Honors Algebra 2 Summer Packet
The Woodlands College Park High School

Honors Mathematics courses are designed for those students who show high levels of aptitude for, interest in, and/or commitment to the study of Mathematics. The courses will cover and extend the state required curriculum in both content and depth. Each course is aligned with the College Board's recommendations and prepares students to be successful in college level courses. As you consider academic and extra-curricular commitments for the next school year, it is imperative to consider the following before enrolling in an Honors Mathematics course:

- The pace of Honors courses is faster than that of the academic level Mathematics courses.
- It will be assumed that students in Honors Math courses have mastered the material from previous Math courses. In general, review of concepts that were developed in the prior Mathematics courses will be minimal.
- Daily attendance and daily review of class notes are crucial for a thorough understanding of the concepts.
- Students should expect an average of 30 to 60 minutes of work <u>outside</u> of class each day.
- Assessments are rigorous and 75% of the course grade is determined by test grades.
- All tests must be completed within a single class period.
- In general, there are not many extra credit opportunities. Grades are based almost solely on mastery of the material.

We have found that the following criteria correlate highly with success in Honors Mathematics courses:

- Near-perfect attendance. Catching up in an Honors Math class can be <u>very</u> difficult.
- Exceptionally high rates of accuracy and timely completion on daily assignments.
- High grades (85 and above) in current Honors Math class.
- Strong ability to work independently.
- Strong organizational and time management skills.

We expect students to have mastered the concepts from Geometry and Algebra 1 prior to the beginning of class. These concepts include, but are not limited to:

- Order of operations
- Factoring
- Solving linear and quadratic equations
- Solving systems of equations
- Writing equations of lines
- Graphing points, lines, and parabolas
- Domain and Range
- Applying laws of exponents
- Simplifying radicals
- Operations with fractions
- Multiplying polynomials
- Inequalities
- Application Problems

The attached summer packet covers the topics listed above and is designed to ensure your readiness to enter Honors Algebra 2 next year.

We will be using the HP Prime graphing calculator in this class. It is suggested that you purchase this to have at home for homework assignments.

If you have any questions or need to refresh your memory, there are several resources available to you online.

- www.purplemath.com
- www.classzone.com
- www.math.com

You can also visit with any of the current or future Honors Algebra 2 teachers before or after school during tutorials.

Show work on ALL problems. Box your answers. All of these problems are intended to be done <u>without the aid of a calculator.</u>

Simplify each expression using order of operations.

1) $4^2 * 2 + [7 - (3^2 - 5)]$

2) $[15(10) - 12(10)] \div 10$

3) $80 \div 4 * 2 - 2 * 2$

4) $4[(3 + 2 * 3) - 5] + 7$

5) $(8 - 4) * (12 - 3) * \frac{1}{2}(2 + 1 * 2)$

6) $3^2 + 7 * 2 - 8 * 2$

Simplify each algebraic expression.

7) $5(x+y)-4(3x-2y+1)$

8) $4w(2-w)+3w^2$

9) $\dfrac{30x^2+20x-10}{-5}$

10) $x^2+y^2-[x(x+y)-y(y-x)]$

11) $7[2-3(d-4)+4(d-6)]$

12) $6-3[3+3(x-4)]$

Evaluate.

13) $-3x^2+4x$ when x = -2

14) $\dfrac{-2(y+1)}{16-2y^2}$ when y = 4

15) $-2b^2+4ab$ when a = 3 and b = -1

Solve the following equations.

16) $-2(4t-7)=3(t-10)$

17) $-4(6-4b)=b+21$

18) $|4x-3|=6$

19) $-4(6y-5)=23-3(8y+1)$

20) $5[12-3(2-y)-2y]=2(1-y)$

21) $-6x^2=-216$

22) $\dfrac{5}{2}(4m+2)=35$

23) $7.6r-0.2=5.2r+1$

24) $\dfrac{11-x}{3x+2}=\dfrac{1}{2}$

Solve for the indicated variable.

25) $y = mx + 6$, for x

26) $V = \pi r^2 h$, for h

27) $A = P + Prt$, for P

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

29) $S = 2wL + 2Lh + 2wh$, for L

30) $5xy + 2x = 3$, for x

Solve each equation by factoring.

