Name: _____

Summer Assignment—2016

Algebra 2 Honors

Algebra 2 Advanced

Directions:

- **This assignment is due on the first day of school.**
- **This assignment should be completed individually and without the help of a tutor.**
- **Show ALL WORK!**
- **You will be assessed on this material during the first week of school. You will not have access to a calculator for those problems indicated.**
- **An answer key will be posted on your teacher's website in late August. Please check your answers before coming to school on the first day.**

Please Note:
All Algebra 2 students are required
to have a TI-83+ or any TI-84 calculator. (No TI-89s).

Prerequisite Mathematical Proficiencies

Evaluate without using a calculator

1. $5 \cdot 2^3 + 7$	2. $48 \div 4^2 + \frac{3}{5}$	3. $50 \div 5^2 \cdot 2$
4. $\frac{12}{25} \cdot \frac{20}{21}$	5. $\frac{2}{3}\left(\frac{9}{2} - 12\right)$	6. $-\frac{7}{8} \div -2\frac{1}{10}$

Evaluate without using a calculator.

7. $x\left(\frac{y}{2} + 3z^2\right) - 2x \;\; if\; x = \frac{1}{2},\; y = 4,\; z = -2$	8. $\frac{-b+\sqrt{b^2-4ac}}{2a} \;\; if\; a = \frac{1}{2},\; b = 4,\; c = -2$
9. $\frac{9}{2}(3)^x \;\; if\; x = -2$	10. If $k \☺ n = k^3 - 3n$, then evaluate $7 \☺ 5$

Simplify the radical without using a calculator.

11. $\sqrt{50}$	12. $\sqrt{192}$	13. $\sqrt{169}$
14. $\sqrt{\frac{6}{27}}$	15. $\frac{3}{\sqrt{6}}$	16. $\left(2\sqrt{5}\right)^2$

17. Given $f(x) = 4x - 12x^2 + 7x^3$, $g(x) = 2\left(\frac{1}{3}\right)^x$, and $h(x) = \frac{4-x}{-x^2}$, evaluate without the use of a calculator:

a. $f(-1)$

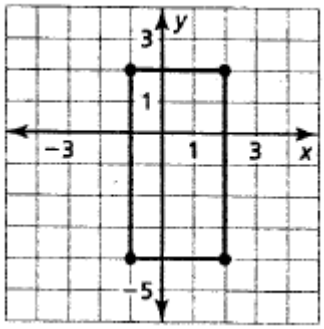
c. $g(2)$

b. $f(1)$

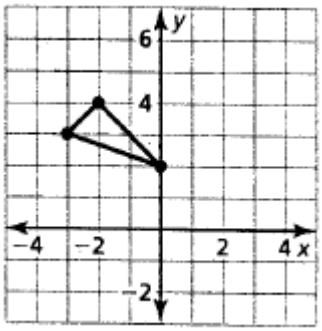
d. $h\big(f(1)\big)$

Graph the transformation of the figure.

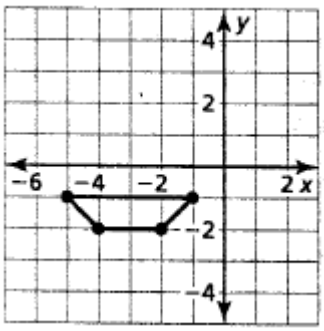
18. Translate the rectangle 1 unit right and 4 units up.



19. Reflect the triangle in the *y*-axis. Then translate 2 units left.



20. Translate the trapezoid 3 units down. Then reflect in the *x*-axis.



Solving Equations and Inequalities

Solve without the use of a calculator.

21. $2\big(x + 3(x-1)\big) = 18$

22. $\frac{2}{3}x - 18 = \frac{x}{6}$

23. $3\left(-\frac{3}{4}x + \frac{5}{6}\right) = \frac{4}{3}(3x - 5)$

24. $5 + 2(k+4) = 5(k-3) + 10$

25. $2x^2 = 50$

26. $6 + 2x(x-3) = 2x^2$

27. $\frac{x-4}{5-2x} = -\frac{3}{4}$	28. $\frac{4}{3}(x-4) = 8+2x$	29. $-2 < 1-3x < 10$
30. $5x+16 \leq 31 \; or \; 8-4x < -12$	31. $\lvert 2x-3 \rvert = -2$	32. $3\lvert 2x-7 \rvert - 5 = 4$

Linear Functions

Find the slope of the line passing through each pair of points:

33. $(-3,-4),\ (-4,6)$	34. $(-4,-6),\ (-4,-8)$

Write an equation, in slope-intercept form, for the line described.

35. Passes through $(5,4)$ and has a slope of $-\frac{2}{3}$.	36. Passes through $(-2,4)$ and has a slope of -3.	37. Passes through $(-6,-3)$ and $(-2,-5)$.

