful Youtube videos out there. Youtube is also a great resource to find out how to do anything you want to do on your graphing calculator.

Again, in all of my classes, I expect that if you don't know how to do something that you do something to get it. You have many resources to find solutions. Over the summer your primary resource is the Internet.

**The summer work is due the first day of class. I will spend a day or two answering questions and then we will have a summative test on this material to see how well prepared you are for the class.**



## Practice Masters Level B

### 2.2 Properties of Exponents

Evaluate each expression.

1.  $\left(\frac{4}{5}\right)^2$  \_\_\_\_\_ 2.  $(5 \cdot 2)^2$  \_\_\_\_\_

3.  $7^0$  \_\_\_\_\_ 4.  $7^{-2}$  \_\_\_\_\_

5.  $\left(\frac{-2}{3}\right)^3$  \_\_\_\_\_ 6.  $\left(\frac{1}{5}\right)^{-3}$  \_\_\_\_\_

7.  $36^{\frac{3}{2}}$  \_\_\_\_\_ 8.  $125^{\frac{4}{3}}$  \_\_\_\_\_

9.  $-(4 \cdot 5)^2$  \_\_\_\_\_ 10.  $(6^2)^{\frac{-3}{2}}$  \_\_\_\_\_

11.  $64^{\frac{-2}{3}}$  \_\_\_\_\_ 12.  $100^{\frac{-5}{2}}$  \_\_\_\_\_

13.  $(-3 \cdot 2^2)^2$  \_\_\_\_\_ 14.  $(3^0 \cdot 5^{-1})^{-3}$  \_\_\_\_\_

Simplify each expression, assuming that no variable equals zero.

Write your answer with positive exponents.

15.  $(-a)^3(-a)^5(-a^4)$  \_\_\_\_\_ 16.  $\frac{x^{-3}y^{-1}}{y^2}$  \_\_\_\_\_

17.  $(5r^3s^4)(-3rs^2)(-rs)$  \_\_\_\_\_ 18.  $x^{\frac{2}{3}} \cdot x^{\frac{4}{9}}$  \_\_\_\_\_

19.  $\left(x^{\frac{3}{7}}\right)^{14}$  \_\_\_\_\_ 20.  $\left(x^{\frac{1}{3}}\right)^{\frac{-3}{5}}$  \_\_\_\_\_

21.  $\left(\frac{x^{\frac{-4}{3}}}{x^{\frac{-2}{3}}}\right)^4$  \_\_\_\_\_ 22.  $\left(\frac{3a^{-2}b^3}{2a^4b^5}\right)^{-5}$  \_\_\_\_\_

23.  $\left((100x^5)^{\frac{-1}{2}}\right)^{-4}$  \_\_\_\_\_ 24.  $\left(\frac{m^{-3}n^{-4}}{m^{-2}n^{-5}}\right)^{\frac{-2}{3}}$  \_\_\_\_\_

25.  $(r^4s^2)(r^2s^3)^5$  \_\_\_\_\_ 26.  $x^2(6x^3 + 3x^{-2} - x + 10)$  \_\_\_\_\_

27.  $(x^{-6})^2(-x^2)^{-3}$  \_\_\_\_\_ 28.  $a^{-2}y^{-2}(ay)^4$  \_\_\_\_\_

29.  $\left(\frac{20x^5}{x^3}\right)^{-2}$  \_\_\_\_\_ 30.  $\left[y^{\frac{10}{5}} \cdot y^{\frac{3}{5}}\right]^{-10}$  \_\_\_\_\_

## Practice Masters Level B

## 1.3 Linear Equations In Two Variables

Write an equation for the line containing the indicated points.

1.  $\left(4, \frac{1}{2}\right)$  and  $\left(0, \frac{5}{2}\right)$  \_\_\_\_\_ 2.  $(-2, -4)$  and  $(-1, -8)$  \_\_\_\_\_  
 3.  $\left(\frac{3}{4}, \frac{-2}{3}\right)$  and  $\left(\frac{1}{2}, \frac{4}{3}\right)$  \_\_\_\_\_ 4.  $\left(\frac{-1}{5}, 0\right)$  and  $(-6, 0)$  \_\_\_\_\_

Write an equation in slope-intercept form for the line that has the indicated slope,  $m$ , and contains the given point.

