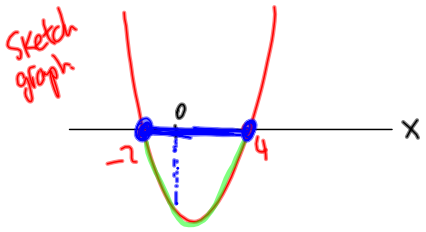
1. Quadratic inequalities

Example 1

Solve the inequality $x^2 - 2x - 8 \leqslant 0$.

If $x^2 - 2x - 8 = 0$

then $(x + 2)(x - 4) = 0 \Rightarrow x = -2$ or $x = 4$



Solution: $-2 \leq x \leq 4$

$f(0) = -8$ 0 test works $\Rightarrow$ its between -2 and 4

3. Find the set of values of x for which

(i) $6x^2 - x > 15$ (ii) $16 - x^2 \leqslant 0$ (iii) $2(x^2 - 6) \geqslant 5x$.

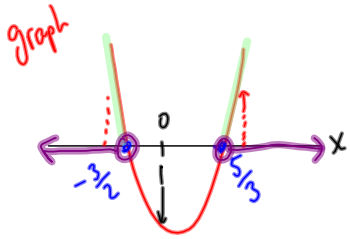
(i) $6x^2 - x > 15$

$6x^2 - x - 15 > 0$

If $6x^2 - x - 15 = 0$

then $(3x - 5)(2x + 3) = 0 \Rightarrow x = \frac{5}{3}, x = -\frac{3}{2}$

Inside or outside?



zero test

$f(0) = -15 < 0$ not $> 0 \Rightarrow$ fails test

inside values don't work $\Rightarrow$ outside do

Solution: $-\frac{3}{2} > x > \frac{5}{3}$