Name _____

Summer Packet for Students Entering

Precalculus Honors or

IB Precalculus

(Questions 44-56 are omitted from the packet)

The packet is due 1st day of school. Your first test will be given during week 1 and it will include questions from the packet.

Identify the property shown.

1. $7(11 + 9) = 7 \cdot 11 + 7 \cdot 9$

Evaluate the expression.

2. $36 - 5^2 \cdot 2 + 7$
3. $(5x + y) \div y$ when $x = -2$ and $y = 5$

Simplify the expression.

4. $5(x^2 - 9x) - 2(3x + 4) + 7$

Solve the equation.

5. $1.2x = 2.3x - 2.2$
6. $|13 + 2x| = 5$
7. $7(7 - 5x) = 3(4 + x)$
8.   Given $\dfrac{A}{B} = \dfrac{C}{D}$

        a. Find A
        b. Find B
        c. Find C
        d. Find D

9.   Solve for x if $4 : 5 = x : 15$
10.   Round the following to their decimal equivalents

        a. $\dfrac{253}{51}$ to the nearest whole number

        b. $\dfrac{3.1425}{6}$ to the nearest hundredths place

        c. $\dfrac{63}{16}$ to three decimal places

	answers
1	
2	
3	
4	
5	
6	
7	
8	a.
	b.
	c.
	d.
9	
10	a.
	b.
	c.

Solve the inequality. Graph the solution on a number line.

11. $6 - x > 15$
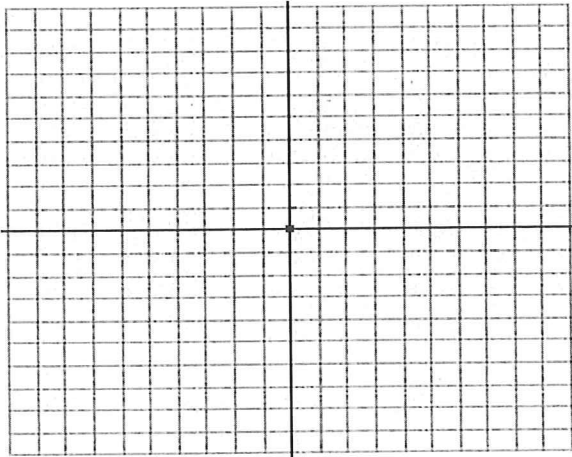

12.

$|x + 3| \geq 4$

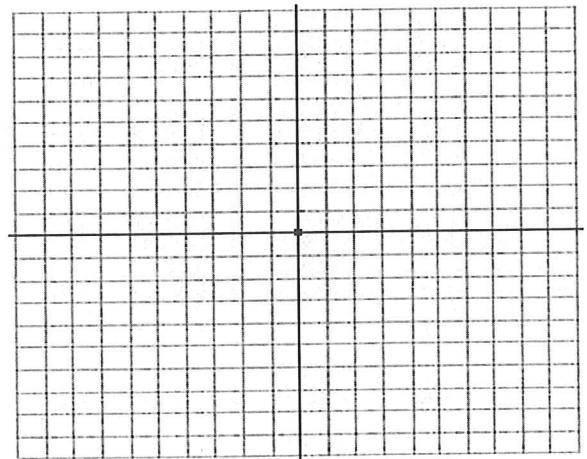13. $8x < 1$ or $x - 9 > -5$

14. $-2x + 8 > 3x + 10$

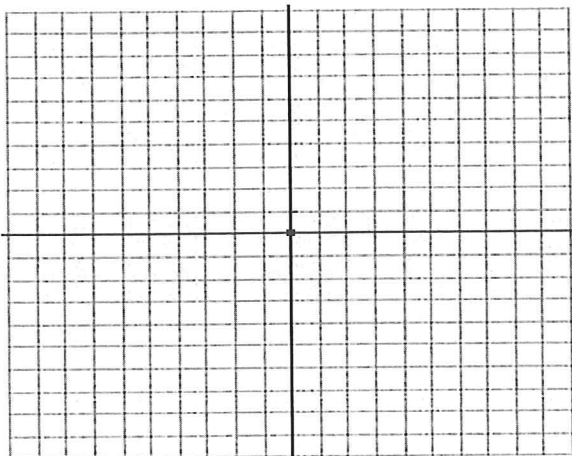15. Graph the relation. Then tell whether the relation is a function.

