Year 11 Mathematics Extension 1

Topic: Further Functions (2 of 5)
Review Questions: Inequalities
Term 3, 2026

How to use this review set

These are real past-paper questions, grouped by question pattern. The grey label on each question shows where it is from and its marks.

- The questions are grouped by the pattern that keeps coming up in exams, a few of each in a row, running from the plainer patterns into the harder ones near the end. Work through them and you will meet every type an exam can throw at you.
- This set **is your diagnostic**. Working through it shows you exactly which patterns are solid and which need work. Attempt every question properly in your own book, and go back to your notes to help you work through tough questions if needed.
- Every question you get wrong, need help with or struggle with goes in your **Mistakes Log**, which you should be working on daily to get you exam-ready.

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Solving inequalities by type

1. Quadratic inequalities

Q1 2020 Girraween Prelim Q1 · **1 mark**

The solution of $x^2 - 5x + 6 \leq 0$ is

(A) $2 < x < 3$

(B) $2 \leq x \leq 3$

(C) $2 < x \leq 3$

(D) $2 \leq x < 3$

Q2 2021 Pymble Prelim Q3 · **1 mark**

What is the solution of the inequality $x^2 - 4x - 12 \leq 0$?

(A) $x \geq 12$ or $x \leq -12$

(B) $-12 \leq x \leq 12$

(C) $x \geq 6$ or $x \leq -2$

(D) $-2 \leq x \leq 6$

Q3 2024 Penrith Prelim Q2 · **1 mark**

Which of the following represents the solution to the inequality $x^2 \leq 8 - 2x$?

(A) $(-4, 2)$

(B) $[-4, 2]$

(C) $(-\infty, -4) \cup (2, \infty)$

(D) $(-\infty, -4] \cup [2, \infty)$

Q4 2022 Hurlstone Prelim Q11(a)(i) · **2 marks**

Solve the quadratic inequality $(5 - x)(2x + 1) \geq 0$.

Q5 2021 Sydney Grammar Prelim Q1(a) · **2 marks**

Solve the inequality $x^2 - 2x - 3 > 0$.

Q6 2022 Presbyterian Prelim Q11(e) · **2 marks**

Solve $3x^2 - 8x - 7 \geq 2x^2 - 2x + 9$.

2. Absolute value inequalities

Q7 2020 Hunters Hill Trial Q11(b) · **1 mark**

Solve $|2x + 3| \leq 7$.

Q8 2020 St George Girls Prelim Q5 · **1 mark**

Solve $|x + 5| < 6$.

(A) $x < 1$

(B) $x > -11$

(C) $x < -11, x > 1$

(D) $-11 < x < 1$

Q9 2021 Presbyterian Prelim Q1 · **1 mark**

Which of the following is the solution to $|x - 3| > 4$?

(A) $-1 < x < 7$

(B) $x < -1$ or $x > 7$

(C) $x < -7$ or $x > 7$

(D) $x > 1$ or $x < -1$

Q10 2025 HSC Q1 · **1 mark**

What is the solution to $|2x + 3| < 5$?

(A) $-4 < x < 1$

(B) $x < -4$ or $x > 1$

(C) $-1 < x < 4$

(D) $x < -1$ or $x > 4$

Q11 2021 Pymble Prelim Q5 · **1 mark**

What is the solution of the inequality $|2x - 4| > 6$?

(A) $-1 < x < 5$

(B) $x < -1$ or $x > 5$

(C) $-6 < x < 6$

(D) $x < -6$ or $x > 6$

Q12 2024 Ascham Trial Q14(a) · **3 marks**

Solve $\dfrac{2}{|x-1|} \geq 3$.

Q13 2024 Riverview Trial Q1 · **1 mark**

How many integer solutions are there for the inequality $\dfrac{1}{|x-2|} > \dfrac{1}{4}$?

(A) 7

(B) 6

(C) 5

(D) 4

3. Rational inequalities: linear over linear

Q14 2024 Fort St Trial Q3 · **1 mark**

The solution to the inequality $\dfrac{3}{x-2} \leq 4$ is given by:

(A) $x < -2$ and $x \geq -\dfrac{11}{4}$

(B) $x > -2$ and $x \leq -\dfrac{11}{4}$

(C) $x < 2$ and $x \geq \dfrac{11}{4}$

(D) $x > 2$ and $x \leq \dfrac{11}{4}$

Q15 2023 Abbotsleigh Trial Q6 · **1 mark**

Which of the following is the solution set of the inequation $\dfrac{2}{x-1} \leq 3$?

