## Exponentials and logarithms - A2 Mathematics P2

1. June/2022/Paper_7357/02/No.9

Given that

$$
\log _{2} x^{3}-\log _{2} y^{2}=9
$$

show that

$$
x=A y^{p}
$$

where $A$ is an integer and $p$ is a rational number.
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
2. June/2022/Paper_7357/02/No.10(a)

A gardener has a greenhouse containing 900 tomato plants.
The gardener notices that some of the tomato plants are damaged by insects.
Initially there are 25 damaged tomato plants.
The number of tomato plants damaged by insects is increasing by $32 \%$ each day.
(a) The total number of plants damaged by insects, $x$, is modelled by

$$
x=A \times B^{t}
$$

where $A$ and $B$ are constants and $t$ is the number of days after the gardener first noticed the damaged plants.
(a) (i) Use this model to find the total number of plants damaged by insects 5 days after the gardener noticed the damaged plants.
[3 marks]
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
(a) (ii) Explain why this model is not realistic in the long term.
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

