MERIT QUESTIONS ON A TYPICAL NCEA PAPER. (B)
ALGEBRA You need to get these right for Merit level
Question ONE

| (a) Calculate $x$ if $\log _{4} 18=x$ | (b) Solve for $x \quad 3^{x}=2^{x+1}$ |
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Question TWO
(a) Solve $\left(3^{x}\right)^{2}-7 \times 3^{x}-18=0$
(b) Solve

$$
\frac{x^{2}-9}{x-3}=5
$$

Question THREE
(a) Find $p$ if the equation
(b) The equation $x^{2}+2 k x+(k+2)=0$ has $x^{2}+(3 p+2) x+(5 p+6)=0$ only has one no real solutions. Find the possible $k$ values.

## CALCULUS You need to get these right for Merit level

Question ONE
(a) The velocity of a ball kicked vertically up is $v=20$ - 10t. If the ball was kicked from an initial height of 1 metre, find the equation for its height at $t$ sec.
(b) Find the $x$ and $y$ values of the maximum and minimum points on the curve $y=x^{3}-12 x^{2}+27 x+2$.
(state the nature of the turning points)

Question TWO
(a) Find the equation of the tangent to the curve $y=x^{2}+3 x$ at the point where $x=-1$
(b) For what values of $x$ is the curve $y=6 x^{2}-x^{3}$ a decreasing function?

Question THREE
(a) A model rocket starts off at ground level with an initial velocity of $1 \mathrm{~m} / \mathrm{s}$ and with an acceleration of $\frac{d v}{d t}=12 t$.
Find the equation for the height of the rocket at tsecs.
(b) Find the equation of a curve if its gradient is $y^{\prime}=x^{2}+x$ and it passes through the point $(6,0)$