(A) $x < 1$ and $x \geq \dfrac{5}{3}$

(B) $1 < x \leq \dfrac{5}{3}$

(C) $x \leq \dfrac{1}{3}$ and $x \geq \dfrac{5}{3}$

(D) $\dfrac{1}{3} \leq x \leq \dfrac{5}{3}$

Q16 2020 Glenwood Trial Q11(a) · **2 marks**

Solve $\dfrac{x+2}{x-5} \geq 0$.

Q17 2022 HSC Q11(f) · **3 marks**

Solve $\dfrac{x}{2-x} \geq 5$.

Q18 2021 Manly Trial Q11(a) · **2 marks**

Solve for x given $\dfrac{x}{x-3} \geq 4$.

Q19 2024 North Sydney Girls Trial Q11(a) · **3 marks**

Solve $\dfrac{x+1}{x-3} \leq 2$.

Q20 2021 Killara Trial Q11(a) · **2 marks**

Solve for x: $\dfrac{3x}{x-2} < 4$.

4. Rational inequalities: quadratic numerator or denominator

Q21 2021 Newington Trial Q1 · 1 mark

What is the solution set of the inequality $\dfrac{x^2-6}{x} \leq 1$?

(A) $(-\infty, -2\,] \cup (0, 3\,]$

(B) $[-2, 0) \cup [3, \infty)$

(C) $[-2, 3\,]$

(D) $(-\infty, -2\,] \cup [0, 3\,]$

Q22 2021 Sydney Girls Trial Q11(c) · 2 marks

Solve $\dfrac{x^2-9}{3x} > 0$.

Q23 2024 Penrith Trial Q11(a) · 3 marks

Solve $\dfrac{4-x^2}{x-1} \leq 0$.

Q24 2022 SCEGGS Prelim Q9(c) · 3 marks

Solve $\dfrac{x^2+6}{x} \geq 5$.

Q25 2022 St George Girls Trial Q11(d) · 3 marks

Solve the inequality $\dfrac{x^2}{x-2} \geq -1$.

Q26 2020 Baulkham Hills Prelim Q11(b)(ii) · 3 marks

Solve the inequality $\dfrac{7}{9-x^2} > -1$.

5. Rational inequalities with a variable on both sides

Q27 2025 Barker Trial Q11(a) · 3 marks

Solve $\dfrac{2}{x-1} < x$.

Q28 2025 Caringbah Prelim Q7(a) · **3 marks**

Solve $\dfrac{2}{x-1} \geq x$.

Q29 2022 Hunters Hill Trial Q11(a) · **3 marks**

Solve $\dfrac{4}{x+3} \geq x$.

Q30 2020 Sydney Tech Trial Q11(f) · **3 marks**

Solve $\dfrac{2x}{x-3} \geq x+4$.

Q31 2025 Sydney Boys Trial Q11(d) · **3 marks**

Solve $\dfrac{1+x}{x} \geq 2x+1$ for x.

Q32 2021 Sydney Grammar Prelim Q4(d) · **4 marks**

Solve the inequality $\dfrac{6}{x-1} \geq x+4$.

6. Cubic and polynomial inequalities

Q33 2022 Girraween Prelim Q5 · **1 mark**

Solve the inequality $(x+2)(2x+1)(x-3) \leq 0$.

(A) $x \leq -2$ or $-0.5 \leq x \leq 3$

(B) $x \leq 2$ or $-0.5 \leq x \leq 3$

(C) $x \leq -2$ or $0.5 \leq x \leq 3$

(D) $x < 2$ or $-0.5 \leq x \leq 3$

Q34 2022 Sydney Boys Trial Q2 · **1 mark**

What are the values of x for which $(x+3)(x-1)(2-x) > 0$?

(A) $x < -3$ or $1 < x < 2$

(B) $x > -3$ or $1 < x < 2$

(C) $-3 < x < 1$ or $x > 2$

(D) $-3 < x < 1$

Q35 2023 Hunters Hill Trial Q11(c) · **3 marks**

Solve $(x^2-1)(x+3) < 0$.

