IB Math AA SL Year 1 Summer Packet

Here you will find a list of problems you must complete to review the necessary Algebra 1, Geometry, and Algebra 2 skills for next year.

Please complete all the problems on a separate sheet of paper and use graph paper where necessary.

The assignment is mandatory and you must be prepared to hand it in on the first day of class in August.

Please be prepared to ask questions on the problems that gave you trouble.

You will be tested on this assignment in August after there has been sufficient class time to review the assignment.

Enjoy your summer.

Mr. Towry

1. Simplify the radical expressions.

a) $\frac{6}{\sqrt{3}}$ b) $\frac{10\sqrt{2}}{\sqrt{5}}$ c) $\sqrt{72}$ d) $3\sqrt{8}$

e) $3\sqrt{5}\square 5\sqrt{75}$ f) $\sqrt{12}-2\sqrt{3}$

g) $\frac{1}{1-2\sqrt{3}}$ h) $\frac{4+\sqrt{2}}{3-2\sqrt{2}}$

2. Simplify $a(b-2c)+b(2a+b)$

3. Factor $3pa-6p^2q^3r$

4. Find each product and simplify.

a) $(3x-4)(x+2)$ b) $(2x-5)(3x+2)$ c) $(2x+7)(2x-7)$ d) $(2x+5)^2$

5. Factor

a) $x^2+11x+28$ b) $4x^2-x-3$ c) $5x^2-17x+6$

d) x^2-9 e) $16x^2-49y^2$ f) $25x^2-1$

6. Solve for the following variables

a) Solve for c, $a=\sqrt{b^2+c^2}$ b) Solve for b, $\frac{\sin A}{a}=\frac{\sin B}{b}$

c) Solve for cosA, $a^2=b^2+c^2-2bc\cos A$

7. Solve $\frac{5x+2}{3}=\frac{3x+10}{4}$

8. Solve the system by substitution or elimination

a) $\begin{cases} 4x-3y=10 \\ 2y+5=x \end{cases}$

b) $\begin{cases} 2x+5y=14 \\ 3x+4y=7 \end{cases}$

c) $\begin{cases} 3x+2y=8 \\ 2x+3y=7 \end{cases}$

d) $\begin{cases} 4x-5y=17 \\ 3x+2y=7 \end{cases}$

9. Combine the fractions, simplifying the answer.

a) $\frac{4}{x}+\frac{2x+1}{x+2}$

b) $\frac{2x-1}{x-2}+\frac{3x}{4x+3}$

10. Determine if the following lines are parallel, perpendicular or neither.

a) Line A through (2, 5) and (0, 1) and Line B through (4, 10) and (5, 12)

b) Line G through (5, 7) and (2,4) and Line H through (8, -5) and (4, -1)

11. Find the equations of each line in slope-intercept form.

a) slope 5; passing through (-2, -13)

b) Passing through (2, 7) and (5, 19)

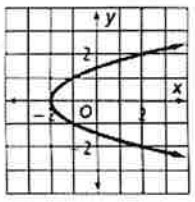
c) Passing through (-1, -3) and (-5, -11)

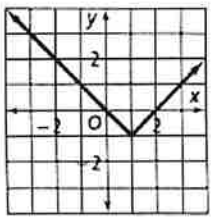
12. Determine if the set of ordered pairs are functions.

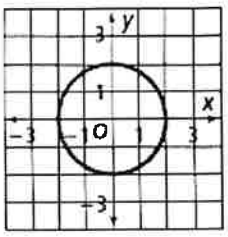
a) $\{(-1,1),(0,3),(1,6),(1,7),(2,8)\}$

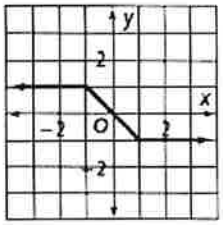
b) $\{(1,2),(2,2),(3,2),(4,2),(5,2)\}$

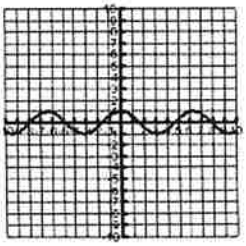
13. Which of these relations are functions?

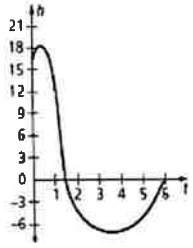
a) 

b) 

c) 

d) 

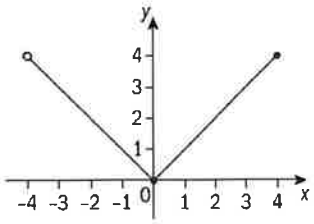
e) 

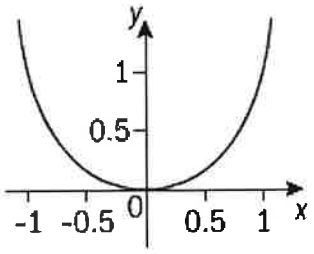
f) 

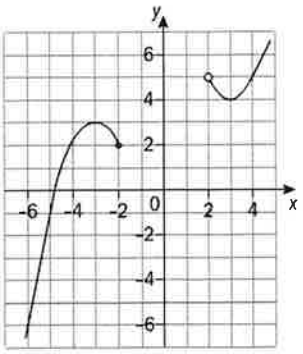
14. Identify the horizontal and vertical asymptotes for these functions, if they exist.

