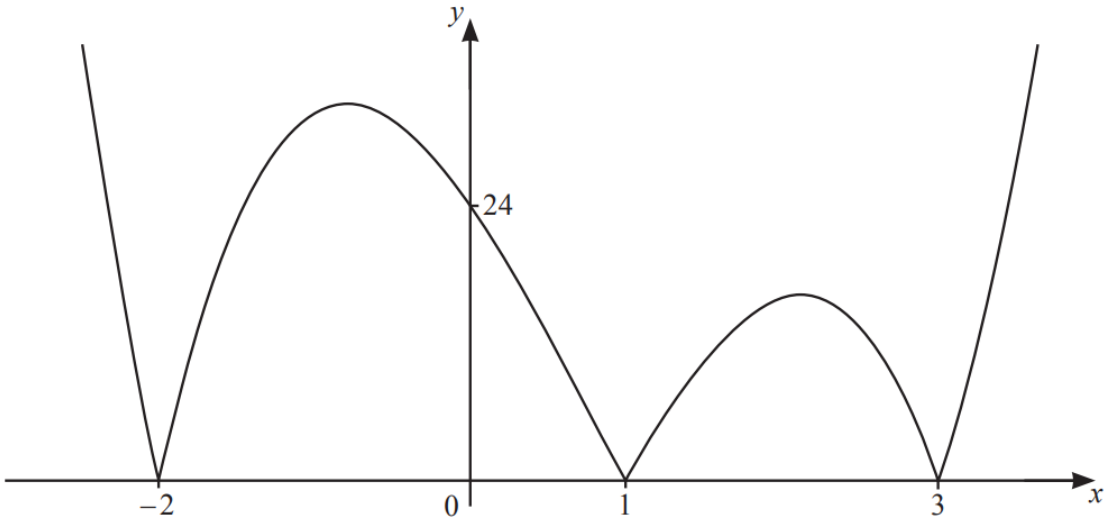
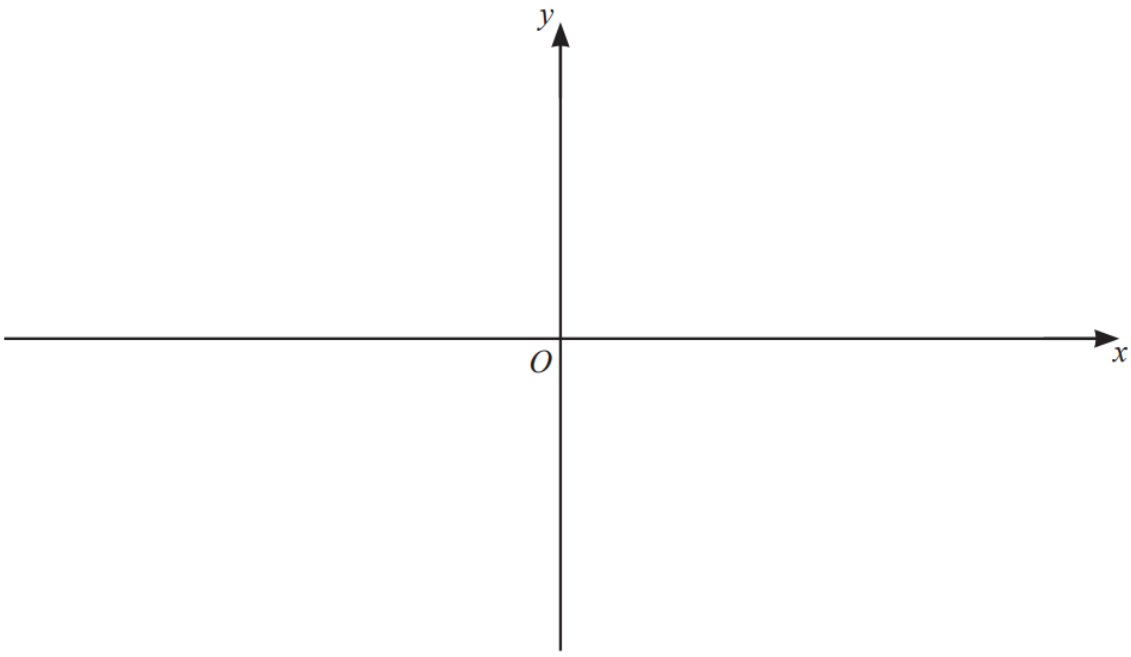
1. 4037/11/M/J/22 Q4

(a)



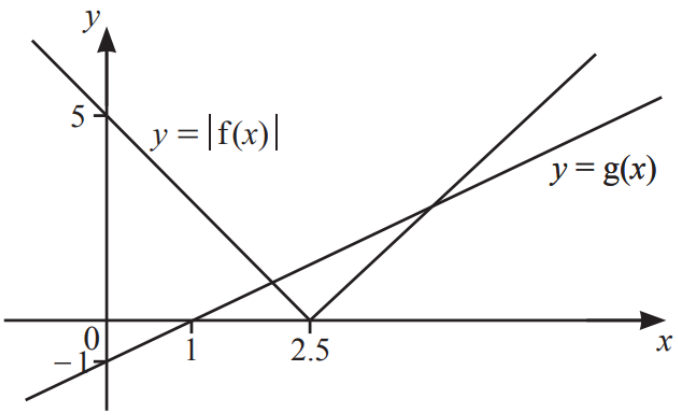
The diagram shows the graph of $y = |f(x)|$, where $f(x)$ is a cubic. Find the possible expressions for $f(x)$. [3]

(b) **(i)** On the axes below, sketch the graph of $y = |2x+1|$ and the graph of $y = |4(x-1)|$, stating the coordinates of the points where the graphs meet the coordinate axes. [3]



(ii) Find the exact solutions of the equation $|2x+1|=|4(x-1)|$. [4]

