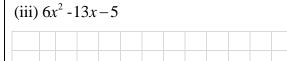
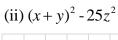
Name of Student:

1. Factorise the following:

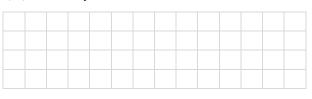
(i) $6xy + 3x^2y - 9x^2y^3$



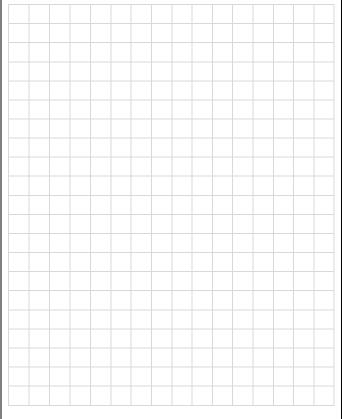




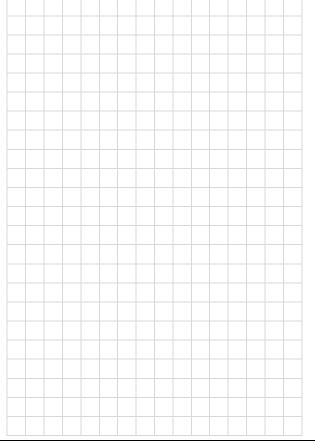
(iv)
$$27x^3 + 8y^3$$



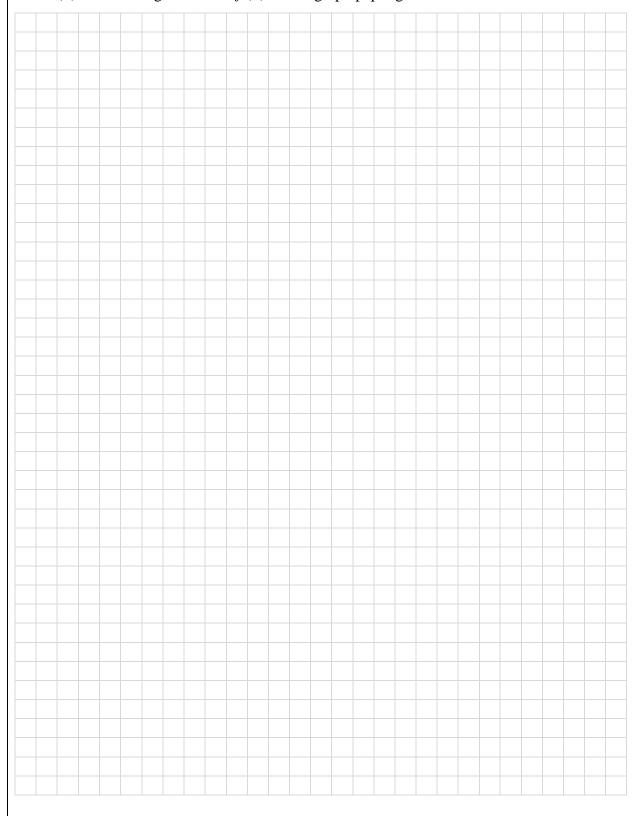
2. A quadratic function has roots of -2 and -1. It also contains the point (-3, 8). Evaluate the function in the form $ax^2 + bx + c = 0$ where $a, b, c \in \mathbb{Z}$



3. Prove that k + 1 is a root of the function $f(x) = x^2 - 2x - k^2 + 1$, where k is a constant.

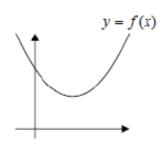


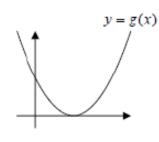
- **4.** The function $f(x) = 2x^2 + 4x 4$ can be expressed as $a(x+b)^2 + c$, where $a,b,c \in \mathbb{Z}$
 - (i) Find the values of a, b and c.
 - (ii) Hence, find the co-ordinates of the local minimum of the curve.
 - (iii) Solve the equation f(x) = 0, writing your answers in surd form.
 - (iv) Where does the graph cut the y-axis?
 - (v) Draw a rough sketch of f(x) on the graph paper given.

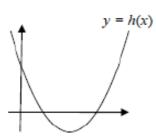


5.(i)

The graphs of three quadratic functions, f, g and h, are shown.







In each case, state the nature of the roots of the function.

Function	Nature of Roots
f(x)	
g(x)	
h (x)	

(ii)

By evaluating the discriminant, or otherwise, match each curve above to one of the following functions giving a reason for your choice:

$$x^2 + 5x + 5$$
, $x^2 + 2x + 5$, and $x^2 - 4x + 4$

$$x^2 + 2x + 5,$$

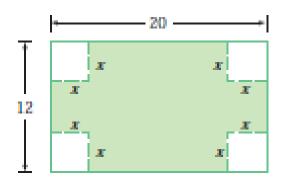
and
$$x^2$$

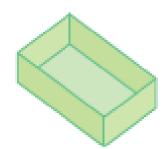
f(x) =______ Reason:_____

g(x) = Reason:

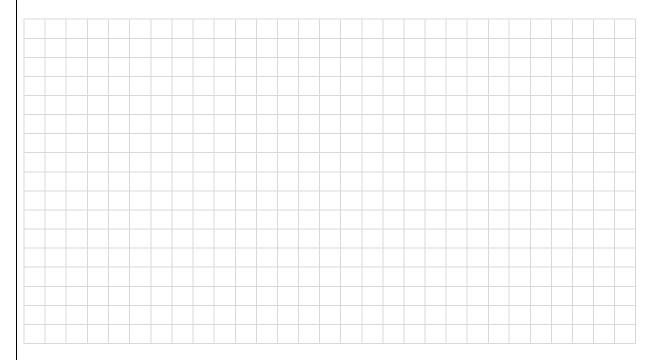
h(x) = Reason:

6. A box with an open top is to be constructed from a rectangular piece of cardboard with dimensions 12 cm by 20 cm by cutting out equal squares of side at each corner and then folding up the sides as in the figure.





(i) Express the volume of the box as a function of x.



(ii) What is the volume when x = 2cm