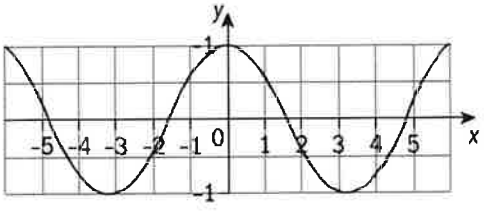
a) $y=3^x$ b) $y=\dfrac{4}{x+1}$ c) $y=\dfrac{2x+1}{x-1}$ d) $y=\dfrac{6}{x^2-9}$

15. Write the domain and range for the following relations. You may use interval or set notation.

a) 

b) 

c) 

d) 

16. If $f(x)=x^2-4$, find

a) $f(-a)$ b) $f(a+5)$

17. If $g(x)=4x-5$ and $h(x)=7-2x$

a) Find x when g(x) = 3 b) Find x when h(x) = -15

c) Find x when g(x) = h(x)

18. Find the inverse for each of the function

a) $f(x)=3x-1$ b) $g(x)=\frac{1}{x}-2$ c) $h(x)=2x^3+3$

d) $f(x)=\frac{x+1}{x-2}$

19. The function $f(x)=x^2$ has no inverse function. However, the square root function $g(x)=\sqrt{x}$ does have an inverse function.

a) Find this inverse
b) By comparing the range of domain explain why the inverse of $g(x)=\sqrt{x}$ is not the same as $f(x)=x^2$

20. Solve by factoring.

a) $x^2-25=0$ b) $4x^2-16x-9=0$ c) $2h^2-3h-5=0$

d) $x^2+2x-7=13+x$ e) $2(a-5)(a+5)=21a$ f) $2x-1=\frac{x+1}{2x}$

21. Solve each equation using the quadratic formula.

a) $4x^2+9x-7=0$ b) $2x^2-3x=1$

22. For each function, write the equation of the axis of symmetry and give the y-intercept.

a) $f(x)=x^2+8x+5$ b) $f(x)=5x^2+10x+6$

23. For each function, write the coordinates of the vertex and give the coordinates of the y-intercept.

a) $f(x)=(x-7)^2-2$ b) $f(x)=4(x-1)^2+6$

24. Write each function in the form $f(x)=a(x-h)^2+k$. Then sketch the graph of the function, labeling the vertex and the y-intercept.

a) $f(x)=x^2+10x-6$ b) $f(x)=3x^2-6x+7$

25. Write each function in the form $f(x)=a(x-p)(x-q)$. Then sketch the graph of the function, labeling the x and y intercept.

a) $f(x)=x^2-8x+15$ b) $f(x)=5x^2+6x-8$

26. Let $f(x)=x^2+3$ and let $f(x)=x-2$

a) Find $f\circ g(x)$

b) Write down the coordinates of the vertex of the graph of $f\circ g(x)$. The graph of the function h(x) is formed by translating the graph of $f\circ g(x)$ by 5 unites in the positive x-direction, and by 2 unites in the negative y-direction.

c) Write the equation of the function h(x) in the form $h(x)=ax^2+bx+c$

d) Hence, write down the y-intercept of the graph of h(x).

27. The height of a ball t seconds after it is thrown is modeled by the function $h(t)=15t-4.9t^2+3$, where h is the height of the ball in meters.

a) Find the maximum height reached by the ball.

b) For what length of time will the ball be higher than 12 meters?

28. A piece of wire 40 cm long is cut into two pieces. The two pieces are formed into two squares.

a) If the side length of one of the squares is x cm, what is the side length of the other square?

b) Show that the combined area of the two squares is given by $A = 2x^2 - 20x + 100$.

c) What is the minimum combined area of the two squares?

29. Simplify

a) $\frac{1}{2}(xy^2)\cdot\frac{2}{3}(x^2y)$ b) $2a^7 \div (2a)^3$ c) $3(x^3y^2)^2$ d) $(-x^2)^3$

30. Evaluate

a) $64^{\frac{2}{3}}$ b) $\left(\frac{8}{27}\right)^{\frac{2}{3}}$ c) $32^{-\frac{2}{5}}$ d) $(2^3)^{-\frac{4}{3}}$

31. Simplify these exponential expressions.

a) $(64a^6)^{\frac{1}{2}}$ b) $\frac{(8p)^{\frac{2}{3}}}{(4p)^2}$ c) $\frac{6x^2y^{-2}}{\sqrt[3]{8x^{-3}}}$

32. Evaluate these logarithmic expressions.

a) $\log_5\sqrt{5}$ b) $\log_9 1$ c) $\log_3\frac{1}{81}$ d) $\log_3 3^4$

d) $\log_6 6$