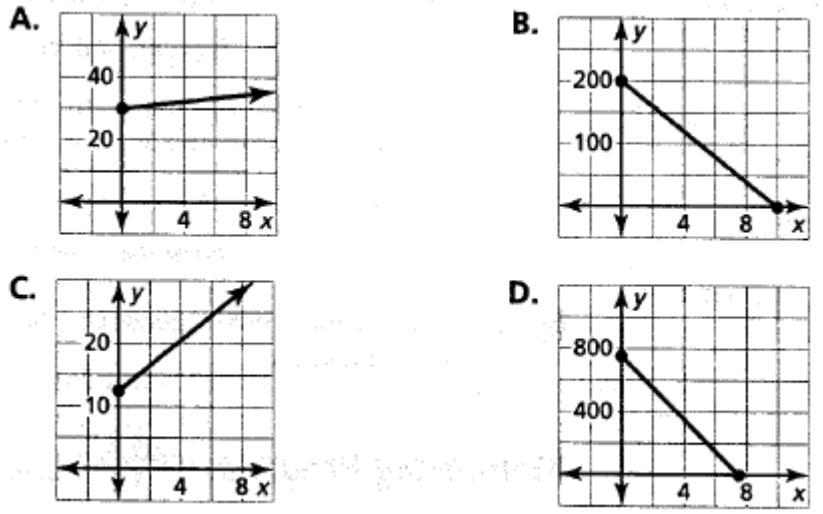
Find the *x*- and *y*-intercepts of the graph of the linear equation.

38. $y = -6x+8$	39. $y = 3(x-5)$

Graph each linear equation.

40. $y = \frac{3}{4}x - 4$	41. $x + 3y = 6$	42. $y = -\frac{2}{3}(x - 1) + 6$

43. Match each description of the situation with its corresponding graph. Explain your reasoning.
    a. A person gives \$20 per week to a friend to repay a \$200 loan.
    b. An employee receives \$12.50 per hour plus \$2 for each unit produced per hour.
    c. A sales representative receives \$30 per day for food plus \$0.565 for each mile driven.
    d. A computer that was purchased for \$750 depreciates \$100 per year.



Solve the system of linear equations in two variables.

44. $\begin{cases} y = 2x + 4 \\ -3x + y = -9 \end{cases}$	45. $\begin{cases} 3x + 3y = 6 \\ -5x + 2y = 17 \end{cases}$
46. $\begin{cases} -3x + 6y = 21 \\ 2x - 4y = 14 \end{cases}$	47. $\begin{cases} \frac{3}{5}x - \frac{3}{4}y = -3 \\ \frac{2}{5}x + \frac{1}{3}y = -8 \end{cases}$

Quadratic and Polynomial Functions

Factor each expression completely.

48. $x^2 - 5x + 6$	49. $6x^2 - 5x - 4$	50. $-3x^2 - 10x - 3$
51. $16x^2 - 9$	52. $4x^2 - 36$	53. $-12x^2 + 27$
54. $x^2 + 9$	55. $3x^2y^2 - 13xy^2 - 10y^2$	56. $6x^2 + 7xy - 20y^2$
57. $4y^3 - 7y^2 - 16y + 28$		

Solve.

58. $5x^2 - 10x = 0$	59. $(x + 5)(x + 2) = 40$	60. $6x^3 - 18x^2 = 24x$
61. $x + 3 = 2x^2$	62. $(x + 5)^2 = 36$	

Problem Solving

63. Kevin ran a 100 meter race at an average speed of v meters per second. He completes the race in 12.5 seconds.
    a. Write an equation that would allow you to solve for v.

    b. What was Kevin's average running speed, in meters per second?

64. On Friday, three friends shared how much they read during the week.

    - Barbara read the first 100 pages from a 320-page book in the last 4 days.
    - Colleen read the first 54 pages from a 260-page book in the last 3 days.
    - Nancy read the first 160 pages from a 480-page book in the last 5 days.

    a. A person's average reading rate can be defined as the number of pages read divided by the number of days. Find each person's reading rate.

    b. If the three friends continue to read every day at their rates, who will finish reading her book first? Second? Third?

65. A group of friends takes a day-long trip down a river. The company that offers the tubing trip charges \$15 to rent a tube for a person to use and \$7.50 to rent a "cooler" tube, which is used to carry food and water in a cooler. The friends spend \$360 to rent a total of 26 tubes. How many of each type of tube do they rent?

66. A local mini-golf course charges \$5 per person to play a round of golf, and the course sells 120 rounds of golf per week. The manager of the course studied the effect of raising the price to increase revenue and found the following data.

The table shows the price, number of rounds of golf, and weekly revenue for different numbers of \$0.25 increases in price.

Number of \$0.25 price increases, n	0	1	2	3	4
Price of a round of golf, $p(n)$	\$5.00	\$5.25	\$5.50	\$5.75	\$6.00
Number of rounds of golf sold, $s(n)$	120	117	114	111	108
Weekly revenue, $r(n)$	\$600	\$614.25	\$627	\$638.25	\$648

a. Based on the data, write a linear function to model the price of one round of golf, $p(n)$, in terms of the number of \$0.25 increases.

b. Based on the data, write a linear function to model the number of rounds of golf sold in a week, $s(n)$, in terms of the number of \$0.25 price increases.

c. Based on the data, write a quadratic function for the weekly revenue in a week, $r(n)$, in terms of n, the number of \$0.25 increases.

d. Use your quadratic function to determine the weekly revenue in a week when tickets cost \$6.25.

e. What is the maximum possible weekly revenue?