Solve Quadratic Equations with using the Formula and Casio

1. These are all prime quadratics. Just like a prime number cannot be factored, a prime quadratic cannot be factored so we use the general method called the quadratic formula. Doing this method by hand is very slow and more error prone than filling in A, B, and C into the calculator.

   The quadratic formula is:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

   To use the calculator, evaluate this twice—once with + and once with −:

$$x_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a}, \qquad x_2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

   The code wording to indicate that the quadratics are prime in the exam is: **Solve to two places of decimal!**

   A quadratic is prime when $b^2 - 4ac > 0$ and $\sqrt{b^2 - 4ac}$ is not a whole number.

   a) $16x^2 - 24x + 7 = 0$ x= $\frac{3+\sqrt{2}}{4}$, $x \approx 1.1,\ 0.4$

   b) $9x^2 + 30x + 13 = 0$ x= $\frac{-5+2\sqrt{3}}{3}$, $x \approx -0.51,\ -2.82$

   c) $4x^2 - 28x + 4 = 0$ x= $\frac{7+3\sqrt{5}}{2}$, $x \approx 6.85,\ 0.15$

   d) $9x^2 - 24x + -134 = 0$ x= $\frac{4+5\sqrt{6}}{3}$, $x \approx 5.42,\ -2.75$

   e) $49x^2 + 28x + -241 = 0$ x= $\frac{-2+7\sqrt{5}}{7}$, $x \approx 1.95,\ -2.52$

   f) $9x^2 - 30x + 22 = 0$ x= $\frac{5+\sqrt{3}}{3}$, $x \approx 2.24,\ 1.09$

g) $9x^2 - 66x + 116 = 0$ x= $\frac{11+\sqrt{5}}{3}$, $x \approx 4.41,\ 2.92$

h) $4x^2 - 8x + 1 = 0$ x= $\frac{2+\sqrt{3}}{2}$, $x \approx 1.87,\ 0.13$

i) $9x^2 - 30x + 22 = 0$ x= $\frac{5+\sqrt{3}}{3}$, $x \approx 2.24,\ 1.09$

j) $9x^2 - 66x + 116 = 0$ x= $\frac{11+\sqrt{5}}{3}$, $x \approx 4.41,\ 2.92$

k) $4x^2 - 8x + 1 = 0$ x= $\frac{2+\sqrt{3}}{2}$, $x \approx 1.87,\ 0.13$

l) $16x^2 - 56x + 47 = 0$ x= $\frac{7+\sqrt{2}}{4}$, $x \approx 2.1,\ 1.4$

m) $4x^2 - 52x + 162 = 0$ x= $\frac{13+\sqrt{7}}{2}$, $x \approx 7.82,\ 5.18$

n) $9x^2 - 18x + 4 = 0$ x= $\frac{3+\sqrt{5}}{3}$, $x \approx 1.75,\ 0.25$

o) $4x^2 - 32x + 58 = 0$ x= $\frac{8+\sqrt{6}}{2}$, $x \approx 5.22,\ 2.78$

p) $16x^2 - 88x + 118 = 0$ x= $\frac{11+\sqrt{3}}{4}$, $x \approx 3.18,\ 2.32$

q) $9x^2 - 24x + 9 = 0$ x= $\frac{4+\sqrt{7}}{3}$, $x \approx 2.22,\ 0.45$

r) $25x^2 - 130x + 167 = 0$ x= $\frac{13+\sqrt{2}}{5}$, $x \approx 2.88,\ 2.32$