Chapter 1 to 5 test

1. (a) Find the range of values of x satisfying the inequality $(5x - 1)(6 - x) < 0$.

[2]

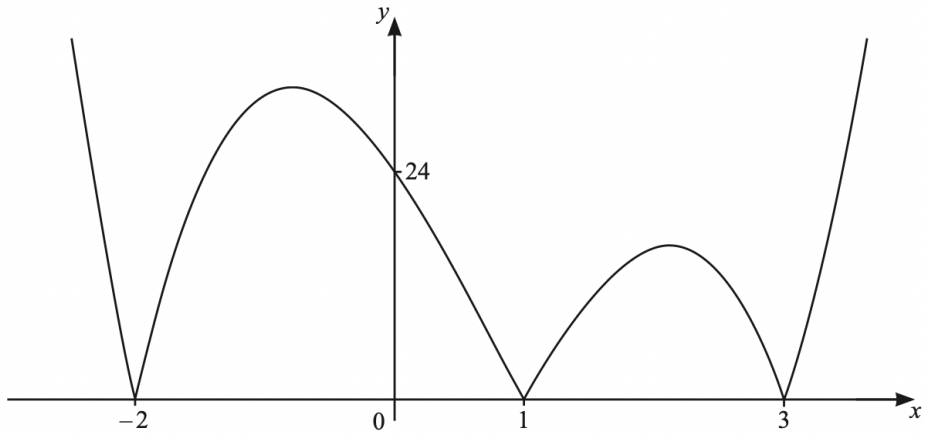
(b)Find the values of k such that the line $y = 9kx + 1$ does not meet the curve $y = kx^2 + 3x(2k + 1) + 4$.

[5]

2. Find constants a, b and c such that $\frac{\sqrt{p}q^{\frac{2}{3}}r^{-3}}{(pq^{-1})^2 r^{-1}} = p^a q^b r^c$.

[3]

3. (a) ,

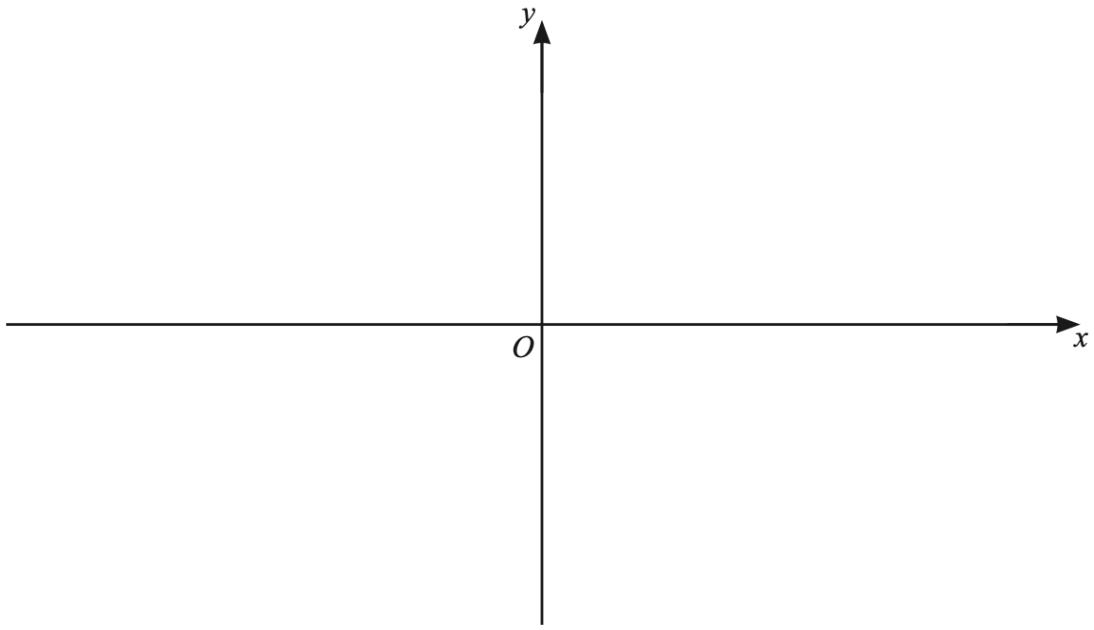


The diagram shows the graph of $y = |f(x)|$, where f(x) is a cubic. Find the possible expressions for f(x).

[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]

4. **DO NOT USE A CALCULATOR IN THIS QUESTION.**

Find the exact coordinates of the points of intersection of the curve $y = x^2 + 2\sqrt{5}x - 20$ and the line $y = 3\sqrt{5}x + 10$.

[4]

5. The polynomial $p(x) = mx^3 - 17x^2 + nx + 6$ has a factor $x - 3$. It has a remainder of -12 when divided by $x + 1$. Find the remainder when $p(x)$ is divided by $x - 2$.

[6]

6. (a) Write $9x^2 - 12x + 5$ in the form $p(x - q)^2 + r$, where *p*, *q* and *r* are constants.

[3]

(b) Hence write down the coordinates of the minimum point of the curve $y = 9x^2 - 12x + 5$.

[2]

7. Find the value of x such that $\frac{4^{x+1}}{2^{x-1}} = 32^{\frac{x}{3}} \times 8^{\frac{1}{3}}$.

[5]