Summer Assignment for Students Going Into Precalculus 10th & 11th - Honors and Intensive

Directions:

- ❏ Complete this packet following the directions below:
  - ❏ Complete all problems in the space provided, showing all of your work. If there is no work to show, write a sentence or two explaining your answer. **Only questions with work and/or explanations will be counted as complete.**
  - ❏ Write your final answer/solution on the chart on the next page
  - ❏ Check your answers using the answer key on the last page of this packet.
    - ❏ If a question is wrong, that's okay! Check your work for any mistakes and try again :)
    - ❏ If multiple questions are wrong or you don't understand how to arrive at the correct answer, it's probably time to get extra help (see below)
- ❏ Bring this packet with you on the first day of school
  - ❏ While we will be looking at the chart to see trends across the class, your grade will be based on **completion** not correct answers.
  - ❏ Please draw a ☆ next to any topic you would like your teacher to review with you or the whole class.

Name: _____

Solution/Reflection Chart

Question	My Answer	Correct?
1		
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4	**Table & Graph**	
5	**Table & Graph**	
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24	**Graph**	

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36	**Graph**	
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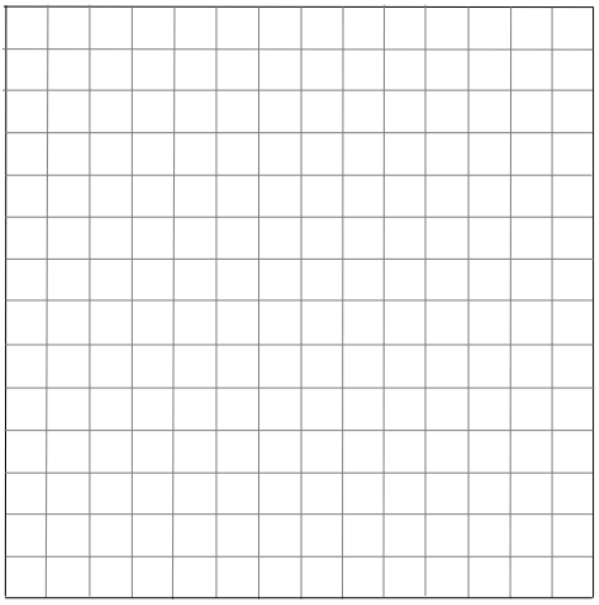
Given the points A (-2, 6) and B (4, -3), compute:

1. The slope of $\overline{AB}$:
2. The y-intercept of $\overline{AB}$:
3. The x-intercept of $\overline{AB}$:

Make a table of values and sketch the graph for:

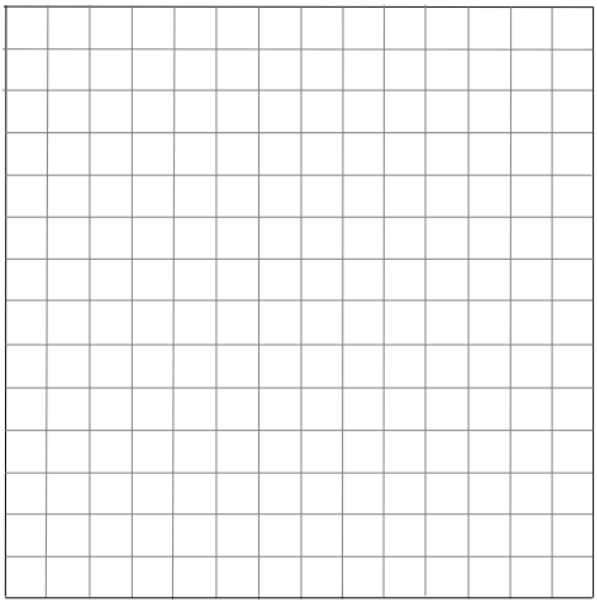
4. $y = 2x^2 - x - 9$

x							
y							



5. $y = \sqrt{x - 5} + 2$

x							
y							



Find the x- and y-intercepts of the graph of:

6. $y = |x + 1| - 3$

7. $y = x\sqrt{4 - x^2}$

8. Write an equation for the line passing through the points A (-1, 8) and B (6, 5) in slope - intercept form.

9. Write an equation for the line through (3, -2) that is *parallel* to the graph of 5x - 4y = 60 in standard form.

10. Write an equation for the line through (-4, 9) that is *perpendicular* to the graph of 2x + 3y = 25 in point-slope form.