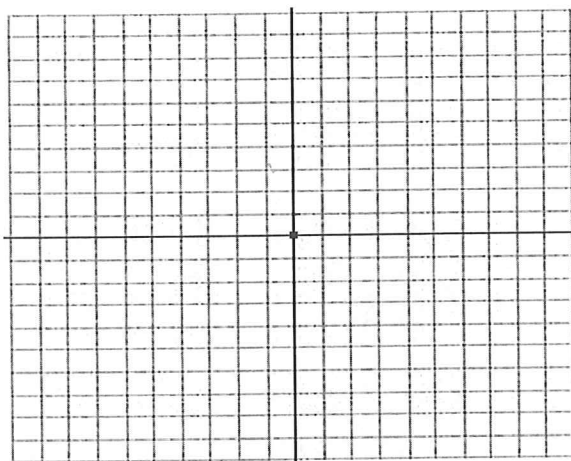| x	2	-3	4	0	-3	1
y	2	-2	0	2	3	-1

16. Graph the equation $5x - 2y = 10$
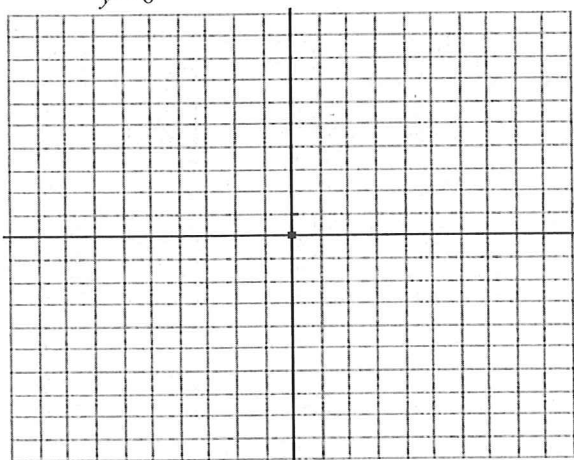
17. Sketch the graph of $y = x^2$

18. Sketch the graph of $(x - 4)^2 = y + 7$

19. Graph the linear system and tell how many solutions it has. If there is exactly one solution, estimate the solution and check it algebraically.

$$y = -\frac{1}{3}x + 4$$
$$y = 6$$

Find the equation of the line with the given characteristics.

20. slope: $\frac{1}{3}$, point: (–6, 2)

21. Through the points: $(5, -7), (1, -3)$

22. Write an equation of the line that passes through (1, 4) and is perpendicular to the line
$$y = -3x + 1.$$

Evaluate the function for the given value of x.

23. $f(x) = 80 - 3x; f(5)$

24. Draw a best-fitting line for the scatter plot. Write an equation of your line.

answers	
20	
21	
22	
23	
24	
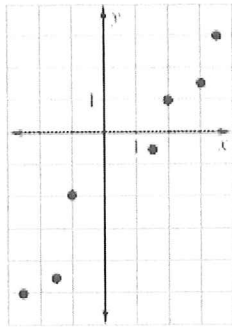
Solve Algebraically

25. $\begin{array}{l} x + 3y = -2 \\ -5x + y = -3 \end{array}$

Perform the indicated operation(s).

26.

$$-4\left(\begin{bmatrix} 1 & 10 \\ -4 & -6 \end{bmatrix} - \begin{bmatrix} 4 & 8 \\ -3 & -8 \end{bmatrix} \right)$$

27. Solve the matrix equation for x and y.

$$\begin{bmatrix} -1 & y+6 \\ x-4 & 3 \end{bmatrix} = \begin{bmatrix} -1 & 8 \\ -9 & 3 \end{bmatrix}$$

28. Write $y = x^2 - 10x + 16$ in intercept form and give the function's zero

Solve the equation by factoring.

29. $4x^2 + 28x - 15 = 0$

30. Simplify the radical expressions. Leave your answer in simplest radical form.

    a) $\sqrt{500}$ b) $(32)^{\frac{1}{2}}$

Solve the quadratic equation using any appropriate method.

31. $7x^2 - 3 = 11$

32. $x^2 + 4 = -32$

33. $m^2 + 8m = -3$

34. Write $y = x^2 + 18x - 4$ in vertex form and identify the vertex.

Simplify the expression leaving answer With positive exponents.

35. $\left(8x^3 y^2 \right)^{-3}$

36. $\dfrac{x^9}{x^{-2}}$

Factorize the polynomial

37. $2x^3 - 3x^2 + 4x - 6$

38. $a^2 + 8ab + 6\,b^2$

39. $y^4 - 16$

40. $3\,a^2 + 24\,a + 45$

41. $7mx^2 + 2nx^2 - 7my^2 - 2ny^2$

Simplify the expression. Assume all variables are positive.

