

Functions, graphs and transformations

8 questions · 47 marks

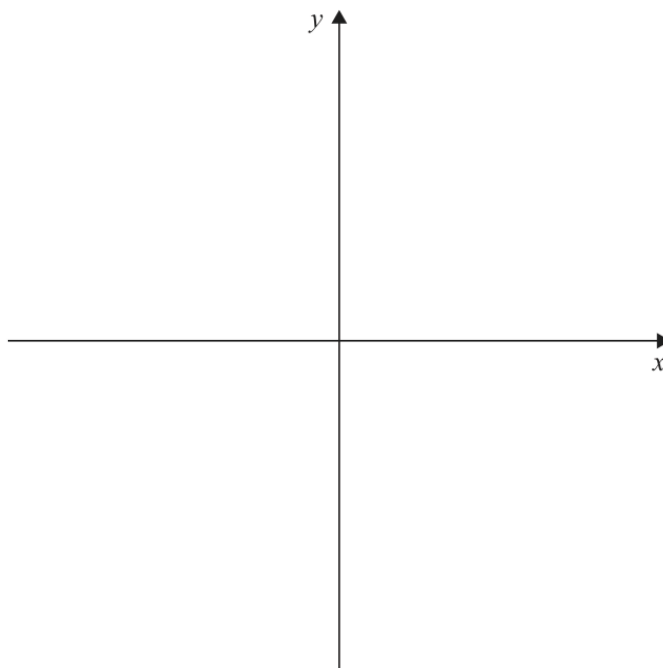
Answer all questions. The marks available are shown against each part. Every question is taken unaltered from a past paper; the source is noted beneath it.

1. Sketch the graph of $y = |2x + a|$, where a is a positive constant.

3 marks

Show clearly where the graph intersects the axes.

[3 marks]



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— AQA 7357/3 Maths · June 2018 · Paper 3, Question 4

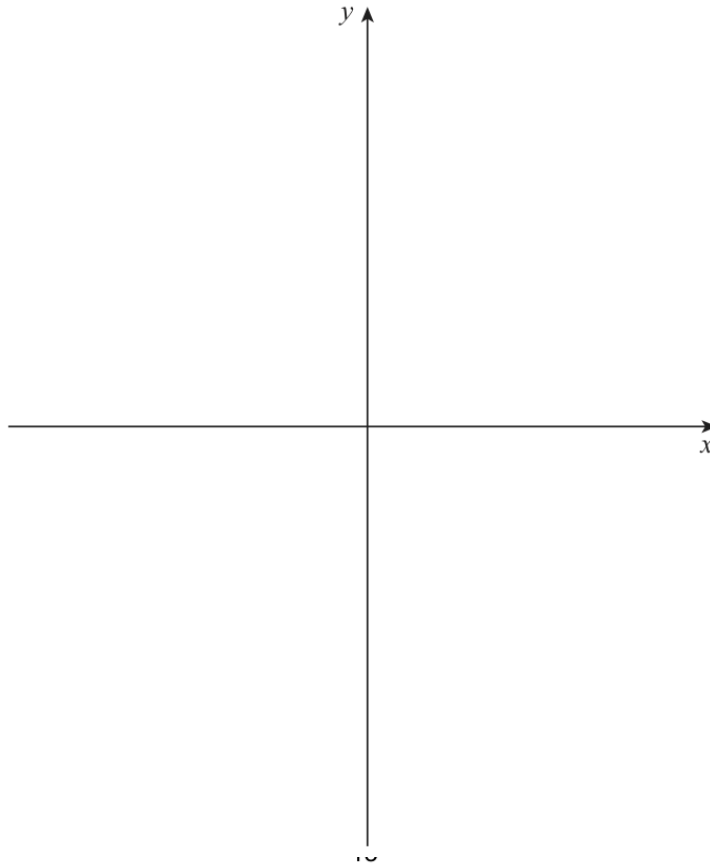
2.