Given the function defined by the piecewise as indicated below, find the requested values:

$$f(x) = \begin{cases} 2x+1 & \text{for } x \leq -1 \\ x^2+2 & \text{for } x > -1 \end{cases}$$

11. f(-2)

12. f(-1)

13. f(0)

14. f(1)

15. f(2)

16. Find the domain of the function defined by $f(x) = \frac{x}{x^2 - x - 6}$

Use algebra (not your calculator!) to determine the zeros of the function

17. $f(x) = 3x^2 - 16x + 21$

18. $g(x) = x^3 - x^2 - 25x + 25$

Consider the functions defined by $f(x) = \frac{1}{x-5}$, $g(x) = x^2 - 4$, *and* $h(x) = \sqrt{x}$. *Write and simplify the formula for* AND *identify any restrictions on the domain of each of the composite functions.*

19. $f(g(x))$

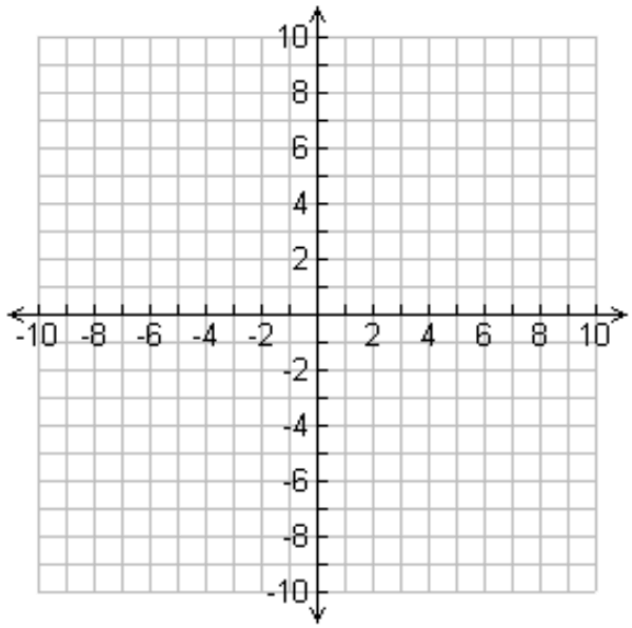
20. $(h \circ f)(x)$

21. $g(h(x))$

22. $(h \circ g)(x)$

23. Given the function $f(x) = 3x + 7$ find a formula for $f^{-1}(x)$, the inverse of f. Then verify algebraically that $f(f^{-1}(x)) = f^{-1}(f(x))$.

24. Sketch the graph of the quadratic function $y = -2x^2 + 4x + 1$. Label with coordinates all points of interest (e.g. vertex, axis of symmetry, intercepts)



25. Describe the end behavior of the polynomial function $g(x) = x^2 - x^3 + 2$

26. Use polynomial long division to divide: $(24x^2 - x - 8) \div (3x - 2)$

27. Use synthetic division to divide: $\frac{6x^4 - 4x^3 - 27x^2 + 18x}{x - 2}$

Using synthetic division, determine whether or not the given values of x are zeros of the function defined by $f(x) = 3x^3 - 8x^2 - 20x + 16$

28. $x = 4$

29. $x = -4$

30. $x = \frac{2}{3}$

31. $x = -1$

32. Given the function $h(x) = x^3 + 4x^2 - 25x - 28$, confirm that $x = 4$ is a zero. Then find all other zeros and write the complete factorization of $x^3 + 4x^2 - 25x - 28$.

Perform the indicated operations and write the result in standard a + b*i form.*

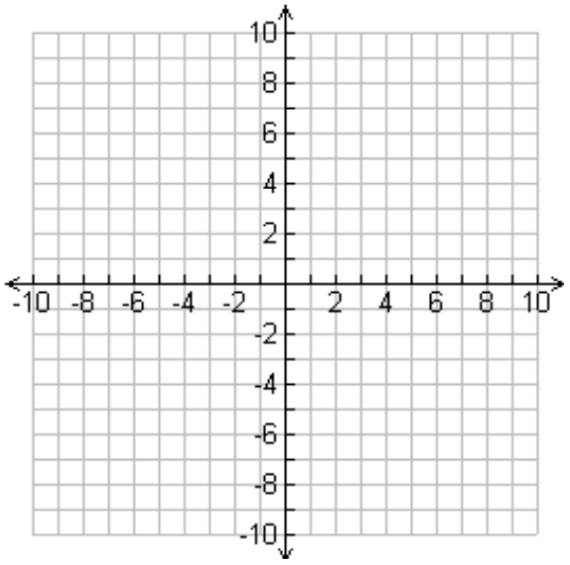
33. $5i(13 - 8i)$

34. $(1 + 6i)(5 - 2i)$

35. $\frac{15}{1 + 2i}$

36. Sketch and label a graph of the system of inequalities. Shade the solution set.

$2x + 3y < 24$
$y \geq x - 2$



37. List all of the possible rational roots of the equation $3x^3 - 20x^2 + 7x + 30 = 0$

38. Mrs. Gottfried invests $12,000 in an account that earns 5% annual interest compounded quarterly. Determine the cash value of her investment after 10 years' time.

