**CALCULATOR ALLOWED**

1. Solve the following equations.
Give exact values when possible. Otherwise, round to the nearest hundredth.

a) $3x^{2}+5x=3$ a’) $6x^{2}+11x+3=0$

b) $2\left(x+4\right)^{2}=3$ b’) $-3\left(x+2\right)^{2}+12=0$

c) $2x^{2}+3x-4=0$ c’) $-2x^{2}-4x+1=0$

d) $\sin(x=-\frac{1}{2})$ d’) $cos x=-\frac{\sqrt{3}}{2}$

e) $\sin(θ)= \frac{1}{4}$ e’) $\cos(x)=-0.2$

f) $\tan(x)= 1$ f’) $\tan(x)=-\frac{1}{\sqrt{3}}$

g) $-3\left(x+2\right)>4x-1$ g’) $(x-3)(x+2)\leq \left(x+1\right)^{2}$

h) $x^{2}-3x\geq 4$ h’) $2x^{2}+x-3<0$

i) $x^{2}<16$ i’) $x^{2}\geq 9$

j) $x+\sqrt{x+2}=4$

j’) $\sqrt{-2x+30}+3=x$

k) $\frac{4}{x^{2}-1}-\frac{x-1}{x+1}=\frac{x+7}{x-1}$

k’) $2-\frac{1}{x^{2}+x}=\frac{3}{x+1}$

k’’) $\frac{x}{x-5}+\frac{3}{x+2}=\frac{7x}{x^{2}-3x-10}$

1. A flee jumps from a stone. Its height above ground, in centimetres, is given by
 $h\left(x\right)=-x^{2}+3x+10$, where *x* is the horizontal distance from the stone, in centimetres.
a) From what height did the flee jump?

b) How far from the stone does the flee land on the ground?

c) What maximum height did the flee reach?

d) What are the Domain and Range for the function?
2. A football player throws a ball. The height, in metres, of the ball is modeled by the function
 $h\left(t\right)=-\frac{5}{3}t^{2}+\frac{10}{3}t+5$ , where *t* is the time in seconds after the throw.

a) From what height did the player throw the ball?

b) For how long will the ball be in the air if nobody catches it?

c) What maximum height did the ball reach?
3. Simplify the following expressions (you can assume that *x* >0):

a)$ \sqrt{75x^{3}}+2x\sqrt{12x}$

a’) $\frac{3x\sqrt{14}+4\sqrt{63x^{2}}}{3\sqrt{7}}$

b) $\frac{\left(2x^{2}y^{3}\right)^{-3}}{4x^{-2}y^{5}}$ b’) $\frac{(3x^{-3}y^{2})^{-1}×x^{2}y^{3}}{3x^{-3}y}$

**CALCULATRORS NOT ALLOWED**

1. Graph the following functions. Show your work. .

a) $f\left(x\right)=2x^{2}-4x-6$.



a) $y=-x^{2}+6x-8$.



b) $g\left(x\right)=-\left(x+2\right)^{2}+5$.



b) $y=\frac{1}{2}\left(x-4\right)^{2}-3$.


2. Expand the following expressions and simplify:
a) $\left(3x-5\right)\left(3x+5\right)-(2x-1)(3x+2)$

b) $\left(4x-3\right)^{2}-(2x+1)(x-3)$

c) $\left(x+3\right)\left(2x-5\right)-\left(3x-1\right)^{2}$

d) $\left(x+5\right)\left(3x-2\right)-(2x+1)(2x-1)$
3. Factor as much as possible.
a) $x^{2}-4x-21$ a’) $x^{2}+7x+10$

b) $2x^{2}+5x-12$ b’) $3x^{2}+x-4$

c) $16x^{2}-72x+81$ c’) $25x^{2}-20x+4$

d) $25x^{2}-36$ d’) $16x^{2}-9$

e) $25x^{3}-15x^{2}$ e’) $27x^{2}-18x$

f) $5x^{2}-20$ f’) $7x^{2}-7$

g) $5x^{2}+20$ g’) $8x^{2}-32$