1 Inequalities

1.1 Inequalities

1.1.1 Properties of Inequalities

$$a > b, c > 0 \implies ac > bc$$
$$a > b, c < 0 \implies ac < bc$$
$$\frac{a}{b} > 0 \implies ab > 0$$
$$\frac{a}{b} < 0 \implies ab < 0$$

1.1.2 Quardratic Inequalities

Find where $f(x) = 0$ by completing square or quadratic formula and sketch graph

1.1.3 Inequality Reduction

For any inequality $\frac{f(x)}{g(x)} > or < 0$ where $f(x)$ or $g(x)$ is strictly positive or negative, reduce inequality to non-strictly positive/negative function and change sign accordingly

1.1.4 Modulus Inequalities

$$|x| < a \iff -a < x < a$$
$$|x| > a \iff x < -aora < x$$
$$|x - a| < b \iff a - b < x < a + b$$
$$|x - a| > b \iff x < a - bora + b < x$$

To solve inequalities, sketch and find intercept, then deduce suitable range of x