31) $8x^2 - 18x = 0$

32) $4x^2 - 100 = 0$

33) $y^2 + 13y + 36 = 0$

34) $a^2 + 11a = -18$

35) $4x^2 - 4x + 1 = 0$

36) $3 + 6b + 3b^2 = 0$

Solve using the quadratic formula. Give answers in exact form. (No decimals.)

37) $-2x^2 + 8x + 2 = 0$

38) $2x^2 - 8x = -5$

39) $3x^2 + 1 = 5x$

Solve the following systems of equations by using substitution.

40) $\begin{aligned} -7x - 7y &= 0 \\ x + 4y &= 18 \end{aligned}$

41) $\begin{aligned} -x - 7y &= 4 \\ 3x + 3y &= 6 \end{aligned}$

42) $\begin{aligned} 5x - y &= -20 \\ -8x + 5y &= 15 \end{aligned}$

Solve the following systems of equations by using elimination.

43) $\begin{aligned} -4x-2y&=-12 \\ 4x+8y&=-24 \end{aligned}$

44) $\begin{aligned} 7x+6y&=6 \\ 5x+3y&=-6 \end{aligned}$

45) $\begin{aligned} 7x-9y&=17 \\ -2x-2y&=18 \end{aligned}$

Write each equation in slope-intercept form.

46) $x-y=2x+3y+9$

47) $-2x=24-8y$

Find the slope and y-intercept of each equation.

48) $y-2x=7$

49) $y=\dfrac{2x+7}{14}$

50) $3x+6y=12$

Find the slope of $\overleftrightarrow{AB}$.

51) A(9, 6), B(1, 4)

52) A(-2, 2), B(4, -4)

53) A(-9, 16), B(-11, 16)

Write the slope-intercept form of the equation of the line described.

54) through (0, -1), parallel to $y=\dfrac{3}{4}x-4$

55) through (1, -1) and (-1, 5)

Write the standard form (Ax + By = C) of the equation of the line described.

56) through (1, -2), slope = -5

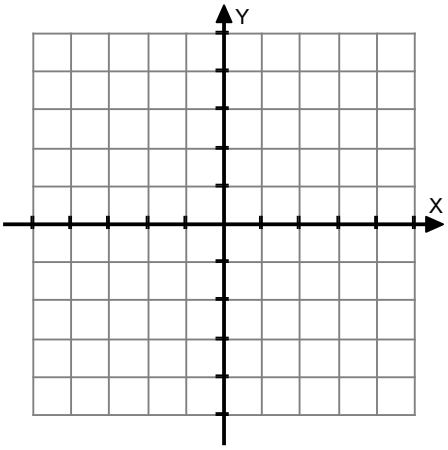
57) through (1, -4), slope = undefined

58) through (-1, -1), perpendicular to $y=\dfrac{1}{2}x+1$

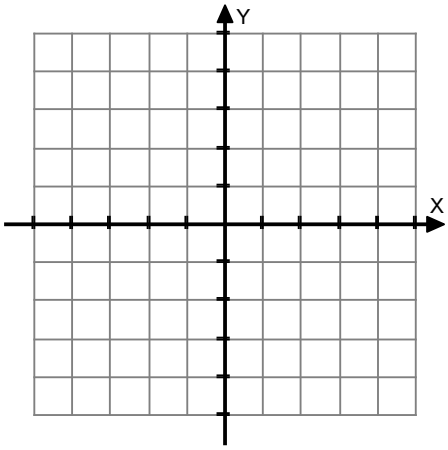
59) through (1, -2) and (5, 3)

Graph each of the following.