39. The number of bacteria in a culture grows continuously at a rate of 6.5% per day. If there are 1000 bacteria initially, approximately how many will be present after 7 days' time?

Simplify the following rational expressions

40. $\frac{4a+5}{3} + \frac{7a-9}{2}$

41. $\frac{2b}{b-3} - \frac{5b}{b+3}$

42. $\left(\frac{c^2-9}{c^2+3c+2}\right)\left(\frac{c^2+7c+10}{c^2+2c-15}\right)$

43. $\left(\frac{2d^2-32}{d^2-3d-4}\right) \div \left(\frac{2d^2+9d+4}{d^2+1}\right)$

Solve each equation:

44. $\sqrt{1-2a} = a + 17$

45. $\frac{2b+1}{3} - \frac{7b-5}{2} = 13$

46. $27^{(3c+8)} = 9$

47. $\log_6(3d + 14) = 2$

Evaluate and/or simplify each expression:

48. $64^{1/2}$

49. $\left(\frac{25}{49}\right)^{\frac{1}{2}}$

50. $\left(\frac{27}{8}\right)^{-\frac{2}{3}}$

51. $\sqrt[3]{24x^{12}y^{16}}$

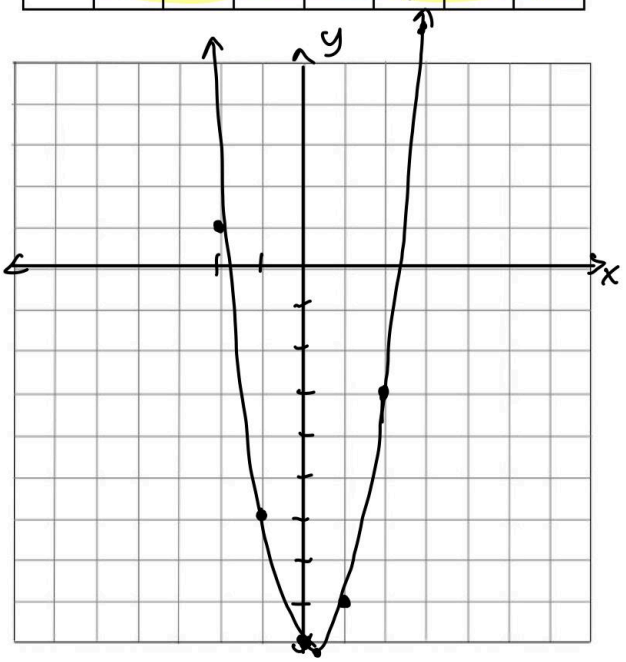
SOLUTIONS

1	$-\frac{3}{2}$	**18**	$x = 1, \pm 5$
2	$(0, 3)$	**19**	$\frac{1}{x^2 - 9},\ x \neq \pm 3$
3	$(2, 0)$	**20**	$\sqrt{\frac{1}{x-5}},\ x > 5$
4	**<<see table/graph below>>**	**21**	$\lvert x \rvert - 4,\ x > 0$
5	**<<see table/graph below>>**	**22**	$\sqrt{x^2 - 4},\ (-\infty, -2] \cup [2, \infty)$
6	x-intercepts: (2,0), (-4,0) y-intercept: (0,-2)	**23**	$f^{-1}(x) = \frac{x-7}{3}$
7	x-intercepts: (0,0), (2,0), (-2,0) y-intercept: (0,0)	**24**	**<<see graph below>>**
8	$y = -\frac{3}{7}x + \frac{53}{7}$	**25**	*As x approaches* $+\infty$, *y approaches* $-\infty$ *As x approaches* $-\infty$, *y approaches* $+\infty$
9	$5x - 4y = 23$	**26**	$8x + 5 + \frac{2}{3x-2}$
10	$y - 9 = \frac{3}{2}(x + 4)$	**27**	$6x^3 + 8x^2 - 11x - 4 - \frac{8}{x-2}$
11	**-3**	**28**	**yes**
12	**-1**	**29**	**no**
13	**2**	**30**	**yes**
14	**3**	**31**	**no**
15	**6**	**32**	$h(x) = (x-4)(x+7)(x+1)$
16	$(-\infty, -2) \cup (-2, 3) \cup (3, \infty)$	**33**	**40+65i**
17	$x = \frac{7}{3}, 3$	**34**	**17+28i**

