Name:
Group 1
Result:

1. (1 point) $\log_9 \frac{1}{\sqrt{3}} =$

   A. $-\frac{1}{4}$ B. $\frac{1}{4}$ C. $-\frac{2}{3}$ D. $\frac{2}{3}$

2. (1 point) Given that:

   $$x = A \times B - C$$

   and A, B and C have been measured to be 30, 20 and 50 respectively, correct to 1 significant figure, then the lower bound for the value of x is

   A. 280 B. 320 C. 330 D. 550

3. (1 point) $\left(\sqrt{6-2\sqrt{5}} - \sqrt{6+2\sqrt{5}}\right)^2 =$

   A. 2 B. 4 C. $4+2\sqrt{5}$ D. 20

4. (1 point) $\frac{2}{\sqrt{3}-1} + \frac{1}{\sqrt{3}-2} =$

   A. -1 B. $2\sqrt{3}-1$ C. $2\sqrt{3}$ D. $3+2\sqrt{3}$

5. (1 point) How many 3-digit numbers satisfying the conditions below are there?
   - the number is even;
   - all digits are different;
   - only digits 1,2,3,4,5 are allowed.

   A. 12 B. 24 C. 30 D. 36

6. (3 points) If $\log_7 2 = a$ and $\log_7 3 = b$, express the following in terms of a and b:

   (i) $\log_7 12 =$

   (ii) $\log_7 \frac{4}{9} =$

   (iii) $\log_4 3 =$

7. (2 points) If $\log_3 A = x$ and $\log_3 B = y$, express the following in terms of x and y:

   (i) $\log_3 \frac{9}{AB} =$

   (ii) $\log_3 \sqrt{\frac{3B^3}{A}} =$

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

   (i) $x^2 + 2x - 24 =$

   (ii) $x^2 - 8x + 12 =$

   (iii) $3x^2 + 13x - 10 =$

   (iv) $x^4 - 81 =$

9. (3 points) Seven people including Adam, Eve and Steve are to be arranged in a line. In how many ways can this be done if:

   (i) Adam, Eve and Steve have to stand in front of the line in the given order?

   (ii) Adam, Eve and Steve have to stand in front of the line in any order?

   (iii) Adam and Steve have to stand on the opposite ends of the line and Eve has to stand exactly in the middle of the line?

10. (3 points) A group of students completed a survey about subjects they like.
60% answered that they like maths (M),
40% liked biology (B)
20% liked history (H)
15% liked both maths and biology,
10% liked both maths and history,
5% liked both biology and history,
5% didn't like any of the three mentioned subjects.

Let x represent the percentage of students who like all three mentioned subjects.

(i) Represent the above information on a Venn diagram.

(ii) Find x.

(ii) On your diagram shade the region corresponding to the set $(M \cap B') \cup H$.