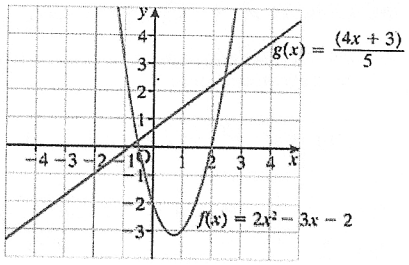
10. The graphs of the functions

$f(x) = 2x^2 - 3x - 2$ and $g(x) = \frac{4x+3}{5}$

are drawn as shown. Using the graphs, estimate the solutions of the following equations

(a) $f(x) = 0$ where green curve cuts x-axis
(b) $g(x) = 0$ where blue line cuts x-axis
(c) $f(x) = g(x)$. Intersection of blue line and green curve



(a) $x = -0.5$ and $x = 2$
(b) $x = -0.7$
(c) $x = -0.6$ and $x = 2.4$

Section 2.2 Nature of quadratic roots

9. Prove that the equation $(k-2)x^2 + 2x - k = 0$ has real roots, whatever the value of k.

1. If $(b^2 - 4ac) > 0 \rightarrow$ two different (distinct) real roots
2. If $(b^2 - 4ac) = 0 \rightarrow$ two equal real roots
3. If $(b^2 - 4ac) < 0 \rightarrow$ two imaginary roots
4. If $(b^2 - 4ac)$ is a perfect square $\rightarrow$ rational roots

Remember...
The square of a real number ≥ 0
$x^2 \geq 0, x \in R$

$a = k-2$
$b = 2$
$c = -k$

$b^2 - 4ac = (2)^2 - 4(k-2)(k) = 4 + 4k^2 - 8k$
$= 4(k^2 - 2k + 1)$
$= 4(k-1)(k-1) = 4(k-1)^2 \geq 0$
$\Rightarrow$ it has real roots