5.  $m = -5$  and  $(-2, -1)$  \_\_\_\_\_ 6.  $m = \frac{3}{4}$  and  $(-15, 5)$  \_\_\_\_\_  
 7.  $m = \frac{-1}{2}$  and  $\left(\frac{2}{3}, 0\right)$  \_\_\_\_\_ 8.  $m = 0$  and  $\left(\frac{7}{4}, \frac{-11}{4}\right)$  \_\_\_\_\_  
 9.  $m = \text{undefined}$  and  $(-2, 1)$  \_\_\_\_\_ 10.  $m = \text{undefined}$  and  $(0, 0)$  \_\_\_\_\_

Write the equations in slope-intercept form for the line that contains the given point and is (a) parallel and (b) perpendicular to the given line.

11.  $(5, 0)$ ;  $x - 3y = 6$  \_\_\_\_\_  
 12.  $(3, -1)$ ;  $x - y = 4$  \_\_\_\_\_  
 13.  $(2, 1)$ ;  $2x + 2y = 5$  \_\_\_\_\_  
 14.  $\left(0, \frac{-1}{2}\right)$ ;  $2x - 3y = 12$  \_\_\_\_\_

Write an equation for the line that is perpendicular to each equation.

15.  $3x + 2y = 8$  at the  $y$ -intercept \_\_\_\_\_  
 16.  $-2x + 5y = -20$  at the  $x$ -intercept \_\_\_\_\_

Use the slope to determine whether the following lines are parallel, perpendicular or neither.

17.  $l_1$  contains  $(2, 1)$  and  $(-1, 4)$   
 $l_2$  contains  $(3, -2)$  and  $(1, 0)$

18.  $l_1$  contains  $\left(\frac{1}{2}, 2\right)$  and  $\left(\frac{1}{2}, -3\right)$   
 $l_2$  contains  $(0, -4)$  and  $(1, 1)$

## Practice Masters Level B

## 1.5 Scatter Plots and Least-Squares Lines

For each question, state whether the statement is true or false.

1. A correlation coefficient can be equal to  $-2$ . \_\_\_\_\_
2. If the slope of a least-squares line is negative, the correlation coefficient is negative. \_\_\_\_\_
3. A data set with a correlation coefficient of  $-0.72$  has a stronger linear relationship than a data set with a correlation coefficient of  $0.64$ . \_\_\_\_\_

Use a graphing calculator to create a scatter plot of the data in each table. Describe the correlation as positive, negative, or no correlation. Then find an equation for the least-squares line.

4.

$x$	4	3	5	6	8	8	5	2	1	7	9	7	2	1	3	4	7	5	2	1
$y$	6	5	9	10	13	14	10	3	2	12	17	11	4	1	5	7	11	9	2	1

5.

$x$	8	10	6	2	5	10	3	9	12	10	10	8	6	1	2	4	3	3	5	8
$y$	1	10	2	2	6	1	9	8	7	7	7	5	4	2	3	6	8	11	8	10

6. The average points per game for Larry Bird for a 10-year period is shown below.

1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
21.3	21.2	22.9	23.6	24.2	28.7	25.8	28.1	29.9	19.3

- a. Enter the data in a graphics calculator and find the equation of the least-squares line. \_\_\_\_\_
- b. Find the correlation coefficient,  $r$ , to the nearest hundredth. \_\_\_\_\_
- c. Use the least-squares line to predict Bird's scoring average in 1990. \_\_\_\_\_
- d. Explain using the correlation coefficient whether your prediction for Bird's 1990 scoring average is accurate or inaccurate, given the fact that Bird's actual scoring averages was 24.3 points per game in 1990.  
\_\_\_\_\_  
\_\_\_\_\_



## Practice Masters Level B

### 1.6 Introduction to Solving Equations

Solve each equation.

1.  $7n + 10 = 3n + 2$  \_\_\_\_\_

2.  $2(y + 1) = y - 8$  \_\_\_\_\_

3.  $3(m - 2) - 5 = 6 - 2(m - 4)$  \_\_\_\_\_

4.  $2x - \frac{2}{3} = -3x + \frac{7}{3}$  \_\_\_\_\_

5.  $6(a + 2) - 8a = 10a + 9$  \_\_\_\_\_

6.  $\frac{1}{3}x - \frac{7}{3} = \frac{1}{6}$  \_\_\_\_\_

7.  $\frac{m}{6} + \frac{m}{4} + \frac{m}{3} = 1$  \_\_\_\_\_

8.  $24 + 2(x + 4) = 2(x + 3)$  \_\_\_\_\_

Solve each equation by graphing. Give answers to the nearest hundredth.