42. $\sqrt[3]{27x^3 y^6 z^9}$
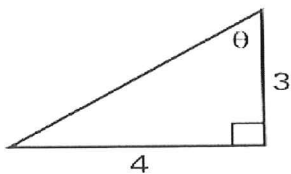
43. $\left(\dfrac{81x^2}{y} \right)^{3/4}$

answers	
28	
29	
30	a)
	b)
31	
32	
33	
34	
35	
36	
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43	

Write the next 3 terms of the sequence

57.　　$12, 6, 3, \dfrac{3}{2}, \ldots$

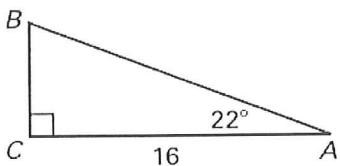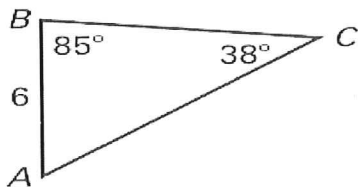**Evaluate the six trig functions of** θ

58.

59.
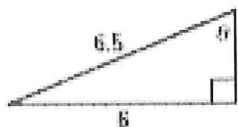
60. Solve $\triangle ABC$.

61 Solve $\triangle ABC$

62.　　Write an equation of the line that passes through $(5, -2)$ and is parallel to the line $2x - 3y = 6$.

answer		
57		
58	$\sin \theta =$	$\cot \theta =$
	$\cos \theta =$	$\sec \theta =$
	$\tan \theta =$	$\csc \theta =$
59	$\sin \theta =$	$\cot \theta =$
	$\cos \theta =$	$\sec \theta =$
	$\tan \theta =$	$\csc \theta =$
60	$<B =$	
	length of $\overline{AB} =$	
	length of $\overline{BC} =$	
61	$<A =$	
	length of $\overline{BC} =$	
	length of $\overline{AC} =$	
62		

63. You have $18 to spend for lunch during a 5 day work week. It costs you about $1.50 to make a lunch at home and about $5 to buy a lunch. How many times each work week should you make a lunch at home?

64. A sphere with radius r is inscribed in a cube as shown. Find the ratio of the volume of the cube to the volume of the sphere. Write your answer in simplified form

answers	
63	
64	
65	
66	
67	
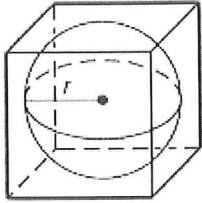
65. Edison is located at (9,3) and Kettering is located at (12, 5) on the same map. Each side of a grid on the map represents 10 miles. Approximate the distance between the two towns.

66. If sin A = 2/5 and A is in Quadrant II find the cos A

67. If tan B is 12/5 and B is in Quadrant I find sin 2B

68. Geologists have calculated that the continents of Europe and America are drifting apart at an average of 0.75 inches per year. If the continents continue to drift apart at the same rate, how many inches will they drift in 50 years?

69. The distance d that an object travels can be calculated when the initial speed v_i, elapsed time t, and the rate of constant acceleration a are known. A formula that relates these factors is

d(t) = v$_i$t + ½ a t² If a motorcycle has an initial speed of 30 m/s and a constant acceleration of 6m/s²,

how much time will it take to travel 200 meters?

70. The first five terms of an arithmetic sequence are shown below.

$$2, \quad 6, \quad 10, \quad 14, \quad 18$$

    a. Write down the sixth number in the sequence

    b. Calculate the 200th term

    c. Calculate the sum of the first 90 terms of the sequence

71. The equation $M = 90 \times 2^{-\frac{t}{20}}$ gives the amount, in grams, of radioactive material held in a laboratory over t years.
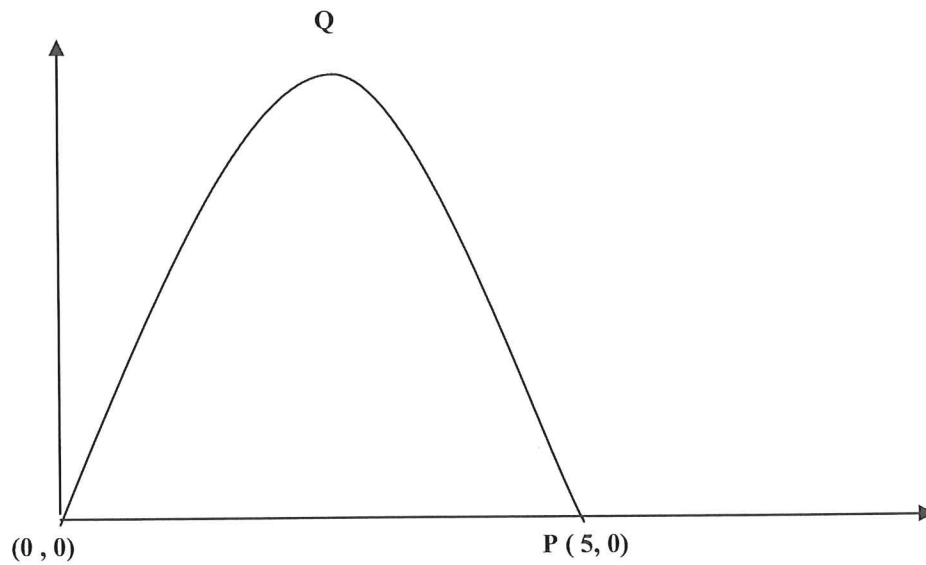
    a.   What is the original mass of the radioactive material?