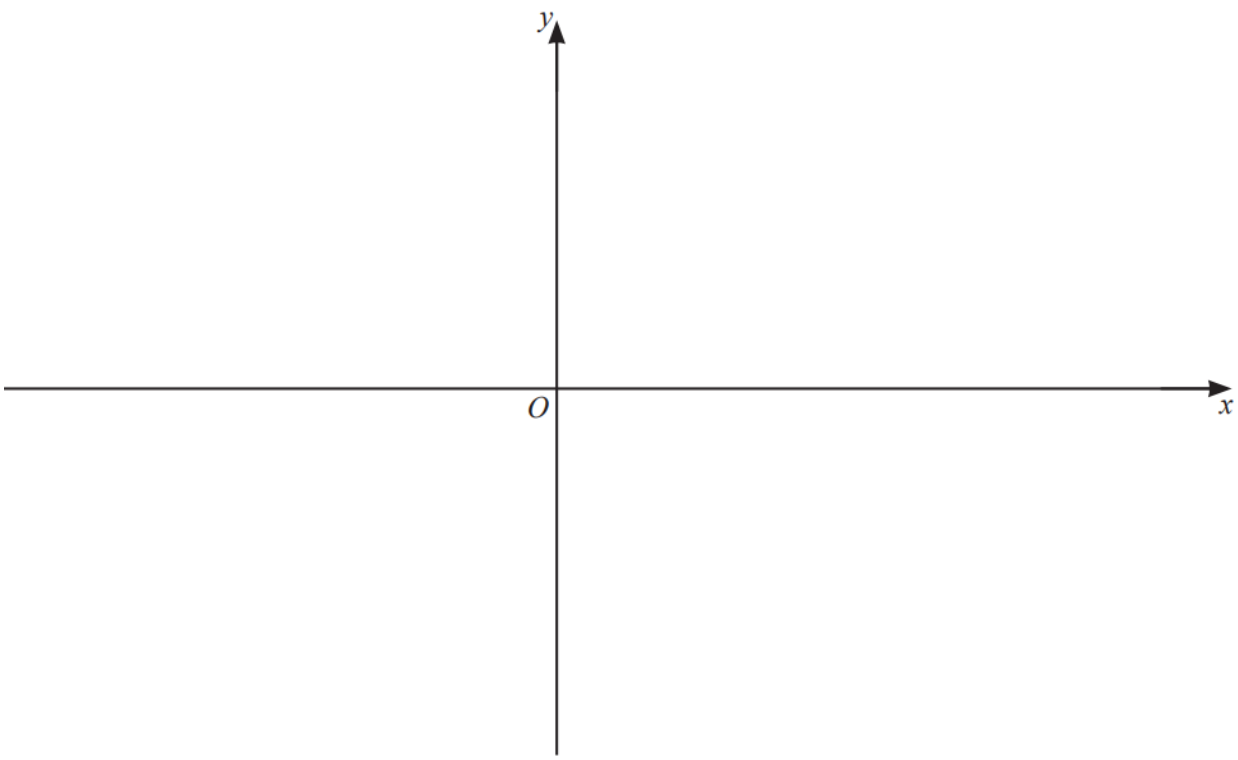
2. 4037/22/M/J/22 Q2



The diagram shows the graphs of $y=|f(x)|$ and $y=g(x)$, where $y=f(x)$ and $y=g(x)$ are straight lines. Solve the inequality $|f(x)| \leqslant g(x)$. [5]

3. 4037/12/O/N/22 Q2

(a) On the axes, draw the graph of $y = |3x^2 + 13x - 10|$, stating the coordinates of the points where the graph meets the axes. [4]



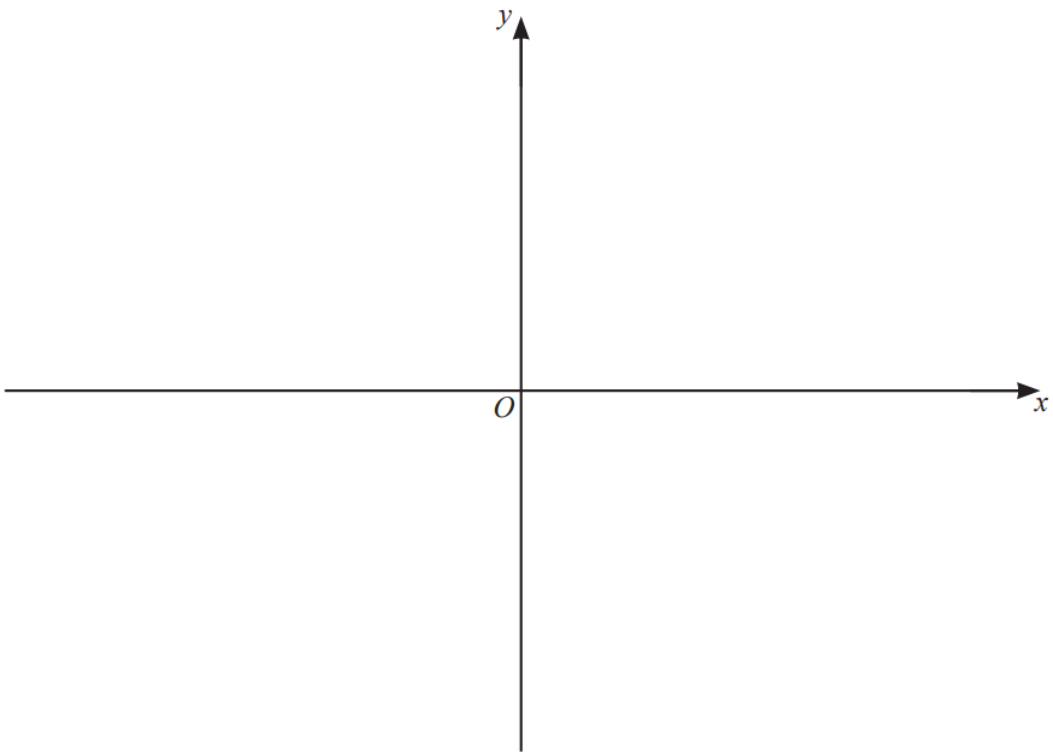
(b) Find the set of values of the constant k such that the equation $k = |3x^2 + 13x - 10|$ has exactly 2 distinct roots. [4]

4. 4037/13/O/N/22 Q2

(a) Show that $2x^2+x-15$ can be written in the form $2(x+a)^2+b$, where a and b are exact constants to be found. [2]

(b) Hence write down the coordinates of the stationary point on the curve $y=2x^2+x-15$. [2]

(c) On the axes, sketch the graph of $y=|2x^2+x-15|$, stating the coordinates of the points where the graph meets the coordinate axes. [3]



(d) Write down the value of the constant k for which the equation $|2x^2+x-15|=k$ has 3 distinct solutions. [1]

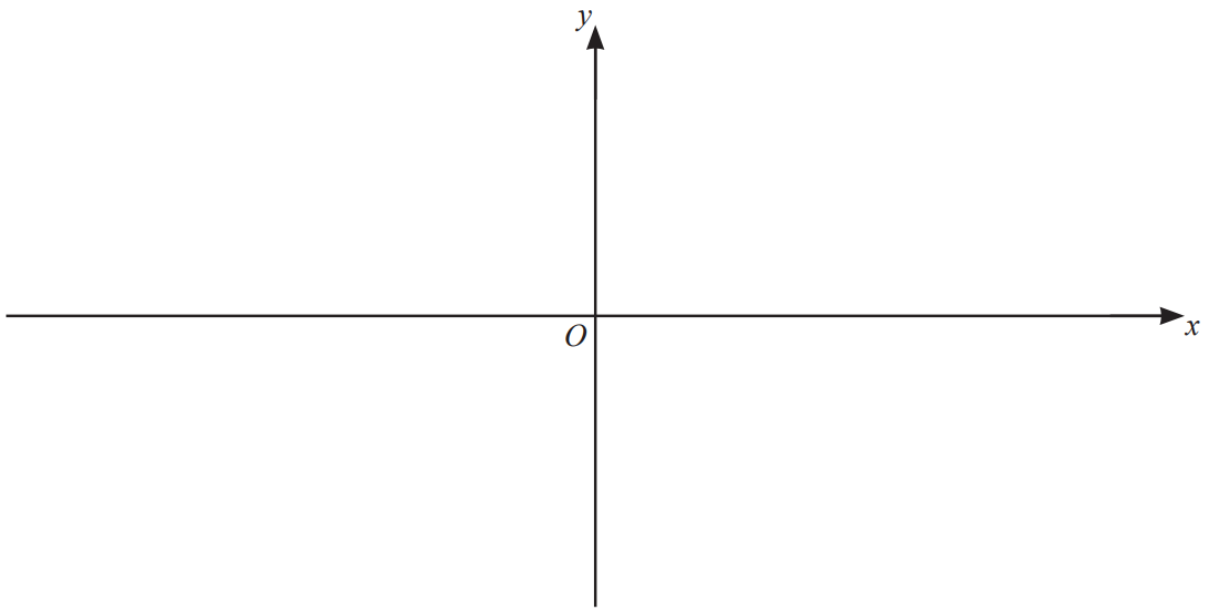
5. 4037/23/O/N/22 Q1

Solve the following inequality.