35	**3-6i**
36	**<<see graph below>>**
37	$\pm\left(1,\ \frac{1}{3},\ 2,\ \frac{2}{3},\ 3,\ 5,\ \frac{5}{3},\ 6,\ 10,\ \frac{10}{3},\ 15,\ 30\right)$
38	**$19,723.43**
39	**1576.173 bacteria**
40	$\frac{29a-17}{6}$
41	$\frac{-3b^2+21b}{(b-3)(b+3)}$
42	$\frac{c+3}{c+1}$
43	$\frac{2\left(d^2+1\right)}{(d+1)(2d+1)}$
44	$a=-12$
45	$b=-\frac{61}{17}$
46	$c=-\frac{22}{9}$
47	$d=\frac{22}{3}$
48	**8**
49	$\frac{5}{7}$
50	$\frac{4}{9}$
51	$2x^4y^5\sqrt[3]{3y}$

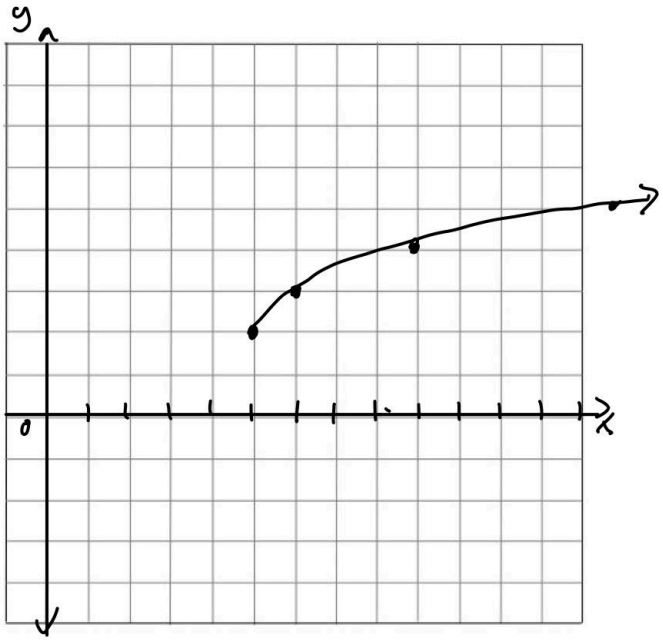
4. $y = 2x^2 - x - 9$

x	-2	-1	0	$\frac{1}{4}$	1	2	3
y	1	-6	-9	-9.125	-8	-3	6



5. $y = \sqrt{x - 5} + 2$

x	5	6	9	14	21	30	41
y	2	3	4	5	6	7	8



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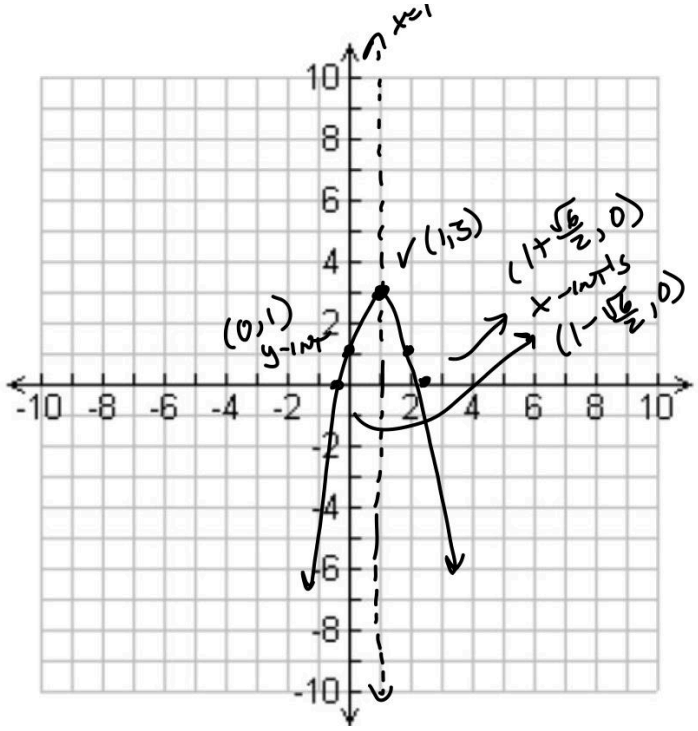

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