9.  $6.46 + 2.3x = 1.24x - 7$

\_\_\_\_\_

10.  $-2.05x + 1.8(x - 3) = 6.2$

\_\_\_\_\_

11.  $0.38 - 0.66x + 0.72x - 0.54 = 0$

\_\_\_\_\_

12.  $1.84 - 0.23x = 0.5(-0.46x + 3.68)$

\_\_\_\_\_

Solve each literal equation for the variable indicated.

13.  $A = \frac{1}{2}h(b_1 + b_2)$  for  $b_1$

\_\_\_\_\_

14.  $P = 2l + 2w$  for  $l$

\_\_\_\_\_

15.  $A = P(1 + RT)$  for  $T$

\_\_\_\_\_

16.  $V = V_o + b(s + s_o)$  for  $s$

\_\_\_\_\_

17.  $A = 2\pi r(r + h)$  for  $h$

\_\_\_\_\_

18.  $A = \frac{1}{2}d_1 d_2$  for  $d_1$

\_\_\_\_\_

Write and solve an appropriate equation for each situation.

19. The measure of one complementary angle is  $20^\circ$  more than twice the measure of angle  $x$ . Find the measure of angle  $x$ . \_\_\_\_\_

20. Carson charges \$18.75 per hour to fix computers, plus a flat service fee of \$30. Carson billed Miss Belkis \$255 for a job. How many hours did Carson spend fixing her computer? \_\_\_\_\_



## Practice Masters Level A

## 5.3 Factoring Quadratic Expressions

Factor each expression.

1.  $-12 - 3x$  \_\_\_\_\_

2.  $-5x^2 - 10x$  \_\_\_\_\_

3.  $6x^3 - 18x^2$  \_\_\_\_\_

4.  $2x(3x + 4) - 3(3x + 4)$  \_\_\_\_\_

5.  $-2x^2 - 5x$  \_\_\_\_\_

6.  $-2x(x + 7) - (x + 7)$  \_\_\_\_\_

Factor each quadratic expression.

7.  $x^2 + 5x + 4$  \_\_\_\_\_

8.  $x^2 + x - 6$  \_\_\_\_\_

9.  $x^2 + 3x - 18$  \_\_\_\_\_

10.  $x^2 - 12x + 35$  \_\_\_\_\_

11.  $x^2 - x - 2$  \_\_\_\_\_

12.  $x^2 + 11x + 10$  \_\_\_\_\_

13.  $x^2 - 25x + 100$  \_\_\_\_\_

14.  $x^2 + 10x - 24$  \_\_\_\_\_

15.  $x^2 - 12x + 32$  \_\_\_\_\_

16.  $x^2 + 21x + 54$  \_\_\_\_\_

17.  $2x^2 - x - 15$  \_\_\_\_\_

18.  $3x^2 + 11x - 4$  \_\_\_\_\_

19.  $8x^2 + 10x - 3$  \_\_\_\_\_

20.  $25x^2 + 10x - 3$  \_\_\_\_\_

21.  $9x^2 - 15x - 14$  \_\_\_\_\_

22.  $12x^2 + 17x - 5$  \_\_\_\_\_

Solve each equation by factoring and applying the Zero-Product Property.

23.  $x^2 - 225 = 0$  \_\_\_\_\_

24.  $x^2 - 5x + 6 = 0$  \_\_\_\_\_

25.  $x^2 + 7x = -10$  \_\_\_\_\_

26.  $x^2 = 14x + 5$  \_\_\_\_\_

27.  $-x^2 + 3x = -4$  \_\_\_\_\_

28.  $x^2 - 8x = -16$  \_\_\_\_\_

29.  $2x^2 - 32 = 0$  \_\_\_\_\_

30.  $2x^2 + 14x + 20 = 0$  \_\_\_\_\_

31.  $x^2 - 64 = 0$  \_\_\_\_\_

32.  $4x^2 - 16 = 0$  \_\_\_\_\_

16. Joel and Wyatt toss a baseball. The height in feet, of the baseball, above the ground is given by  $h(t) = -16t^2 + 55t + 6$ , where  $t$  represents the time in seconds after the ball is thrown. How long is the ball in the air?