$$(2x+3)(x-4) > (3x+4)(x-1)$$ [5]

6. 4037/11/M/J/21 Q1

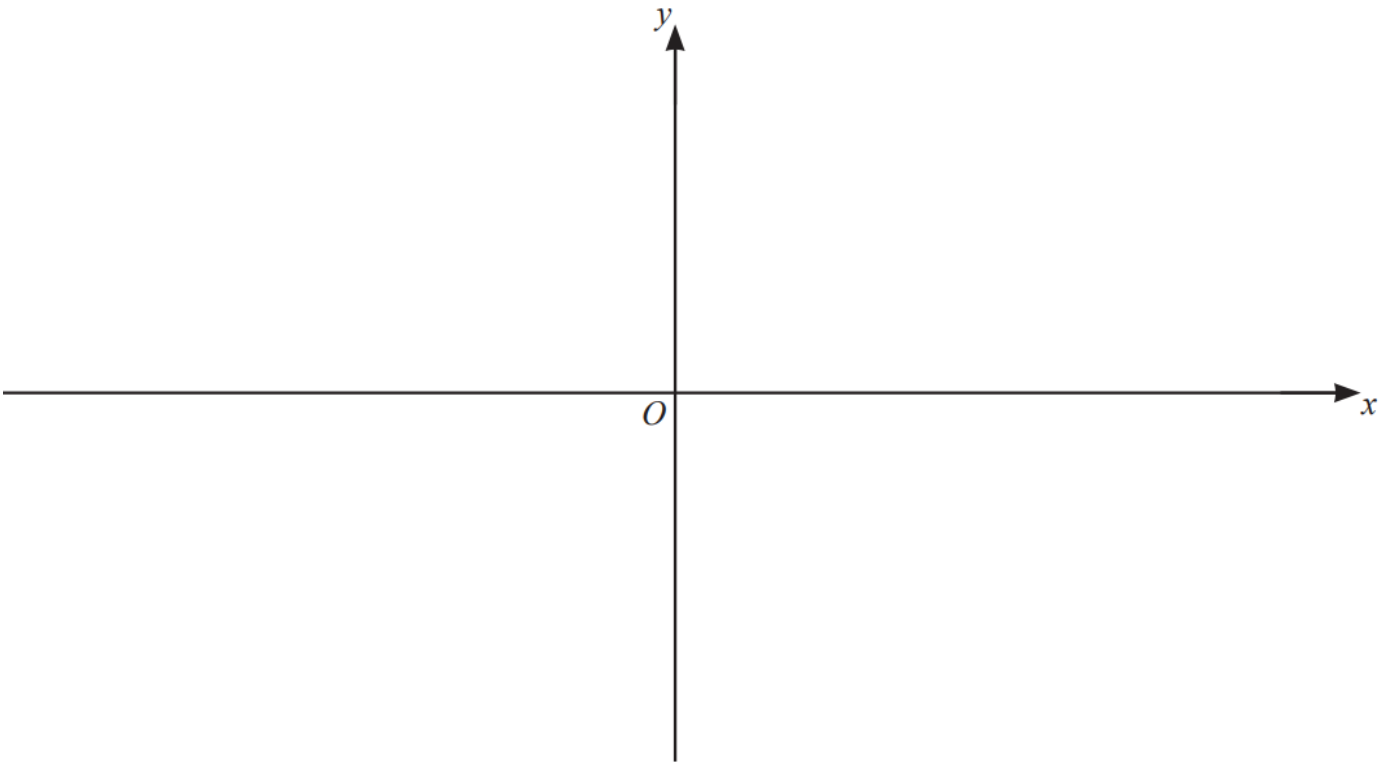
(a) On the axes, sketch the graph of $y = 5(x+1)(3x-2)(x-2)$, stating the intercepts with the coordinate axes. [3]



(b) Hence find the values of x for which $5(x+1)(3x-2)(x-2) > 0$. [2]

7. 4037/12/ M / J/21 Q2

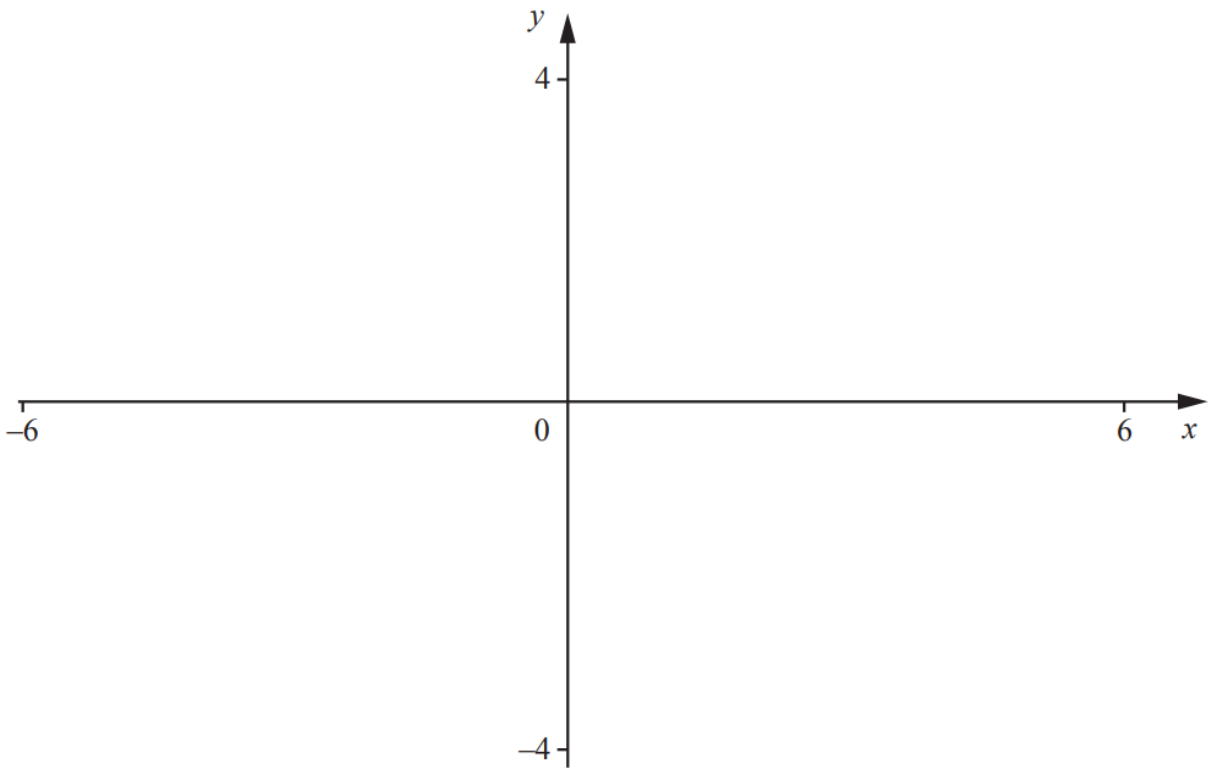
(a) On the axes, sketch the graph of $y = |4 - 3x|$, stating the intercepts with the coordinate axes. [2]