(a)

Sketch the graph of $y = \frac{1}{x^2}$

5 marks

[2 marks]



(b)

The graph of $y = \frac{1}{x^2}$ can be transformed onto the graph of $y = \frac{9}{x^2}$ using a stretch in one direction.

Beth thinks the stretch should be in the y -direction.

Paul thinks the stretch should be in the x -direction.

State, giving reasons for your answer, whether Beth is correct, Paul is correct, both are correct or neither is correct.

[3 marks]

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3.

The functions f and g are defined by

5 marks

$$f(x) = \sqrt{10 - 2x} \quad \text{for } x \leq 5$$

$$g(x) = \frac{1}{x} \quad \text{for } x \neq 0$$

The function h has maximum possible domain and is defined by

$$h(x) = gf(x)$$

(a)

Find an expression for $h(x)$

[1 mark]

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(b)

Find the domain of h

[1 mark]

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(c)

Show that $h^{-1}(x) = 5 - \frac{1}{2x^2}$

[3 marks]

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— AQA 7357/2 Maths · 2023 · Paper 2, Question 7

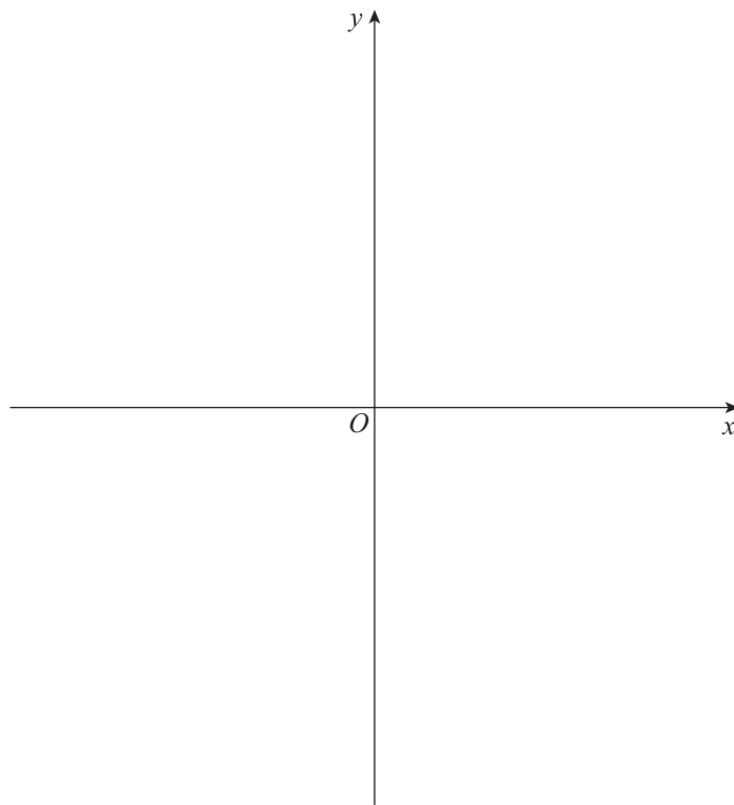
4.