Q36 2025 Blacktown Boys Trial Q5 · **1 mark**

Given that $P(x) = x^3 + x^2 - 8x - 12$ has a double root at $x = -2$, which of the following is the solution to $P(x) < 0$?

(A) $x < -2$

(B) $x < 3$

(C) $-2 < x < 3$

(D) $x < -2,\ -2 < x < 3$

Q37 2024 Sydney Boys Trial Q11(a) · **3 marks**

By first factorising $f(x)$, where $f(x) = -x^3 - 2x^2 + 4x + 8$, solve $f(x) < 0$.

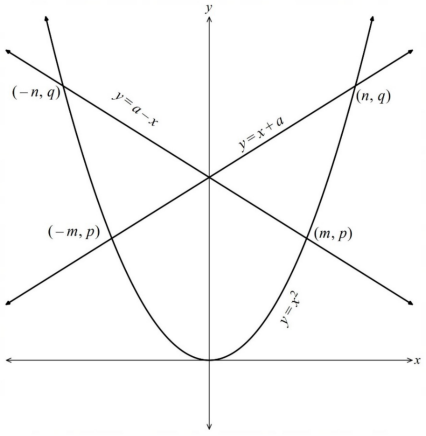
Graphical and reasoning

7. Solving an inequality using a graph

Q38 2024 Cheltenham Girls Trial Q3 · 1 mark

The graph below shows the curve $y = x^2$ and the lines $y = x + a$ and $y = a - x$, along with the points of intersection between the curve and the lines. (The terms a, m, n, p and q are all positive constants.) What is the solution to $x^2 + x - a < 0$?

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(A) $-n < x < -m$

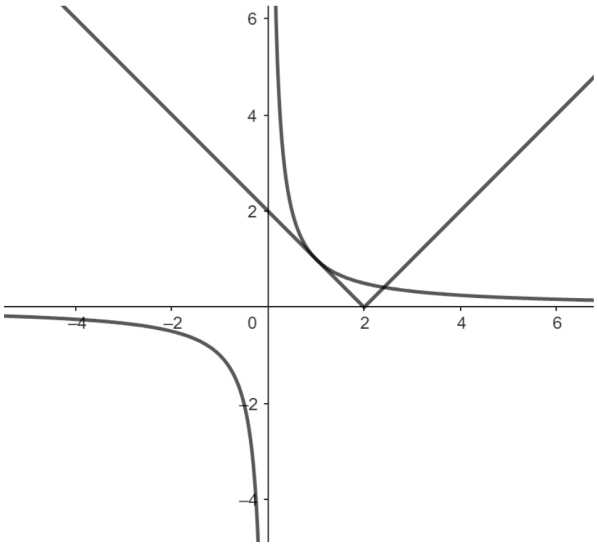
(B) $-n < x < m$

(C) $-m < x < m$

(D) $-m < x < n$

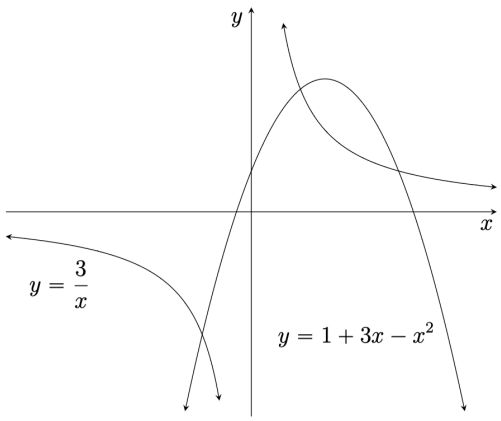
Q39 2025 Hurlstone Prelim Q11(c) · **2 marks**

The graph below shows $y = x - 2$ and $y = \dfrac{1}{x}$, intersecting at two points. Using this diagram, or otherwise, solve $x - 2 > \dfrac{1}{x}$.