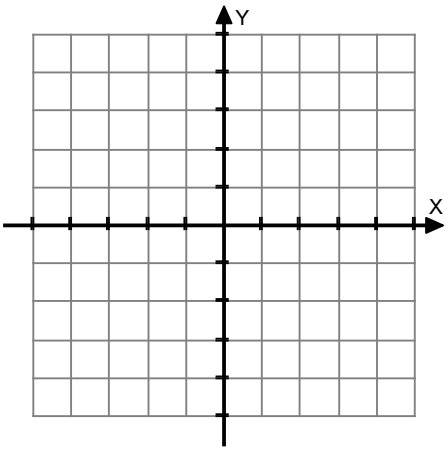
60) $y = -2x + 4$



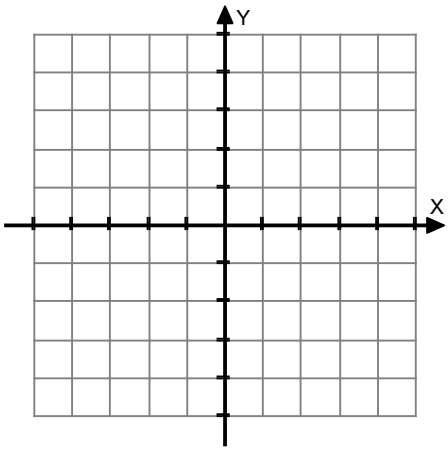
61) $x - 2y = 0$



62) $x = 5;\ y = -2$ (yes, two lines)



63) $y = -2x^2 + 4$



Simplify each expression. Your answers should contain only positive exponents.

64) $2m^2 * 2m^3$

65) $\dfrac{r^2}{2r^3}$

66) $(2x^2)^0$

67) $(x^2y^4)^5$

68) $(6xy^2)(-8x + 9y)$

69) $\dfrac{x^2y}{3y^3x^3} * \dfrac{18x^4}{xy^6}$

Simplify each radical. Give each answer in exact form (No decimals).

70) $\sqrt{8}$

71) $\sqrt{x^3}$

72) $\sqrt{27m}$

73) $\sqrt{216r^2}$

74) $4\sqrt{10}$

75) $\sqrt{4x^3y^4}$

76) $\sqrt{2} * \sqrt{2}$

77) $\sqrt{8} * \sqrt{10}$

78) $\sqrt{32} + 3\sqrt{18} + \sqrt{2}$

Evaluate each expression. Write your answer in simplest form (REDUCE!). Where applicable, leave answers as improper fractions. Show your work.

79) $\frac{1}{3}\left(\frac{5}{6} - \frac{3}{4} + \frac{2}{3}\right)$

80) $\dfrac{\frac{3}{9} - \frac{8}{12}}{\frac{3}{8} * 2}$

81) $-\frac{4}{9} * \frac{3}{2} - \frac{5}{6} + 3$

82) $(4 - \frac{5}{6} + 3 * 2) \div \frac{5}{6}$

83) $\dfrac{\frac{2}{3} + 4}{\frac{5}{6}}$

84) $\dfrac{\frac{3}{2} + \frac{3}{4} + \frac{3}{8}}{21}$

Multiply the following polynomials

85) $(3x-2)(x-1)$

86) $(2x-9)(3x-8)$

87) $(-3k-4)(-k-4)$

88) $(3x-5)^2$

89) $(5x-3y)(5x+3y)$

90) $(8a^3+2b)^2$

Solve the following inequalities

91) $x + 6 \geq 2(1-x)$

92) $-2x + 3 < x - 6$

93) $-2 \leq 4x + 6 \leq 22$

Application Problems

94) A lamppost casts a shadow that is 24 feet long. Tad, who is 6 feet tall, is standing directly next to the lamppost. His shadow is 15 feet long. How tall is the lamppost?

95) A locksmith charges \$25 to make a house call and \$15 for each lock that is re-keyed. Another locksmith charges \$10 to make a house call and \$20 for each lock that is re-keyed. For how many locks will the total costs be the same?

96) A popular mixture of potpourri includes pine needles and lavender. If pine needles cost \$1.50 per ounce and lavender costs \$4.00 per ounce, how much of each ingredient should be mixed to make 80 oz of the potpourri that is worth \$200?

97) A passenger plane made a trip to Las Vegas and back. On the trip there it went 432 mph and on the return trip it went 480 mph. How long did the trip to Las Vegas take if the return trip took 9 hours?

98) Ryan left the science museum and drove south. Gabriella left the science museum three hours later driving 42 km/h faster than Ryan in an effort to catch up to him. After two hours Gabriella finally caught up. Find Ryan's average speed.

99) How many mg of a metal containing 45% nickel must be combined with 6 mg of pure nickel to form an alloy containing 78% nickel?

100) From 1980 through 1990, the prize money, P (in \$1000's) for the singles champions at the U.S. Tennis Open can be modeled by $P = 30.2t + 35.8$ where t = 0 represents 1980. According to the is model, when will the prize money be \$500,000?