    The table below lists some values for M.

t	60	80	100
M	11.25	v	2.8125

    b.   Find the value of v

    c.   Calculate the number of years it would take for the radioactive material to have a mass of 45 grams.

72. The diagram below shows the graph of $y = c + kx - x^2$, where k and c are constants.

Q

(0, 0)   P (5, 0)

    a.   Find the values of k and c.
    b.   Find the coordinates of **Q**, the highest point on the graph.

73. The sixth term of an arithmetic sequence is 24. The common difference is 8.
   a.   Calculate the first term of the sequence.
    b.   If the sum of the first n terms is 600, calculate the value of n.

74. A swimming pool is to be built in the shape of the letter L. The shape is formed from two squares with side dimensions x and $\sqrt{x}$ as shown.
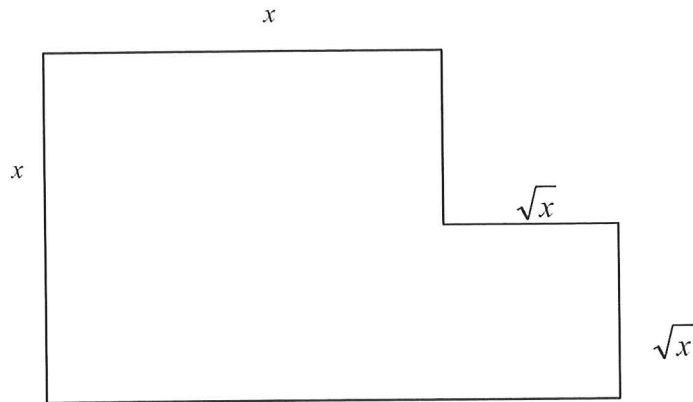
a. Write down an expression for the area A of the swimming pool surface
b. The area A is to be 30 m² . Write a quadratic equation that expresses this information.
c. Find both the solutions of your equation in part (b)
d. Which of the solutions in part (c) is the correct value of x for the pool? State briefly why you made this choice.

75. The graph of the function $f(x) = x^2 - 2x - 3$ is shown in the diagram below.
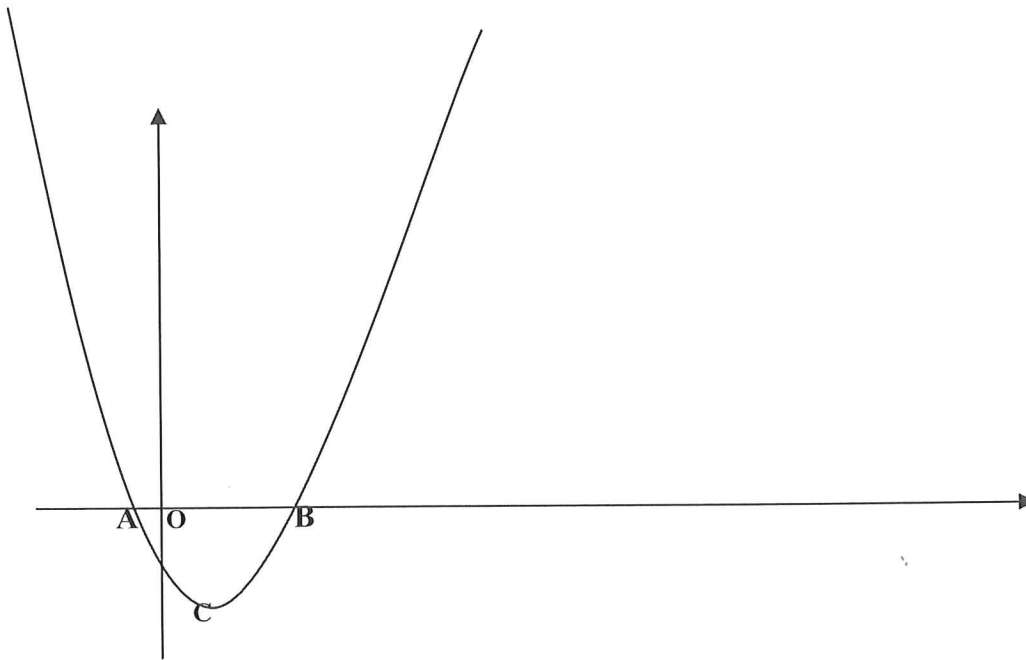
a. Factorize the expression $x^2 - 2x - 3$
b. Write down the coordinates pf the points **A** and **B**
c. Write down the axis of symmetry
d. Write down the coordinates of the point **C,** the vertex of the parabola