## ALGEBRA ASSESSMENT.

1.(a) Simplify fully: $\frac{\left(x^{2}-x-12\right)}{\left(x^{2}-16\right)}$
(b) Expand and simplify: $(2 x-5)(x+2)(x-3)$
(c) Factorise fully:
(i) $3 x^{2}-3 x-6$
(ii) $3 x^{2}-11 x-4$
(d) (i) Change this equation into the form $a x^{2}+b x+c=0$ $(x-2)(x+1)=2 x+5$
(ii) Solve the equation in (i) using the quadratic formula and give your answer to 3 sig fig.
(e) The equation $2 x^{2}+3 x-(k+2)=0$ has only one real solution. Find $k$.
(f) (i) Express $p x^{2}-4 x+p=x^{2}-1$ in the form $a x^{2}+b x+c=0$
(ii) Find the possible values of $p$ so that the equation in (i) has real solutions.
2.(a) Solve for $x: \quad 4(3 x-2)=6-x$
(b) Solve for $x: \quad(x-1)^{2}-2(x+2)+7=0$
(c) Solve for $x$ : $3 x^{2}=x+2$
(d) The area of the outside of a cone is given by $A=\pi R L$ where $R$ is the radius of the base and L is the slant height. If $L=R-2$ and the area is $24 \pi$, find the values of $R$ and $L$.
(e) Solve the equation: $\frac{1}{x}+\frac{1}{(x+3)}=\frac{13}{40}$
3. (a) Factorise $7 x^{2}-4 x+3$
(b) Solve $7 x^{2}-4 x+3=0$
(c) Find the EXACT solution of the equation:
$x^{2}-8 x=5$ in the form $d \pm \sqrt{ }$ using the quadratic formula or by completing the square method
(d) Find what the value of $k$ must be: $\frac{x^{2}-5 x+k}{x^{2}-6 x+8}=\frac{x-3}{x-4}$
(e) Bob tries to solve the equation: $\quad \frac{x^{2}-2 x-24}{x^{2}-6 x}=3$

This is his working:

$$
\begin{aligned}
x^{2}-2 x-24 & =3 x^{2}-18 x & & \text { line } 1 \\
0 & =2 x^{2}-16 x+24 & & \text { line } 2 \\
0 & =2\left(x^{2}-8 x+12\right) & & \text { line } 3 \\
0 & =2(x-3)(x-4) & & \text { line } 4 \\
x & =-3 \text { or }-4 & & \text { line } 5
\end{aligned}
$$

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


This building has a parabolic cross section with the top chopped off. The distance $A B$ is 20 metres. The distance $P Q$ is 40 metres. The height of $A B$ above the ground $P Q$ 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.