(b) Solve the inequality $|4 - 3x| \geqslant 7$. [3]

8. 4037/14/M/J/21 Q2

(a) On the axes below, sketch the graphs of $y = |x-3|$ and $y = \left|\frac{2}{5}x\right|$, giving the coordinates of the points where the graphs meet the axes. [3]



(b) Solve the equation $\left|\frac{2}{5}x\right| = |x-3|$. [2]

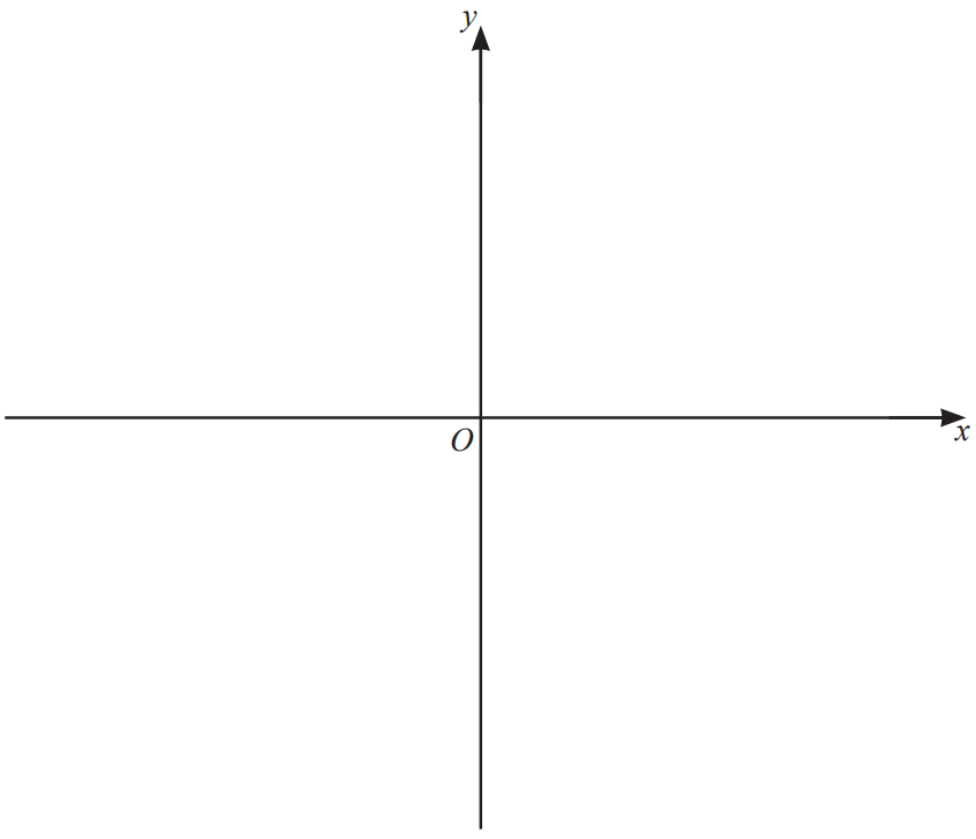
9. 4037/21/M/J/21 Q3

(a) Solve the inequality $|4x-1|>9$. [3]

(b) Solve the equation $2x-11\sqrt{x}+12=0$. [3]

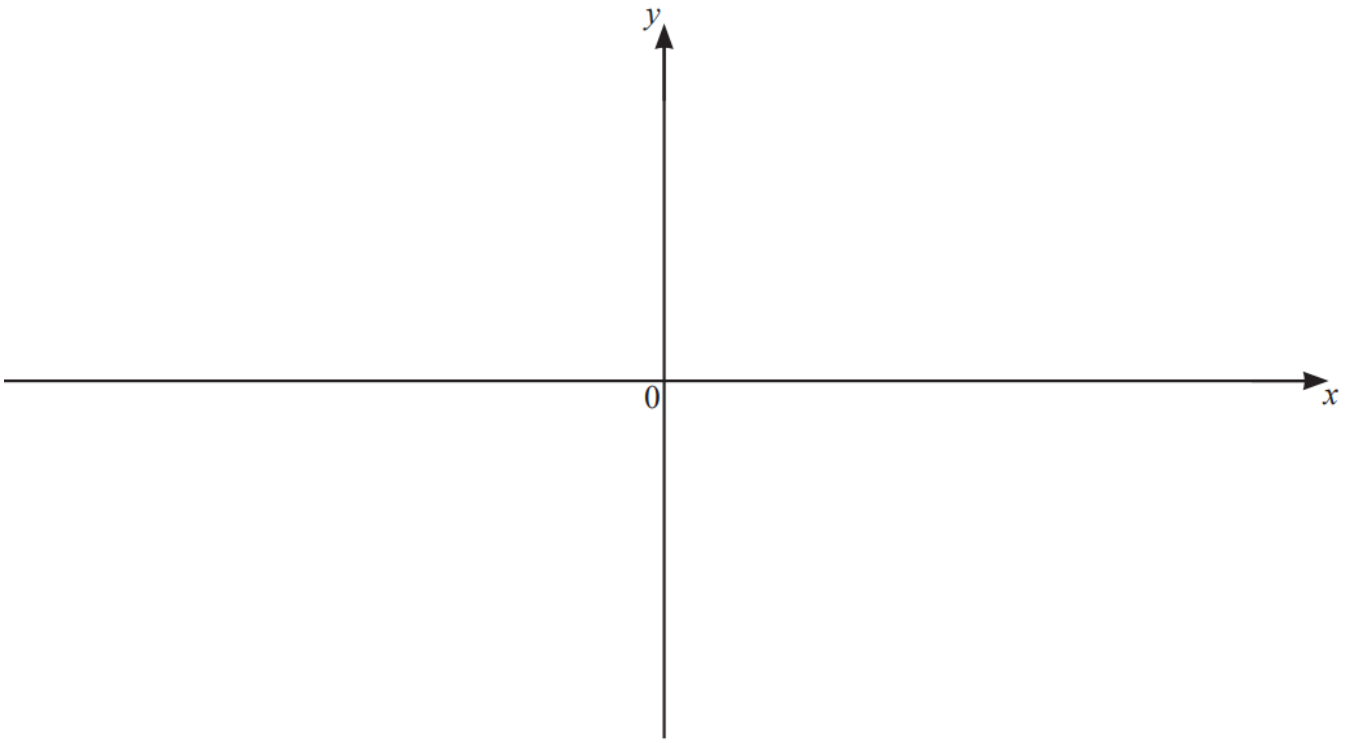
10. 4037/22/M/J/21 Q2

On the axes, sketch the graph of $y=3(x-3)(x-1)(x+2)$ stating the intercepts with the coordinate axes. [3]