It is given that

5 marks

$$f(x) = x(x - a)(x - 6)$$

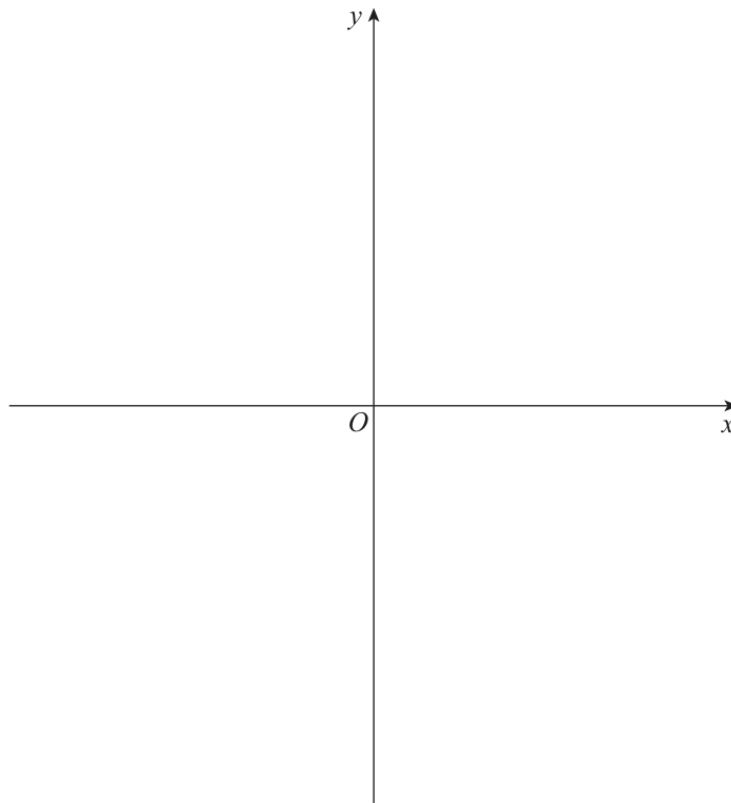
where $0 < a < 6$

(a)Sketch the graph of $y = f(x)$ on the axes below.**[3 marks]**

(b)

Sketch the graph of $y = f(-2x)$ on the axes below.

[2 marks]



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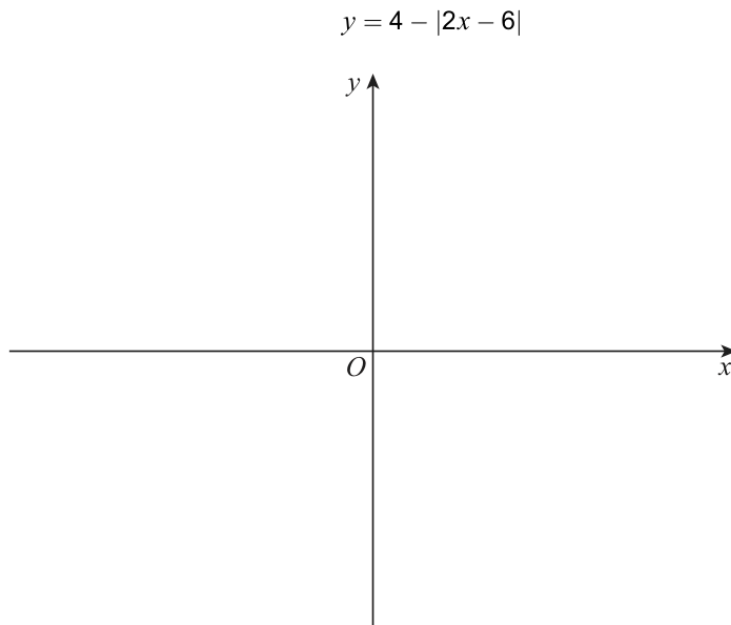
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5. (a) Sketch the graph of

5 marks



[3 marks]

- (b) Solve the inequality

$$4 - |2x - 6| > 2$$

[2 marks]

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— AQA 7357/1 Maths · June 2020 · Paper 1, Question 4

6. The function f is defined by

6 marks

$$f(x) = |x| + 1 \text{ for } x \in \mathbb{R}$$

The function g is defined by

$$g(x) = \ln x$$

where g has its greatest possible domain.

- (a) Using set notation, state the range of f

[2 marks]

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(b) State the domain of g

[1 mark]

(c) The composite function h is given by

$$h(x) = gf(x) \text{ for } x \in \mathbb{R}$$

17 (c) (i) Write down an expression for $h(x)$ in terms of x

[1 mark]

17 (c) (ii) Determine if h has an inverse.

Fully justify your answer.