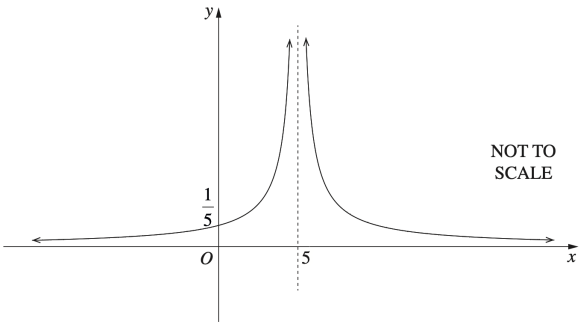
Q40 2025 Sydney Girls Trial Q13(b) · **3 marks**

The curves $y = 1 + 3x - x^2$ and $y = \dfrac{3}{x}$ are sketched below. Using this diagram, or otherwise, solve $1 + 3x - x^2 \leq \dfrac{3}{x}$.



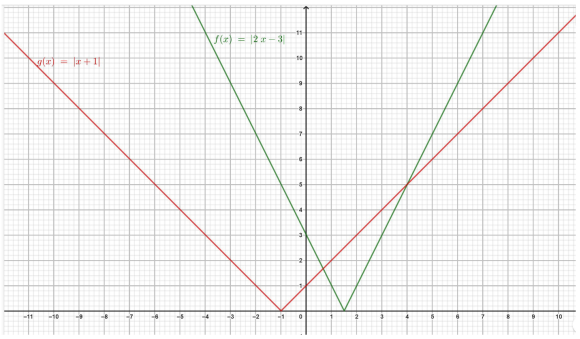
Q41 2024 HSC Q12(e) · **3 marks**

The diagram shows the graph of $y = \dfrac{1}{|x-5|}$. For what values of x is $\dfrac{x}{6} \geq \dfrac{1}{|x-5|}$?



Q42 2023 Hurlstone Prelim Q7 · **1 mark**

The graphs of $f(x) = |2x-3|$ and $g(x) = |x+1|$ are shown below. Which of the following is the solution to the inequality $|2x-3| + |x+1| \leq 4$?



(A) $[0, 2]$

(B) $(-\infty, 0] \cup [2, \infty)$

(C) $[2, \infty)$

(D) $(-\infty, 0]$

8. Reasoning about equivalent inequalities

Q43 Killara 2024 Trial Q5 · 1 mark

Which inequality below has the same solution as $|x+5|+|x-1|=6$?

(A) $\dfrac{1}{x^2-4x-5} \leq 0$

(B) $x^2-4x-5<0$

(C) $|x+2| \leq 3$

(D) $|x+2| \geq 3$

Q44 Baulkham Hills 2020 Prelim Q9 · 1 mark

Which inequality has the same solution as $|x+3|+|x-4|=7$?

(A) $|2x-1| \geq 7$

(B) $x^2-x-12 \leq 0$

(C) $\dfrac{7}{3-x} \geq 1$

(D) $\dfrac{1}{x-4}-\dfrac{1}{x+3} \leq 0$

Q45 Normanhurst Boys 2021 Trial Q2 · 1 mark

Which of the following has the same solutions as the inequality

$$\frac{-x}{(x-3)(2x+1)} \leq \frac{1}{4}?$$

(A) $(2x-3)(x+1)(x-3)(2x+1) \geq 0$

(B) $(2x-3)(x+1)(x-3)(2x+1) \leq 0$

(C) $(2x-3)(x+1) \geq 0$

(D) $(2x-3)(x+1) \leq 0$

Q46 James Ruse 2024 Trial Q5 · 1 mark

Which of the following has the same solution as that of $\dfrac{3}{2-x} > 2$?

(A) $2x - 1 \geq 0$

(B) $(x-2)(2x-1) > 0$

(C) $(x-2)(2x-1) < 0$

(D) None of the above.

Q47 Sydney Grammar 2020 Trial Q10 · 1 mark

In trying to solve

$$\frac{x-2}{x-3} < \frac{4}{\sqrt{x-2}}$$

over its natural domain in the set of real numbers, three students produce the following inequalities.

Student I $\quad (x-2)\sqrt{x-2} < 4(x-3)$

Student II $\quad \sqrt{(x-2)^3(x-3)} < 4(x-3)^2$

Student III $\quad (x-2)^2(x-3) < 4(x-3)^2\sqrt{x-2}$

Which students are still on track to obtain the correct solution set?

(A) Just Student II

(B) Student III only

(C) Both Students II and III but not Student I

(D) All three students