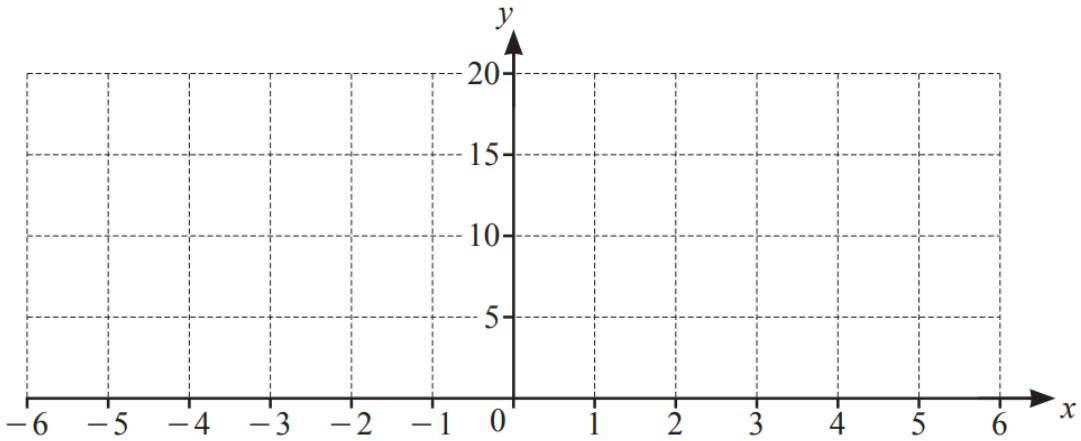


11. 4037/13/O/N/21 Q1

On the axes below, sketch the graph of $y = -\frac{1}{4}(2x+1)(x-3)(x+4)$ stating the intercepts with the coordinate axes. [3]



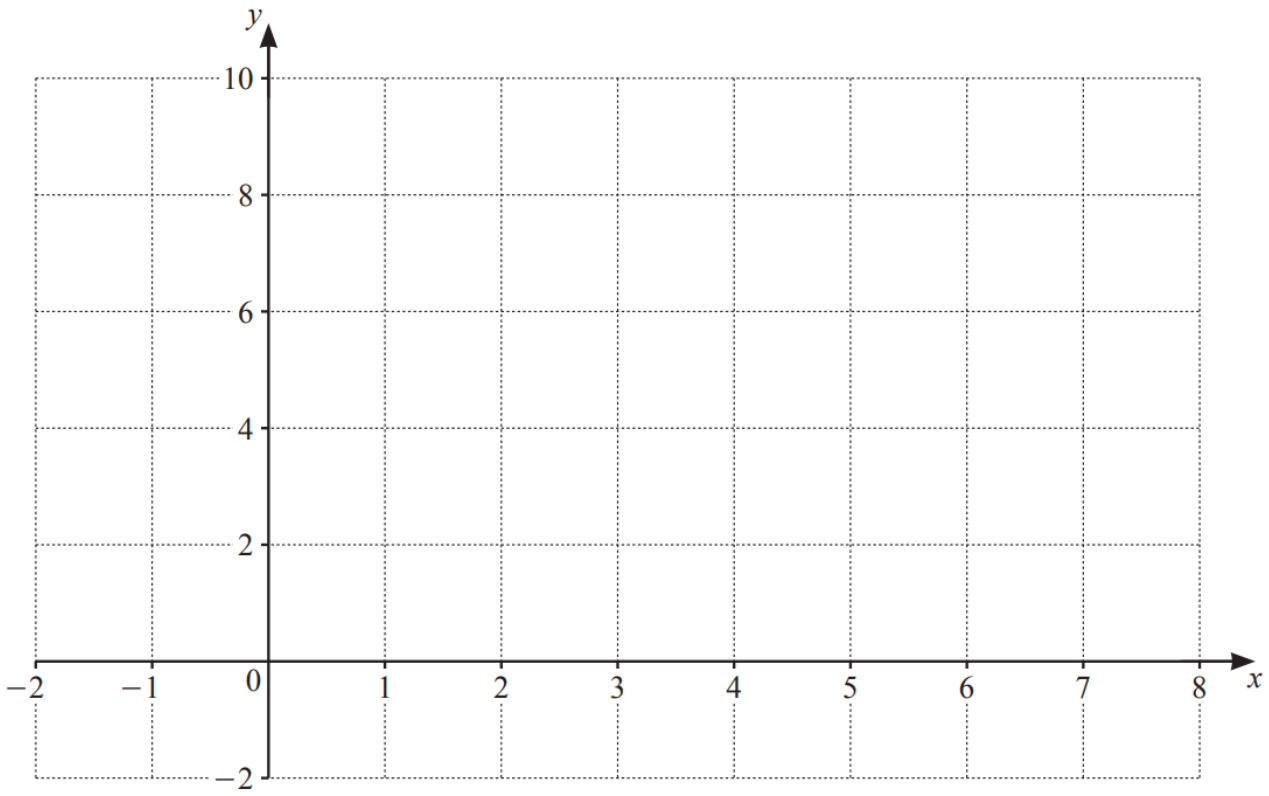
12. 4037/22/O/N/21 Q1



(a) On the axes, draw the graphs of $y = 5 + |3x-2|$ and $y = 11 - x$. [4]

(b) Using the graphs, or otherwise, solve the inequality $11 - x < 5 + |3x-2|$. [2]

