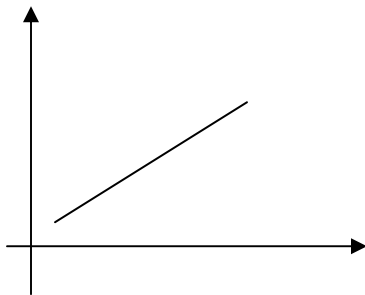


TEST : EXCELLENT II
ADDITIONAL MATHEMATICS

1. Given that $f(x) = 4 + 5x$ and $g(x) = x - 1$, find
 - a) $f^{-1}(x)$
 - b) $gf^{-1}(x)$
 - c) $h(x)$ such that $hg(x) = 6 - 5x$
2. Sketch the graph of $f(x) = |2 - 3x|$ for $-1 < x < 4$.
 - a) State the range for $0 < x < 4$.
 - b) Find the domain for $0 < f(x) < 5$.
3. Given that $2x^2 + px = k$, find the relation between p and k if the equation has no roots.
4. Find the range of values of t if the quadratic equation $4x^2 - 5x + t + 2 = 0$ has two distinct roots.
5. Find the range of the values of x so that $f(x) = 5x^2 - 4x - 1$ is negative.
6. Find the range of values of x so that the function $g(x) = 4x^2 - 9$ is always positive.
7. Solve the equation $6^{1+3x} = 7^x$
8. Find the value of $\log_3 81 - \log_{\sqrt{t}} t$.
9. Given that the coordinates of points A and B are $(2, -1)$ and $(3, 5)$ respectively, find the equation of the locus of point P which moves such that $PA : PB = 3 : 2$.
10. Find the coordinates of the point on the curve $y = (2x^2 + 5)^2$ where the gradient of the tangent to the curve is -8 .
11. Given a geometric progression $x - 1, 10, 3x + 2, p, \dots$, express p in the terms of x .
12. The first four terms of an arithmetic progression are $-4, -6, -8, -10, \dots$. Find
 - a) the common difference of the progression,
 - b) the sum of the 30 terms after the 4th term.

13.



The diagram shows a straight line graph of x^2y against x^3 . given that $y = 3x + 4$, calculate the value of h and of k .

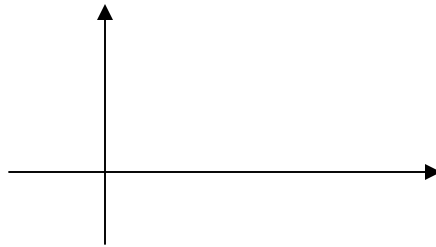
TEST : EXCELLENT III
ADDITIONAL MATHEMATICS

1. Form the quadratic equation which has the roots -5 and $\frac{2}{3}$. Give your answer in the general form.

2. Find the range of values of p if the quadratic equation $(p - 1)x^2 - 8x = 4$ has no roots.

3. The graph shown is a quadratic function $y = (x - p)^2 + 5$ where p is a constant. Find

- a) the value of p
- b) the equation of the axis of symmetry,
- c) the coordinates of the minimum point .



4. $k^2x^2 + 4x = x^2 - 1$ has two equal roots. Find the possible values of k .

5. Given that $\log_3 x = 4 \log_3 y + 2$, express y in the term of x .

6. Solve the equation $\log_2 (2x + 1) = \log_2 (x - 1) + \log_2 8$.

7. The second term of geometric progression is 6. The sum of the next two terms is $4\frac{1}{2}$, where common ratio, $r > 0$. Find

- a) the first term and the common ratio of the progression,
- b) the sum to infinity of the progression.

8. The point $P(1, t)$ lies on the curve $y = (3x - k)^2$, where t and k are constants. It is given that the gradient of the normal at P is -1 . Find the values of k and t .

12

9. Express $\frac{d}{dx} [3u^5]$ in terms of x , where $u = 4 - 3x^2$.

10. Given that $\int h(x) dx = 10$, where $h(x)$ is a continuous function in the range $1 < x < 3$, find

- a) the value of $\int_1^3 2h(x) dx$,
- b) the value of k if $\int_1^3 h(x) dx + \int_1^3 [h(x) - k] dx = 20$