\_\_\_\_\_

17. A rocket is launched into the air. The height in feet, of the rocket, above the ground is given by  $h(t) = -4.9t^2 + 220t$ , where  $t$  represents the time in seconds after the launch.

a. How long is the rocket in the air?

\_\_\_\_\_

b. When is the rocket at its highest point?

\_\_\_\_\_

c. How high is the rocket at its highest point?

\_\_\_\_\_

18. A 15-inch by 28-inch poster is to be framed using a border of uniform width. To make the framing visually appealing, the border should have an area equal to 60% of the area of the poster. How wide should the border be?

\_\_\_\_\_

A baseball player throws a ball. The table shows the height,  $h$ , of the ball,  $t$ , seconds after it is thrown.

Time (in seconds)	Height (in feet)
1	21
3	25
5	10
6	1

11. Use regression to find a quadratic model for the data.

\_\_\_\_\_

12. What was the maximum height reached by the ball?

\_\_\_\_\_

13. How long did it take the ball to reach maximum height?

\_\_\_\_\_

14. Determine the height of the ball 1.5 seconds after it was thrown.

\_\_\_\_\_

15. Determine how many seconds it took for the ball to hit the ground.

\_\_\_\_\_

## Practice Masters Level A

## 5.4 Completing the Square

Complete the square for each quadratic expression to form a perfect-square trinomial. Then write the new expression as a binomial squared.

1.  $x^2 + 12x$

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2.  $x^2 - 14x$

---

3.  $x^2 + 26x$

---

4.  $x^2 + 5x$

---

5.  $x^2 - 3x$

---

6.  $x^2 + x$

---

Solve each equation by completing the square. Give exact solutions. Then give answers rounded to the nearest hundredth, if necessary.

7.  $x^2 + 8x + 2 = 0$

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9.  $x^2 + 6x = 0$

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11.  $x^2 - 3x + 9 + 6 = 0$

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Write each quadratic function in vertex form. Give the coordinates of the vertex and the equation of the axis of symmetry.

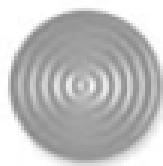
13.  $f(x) = x^2 + 4x + 3$

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15.  $f(x) = x^2 + 2x + 5$

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## Practice Masters Level A

### 8.3 Multiplying and Dividing Rational Expressions

Simplify each expression.

1.  $\frac{x^2 + 6x + 8}{x^2 + x - 12}$

---

3.  $\frac{x^2 - x - 12}{x^2 + 5x + 6}$

---

5.  $\frac{x^{12}}{5} \cdot \frac{15}{x^4} \cdot \frac{x^3}{9}$

---

7.  $\frac{6x^2 + 18x - 108}{x^2 + 4x - 12} \cdot \frac{x + 4}{10x - 30}$

---

9.  $\frac{x^2 + 4x - 5}{18} \div \frac{x^2 - x}{6}$

---

11.  $\frac{x^4 + 2x^3}{x^2 + 3x + 2} \cdot \frac{x^2 - 1}{5x - 5}$

---

13.  $\frac{\frac{x^2 + x - 6}{x + 5}}{\frac{3x^2 - 12}{3x + 15}}$

---

15.  $\frac{\frac{5x - 35}{3x + 9}}{\frac{5x^2 + 15x}{x^2 + 6x + 9}}$

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**Practice Masters Level A****8.4 Adding and Subtracting Rational Expressions**

Write each expression as a single rational expression in simplest form.

1.  $\frac{4}{x} + \frac{6}{x}$   
\_\_\_\_\_

3.  $\frac{7x}{12} - \frac{3x}{4}$   
\_\_\_\_\_

5.  $\frac{4x - 2}{10} - \frac{3x - 2}{6}$   
\_\_\_\_\_

7.  $\frac{5x}{x + 5} + \frac{-8x}{x - 7}$   
\_\_\_\_\_

9.  $\frac{x - 2}{x^2 + 8x} + \frac{x + 5}{x - 3}$   
\_\_\_\_\_

11.  $\frac{4x}{x^2 - 16} + \frac{6}{x - 4}$   
\_\_\_\_\_

13.  $\frac{x}{x^2 - 9} + \frac{x}{x^2 + 6x - 27}$   
\_\_\_\_\_

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