13. 4037/23/O/N/21 Q1

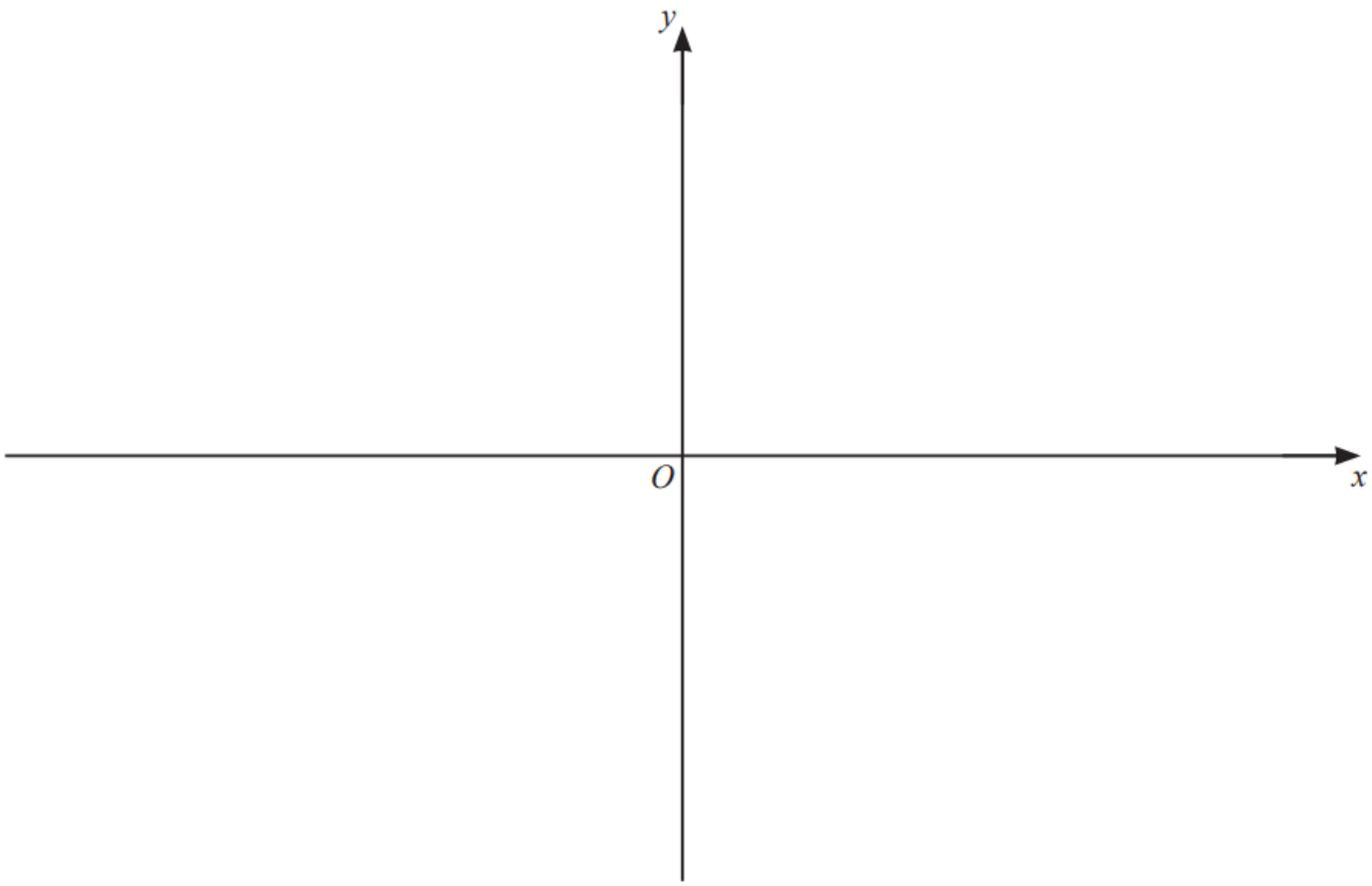


(a) On the axes draw the graphs of $y = |x-5|$ and $y = 6-|2x-7|$. [4]

(b) Use your graphs to solve the inequality $|x-5| > 6-|2x-7|$. [2]

14. 4037/12/M/J/20 Q1

On the axes below, sketch the graph of $y = |(x-2)(x+1)(x+2)|$ showing the coordinates of the points where the curve meets the axes. [3]



15. 4037/22/O/N/20 Q1

Solve the inequality $(x-8)(x-10) > 35$. [4]

16. 4037/23/O/N/20 Q1

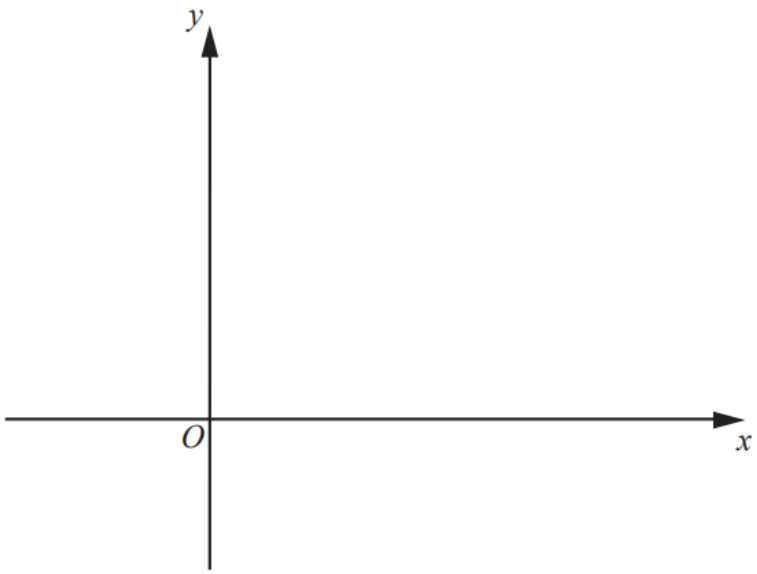
Solve $|3x-2| = 4+x$. [3]

17. 4037/21/M/J/19 Q1

Find the values of x for which $x(6x+7) \geqslant 20$. [3]

18. 4037/21/M/J/19 Q3

(i) Sketch the graph of $y = |5x - 3|$ on the axes below, showing the coordinates of the points where the graph meets the coordinate axes.

