TEST : EXCELLENT 1
ADDITIONAL MATHEMATICS

1. Given that the function f (x) = 4x -1 and fg(x) = 5x , find
   (a) g (x) (b) the value of x when gf (x) = 9 .

2. Given function f : x p - 3x and f^{-1} : x $\frac{q}{2}x + \frac{2}{3}$, where p and q are constants.
   Find the value of p and of q .

3. One of the roots of the quadratics equation $2x^2 – 2 = 8x - 4k$ is three times the value of the other root, find the value of k.

4. Given α and β are the roots of the quadratic equation $3x^2 – 5x – 2 = 0$, where α > 0 and β < 0 . Form a quadratic equation with roots α – 1 and $\beta + \frac{3}{4}$.

5. Solve the inequality $3x – \frac{x^2}{2} < 1$

6. Find the range of the values of y if x - 2y = 1 and y + 3 ≤ 2xy.

7. Find the coordinates of the points of intersection between the curve $x^2 + y^2 - 2y + 3x - 3 = 0$ and the line 1 - y = 0.

8. Given that $\log_3 p + \log_9 m = 2$, express m in terms of p .

9. Solve the equation $2^{4-x} - 2^{3-x} = \frac{1}{4}$.

10.

Weight (kg)	Number of watermelons
1.0 - 1.2	6
1.3 - 1.5	10
1.6 - 1.8	12
1.9 - 2.1	13
2.2 - 2.4	9

The table shows the frequency distributions of weight for the watermelons .
   a) Find the range.
   b) Calculate the mean weight.
   c) Determine the median without using an ogive.

11. Find the gradient of the tangent to the curve y = (x – 1) (x + 1) at the point (1 , 0).
12. Find the gradient of the normal to the curve $y = x^2 + 4x$ at the point (1 , 5).

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