Honors Algebra 2 Summer Packet

The Woodlands College Park High School

The purpose of this packet is to help you refresh fundamental concepts from Algebra I and Geometry and start the school year ready to succeed. Essential topics include:

- 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

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

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

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

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 $\overline{AB}$.

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

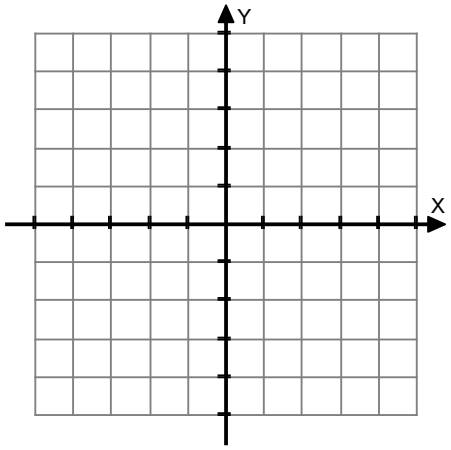
57) through (1, -4), slope = undefined

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

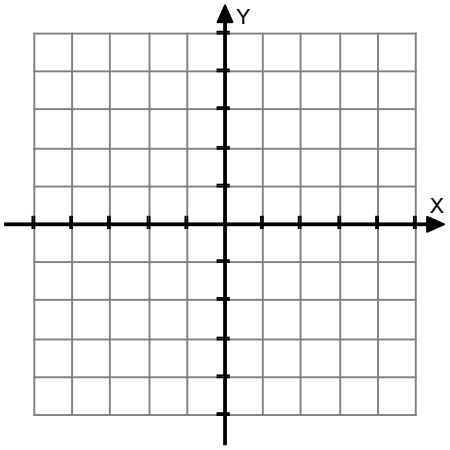
59) through (1, -2) and (5, 3)

Graph each of the following.

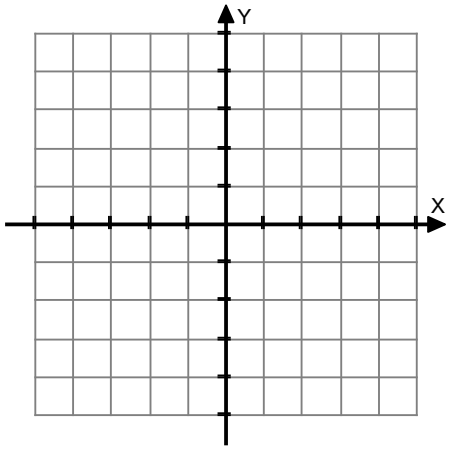
60) $y = -2x + 4$



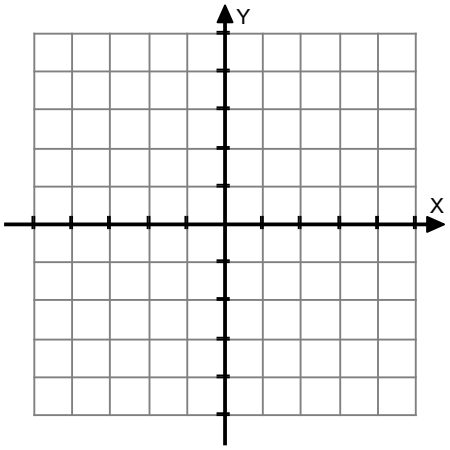
61) $x - 2y = 0$



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?