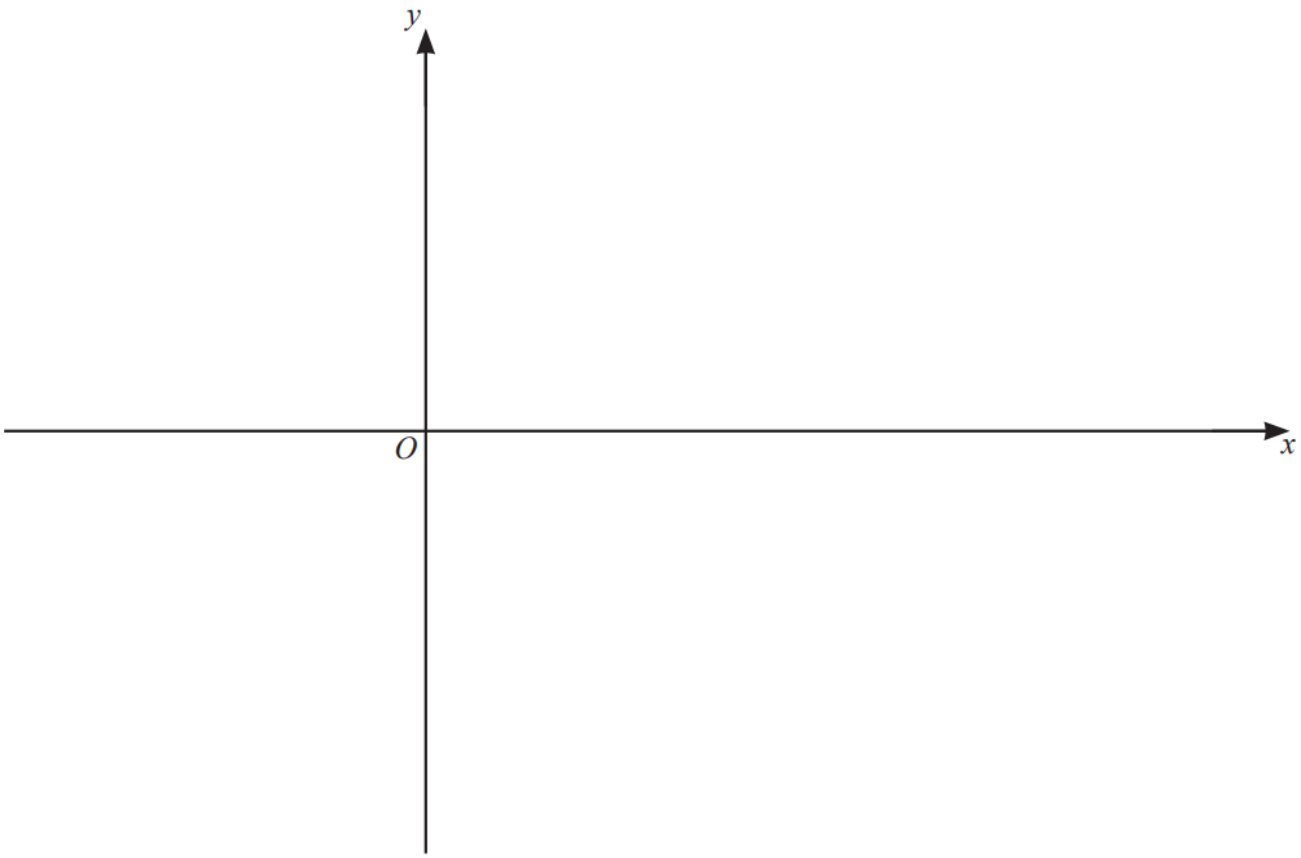


[3]

(ii) Solve the equation $|5x - 3| = 2 - x$. [3]

19. 4037/12/O/N/19 Q4

(i) On the axes below, sketch the graph of $y = |2x^2 - 9x - 5|$ showing the coordinates of the points where the graph meets the axes. [4]



(ii) Find the values of k for which $|2x^2 - 9x - 5| = k$ has exactly 2 solutions. [3]

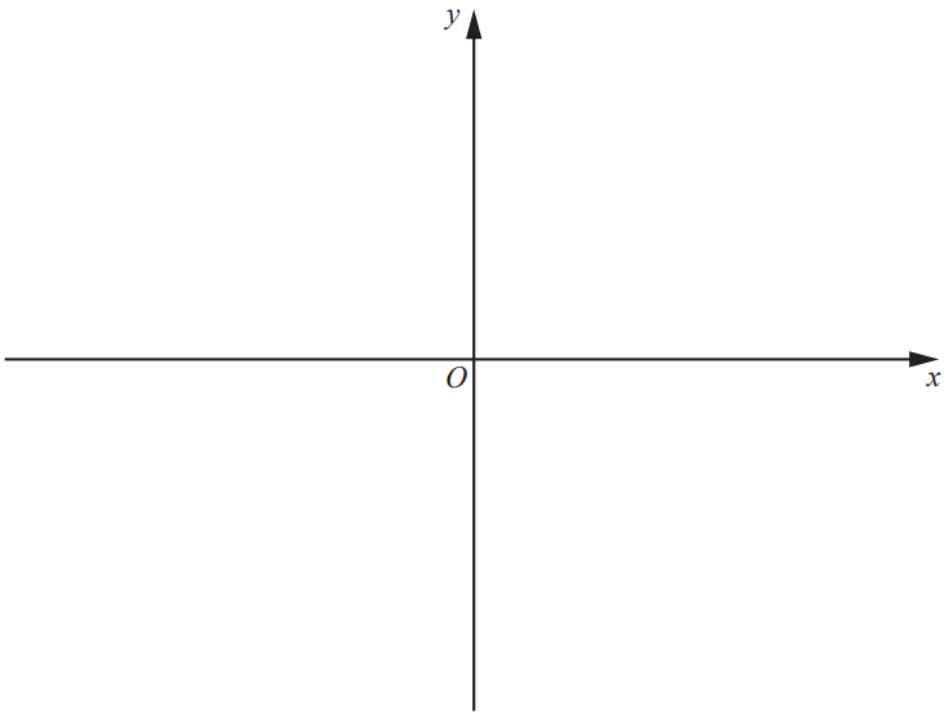
20. 4037/23/O/N/19 Q1

Solve $|3x+2| = x+4$. [3]

21. 4037/21/M/J/18 Q9

(i) Express $5x^2 - 14x - 3$ in the form $p(x+q)^2 + r$, where p, q and r are constants. [3]

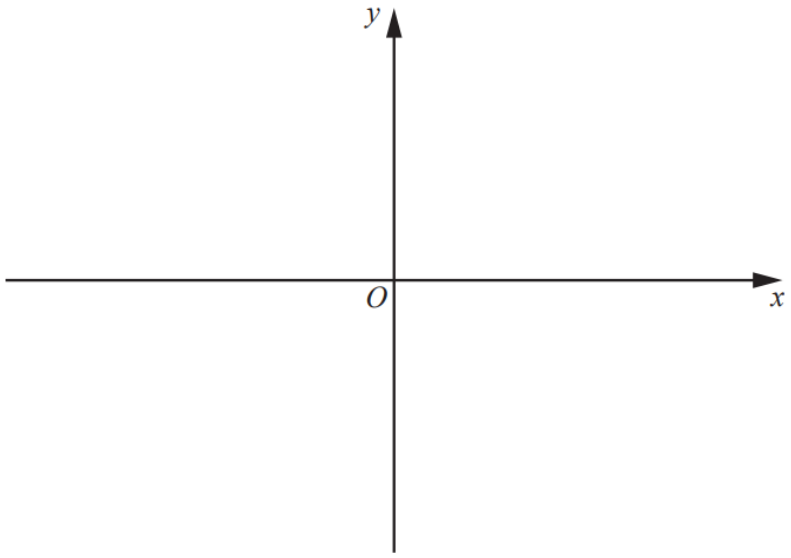
(ii) Sketch the graph of $y = |5x^2 - 14x - 3|$ on the axes below. Show clearly any points where your graph meets the coordinate axes. [4]



(iii) State the set of values of k for which $|5x^2 - 14x - 3| = k$ has exactly four solutions. [2]

