ALGEBRA ASSESSMENT.

1.(a) Simplify fully:
$$\frac{(x^2 - x - 12)}{(x^2 - 16)}$$

(b) Expand and simplify: (2x-5)(x+2)(x-3)

- (c) Factorise fully: (i) $3x^2 - 3x - 6$
 - (*ii*) $3x^2 11x 4$
- (d) (i) Change this equation into the form $ax^2 + bx + c = 0$ (x-2)(x+1) = 2x + 5
 - (ii) Solve the equation in (i) using the quadratic formula and give your answer to 3 sig fig.

(e) The equation $2x^2 + 3x - (k+2) = 0$ has only one real solution. Find k.

- (f) (i) Express $px^2 4x + p = x^2 1$ in the form $ax^2 + bx + c = 0$
 - (ii) Find the possible values of p so that the equation in (i) has real solutions.

2.(a) Solve for x:
$$4(3x-2) = 6-x$$

(b) Solve for x: $(x-1)^2 - 2(x+2) + 7 = 0$

(c) Solve for x: $3x^2 = x + 2$

(d) The area of the outside of a cone is given by $A = \pi RL$ where R is the radius of the base and L is the slant height. If L = R - 2 and the area is 24π , find the values of R and L.

(e) Solve the equation:
$$\frac{1}{x} + \frac{1}{(x+3)} = \frac{13}{40}$$

- 3. (a) Factorise $7x^2 4x + 3$
 - (b) Solve $7x^2 4x + 3 = 0$

(c) Find the EXACT solution of the equation: $x^2 - 8x = 5$ in the form $d \pm \sqrt{p}$ using the quadratic formula or by completing the square method

(d) Find what the value of k must be:
$$\frac{x^2 - 5x + k}{x^2 - 6x + 8} = \frac{x - 3}{x - 4}$$

(e) Bob tries to solve the equation: $\frac{x^2 - 2x - 24}{x^2 - 6x} = 3$

This is his working:	
$x^2 - 2x - 24 = 3x^2 - 18x$	line 1
$0 = 2x^2 - 16x + 24$	line 2
$0 = 2(x^2 - 8x + 12)$	line 3
0 = 2(x-3)(x-4)	line 4
$x = -3 \ or - 4$	line 5

- (i) Find which lines Bob has made mistakes.
- (ii) Explain what the mistakes are.
- (iii) Suggest another way he could have solved the equation.



This building has a parabolic cross section with the top chopped off. The distance AB is 20 metres. The distance PQ is 40 metres. The height of AB above the ground PQ is 60 metres.

Find the equation of this parabolic cross section and find how high it would have been if the top were not chopped off.