

Name:

Group 1

Result:

1. (1 point)  $\log_{16} \frac{1}{8} =$

A.  $-\frac{3}{4}$

B.  $\frac{3}{4}$

C.  $-\frac{4}{3}$

D.  $\frac{4}{3}$

2. (1 point)  $4^{3-\log_2 3} =$

A.  $\frac{64}{9}$

B.  $\frac{64}{3}$

C.  $\frac{64}{\sqrt{3}}$

D.  $64\sqrt{3}$

3. (1 point)  $\left(\sqrt{7-\sqrt{13}} - \sqrt{7+\sqrt{13}}\right)^2 =$

A. 2

B.  $2 + 2\sqrt{13}$

C. 8

D. 26

4. (1 point) There are 30 students in an IB class. 20 of those chose Biology as their group 4 subject, 8 students chose Chemistry and 7 chose neither Biology nor Chemistry. How many students take Chemistry, but do not take Biology?

A. 2

B. 3

C. 5

D. 7

5. (1 point) How many 3-digit numbers satisfying the conditions below are there?

- the number is greater than 340;
- all digits are different;
- only digits 1,2,3,4,5 are allowed.

A. 24

B. 30

C. 36

D. 126

6. (4 points) If  $\log_2 3 = a$  and  $\log_2 5 = b$ , express the following in terms of  $a$  and  $b$ :

(i)  $\log_2 15 =$

(ii)  $\log_2 75 =$

(iii)  $\log_2 0.6 =$

(iv)  $\log_3 25 =$

7. (2 points) If  $\log A = x$  and  $\log B = y$ , express the following in terms of  $x$  and  $y$ :

(i)  $\log \frac{10A}{B^2} =$

(ii)  $\log \sqrt{\frac{A}{1000B}} =$

8. (4 points) Factorize the following expressions fully:

(i)  $x^2 - 3x - 10 =$

(ii)  $x^2 - 9x + 20 =$

(iii)  $2x^2 - 11x - 21 =$

(iv)  $x^4 - 13x^2 + 36 =$

9. (2 points) Consider the formula:

$$A = B(x + y)$$

(a) Make  $x$  the subject of the formula.

(b) The quantities  $A$ ,  $B$  and  $y$  have been measured to be 8, 1 and 3 respectively, correct to the nearest unit. What is the upper bound for the possible value of  $x$ .

10. (3 points) Seven people including Adam and Eve are to be arranged in a line. In how many ways can this be done if:
- (i) Adam and Eve have to stand next to each other?
  
  - (ii) Adam and Eve cannot stand next to each other?
  
  - (iii) Adam and Eve have to stand on the opposite ends of the line?