22. 4037/22/M/J/18 Q10

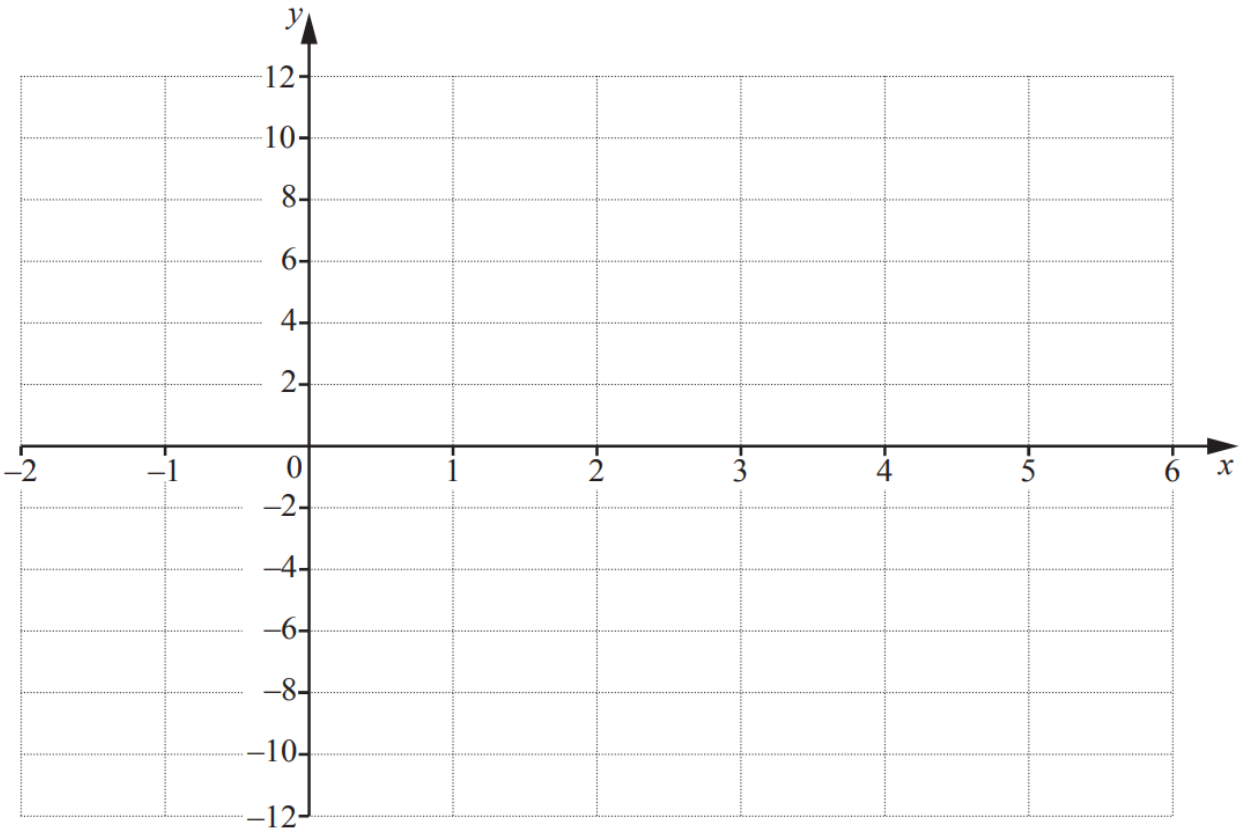
(a) **(i)** On the axes below, sketch the graph of $y = |(x + 3)(x - 5)|$ showing the coordinates of the points where the curve meets the x-axis. [2]



(ii) Write down a suitable domain for the function $f(x) = |(x + 3)(x - 5)|$ such that f has an inverse. [1]

23. 4037/12/O/N/18 Q3

(i) On the axes below, sketch the graph of $y = |6 - 3x|$, showing the coordinates of the points where the graph meets the coordinate axes. [2]

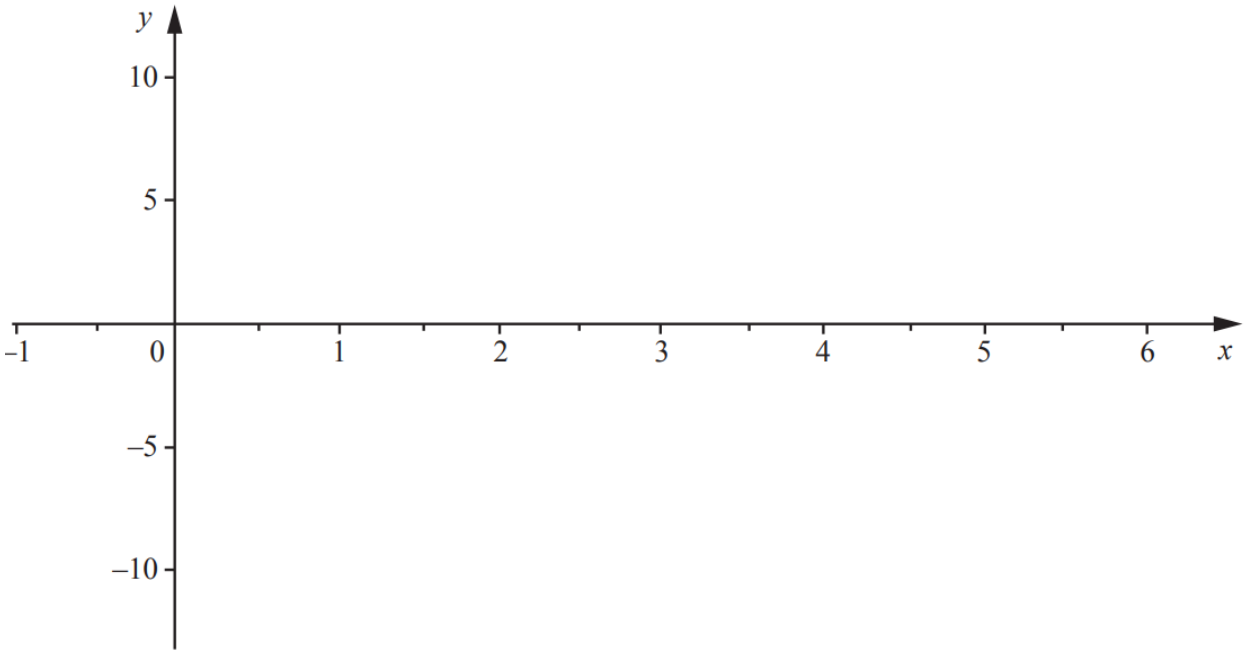


(ii) Solve $|6 - 3x| = 2$. [3]

(iii) Hence find the values of x for which $|6 - 3x| > 2$. [1]

24. 4037/11/M/J/17 Q8

(i) On the axes below sketch the graphs of $y = |2x - 5|$ and $9y = 80x - 16x^2$. [5]



(ii) Solve $|2x - 5| = 4$. [3]

(iii) Hence show that the graphs of $y = |2x - 5|$ and $9y = 80x - 16x^2$ intersect at the points where $y = 4$. [1]

(iv) Hence find the values of x for which $9|2x - 5| \leqslant 80x - 16x^2$. [2]

25. 4037/22/M/J/17 Q1

Solve $|5x + 3| = |1 - 3x|$. [3]

26. 4037/22/O/N/17 Q3

Solve the inequality $|3x - 1| > 3 + x$. [3]

27. 4037/23/O/N/17 Q2

Solve the equation $|3x - 1| = |5 + x|$. [3]