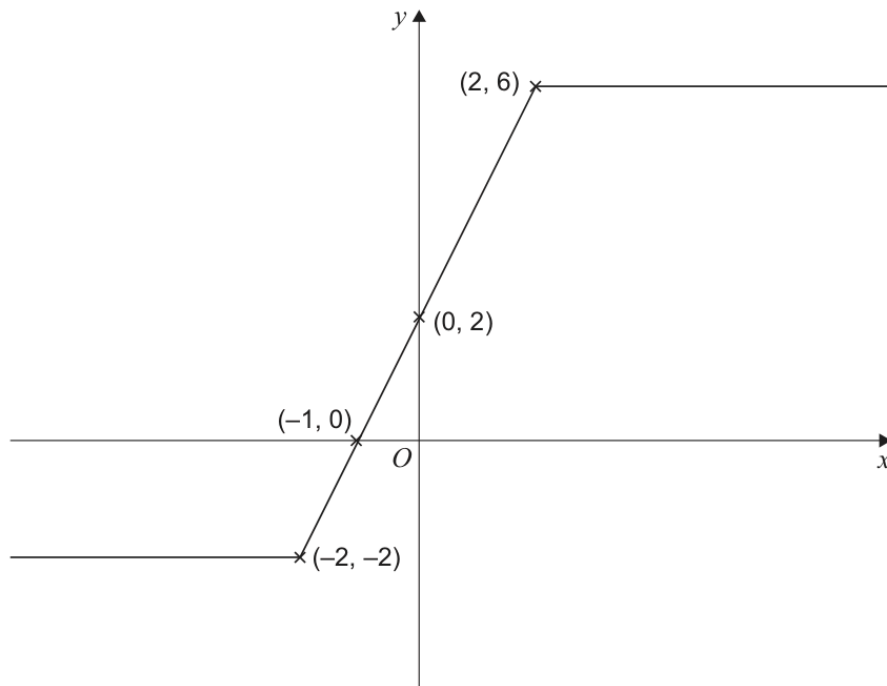
[2 marks]

— AQA 7357/1 Maths · June 2024 · Paper 1, Question 17

7.

The graph of $y = f(x)$ is shown below.

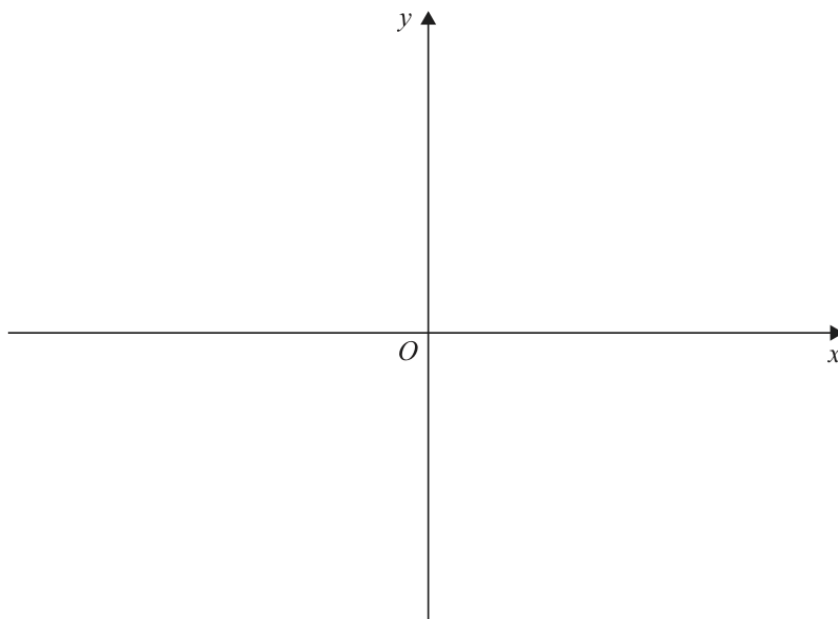
7 marks



(a)

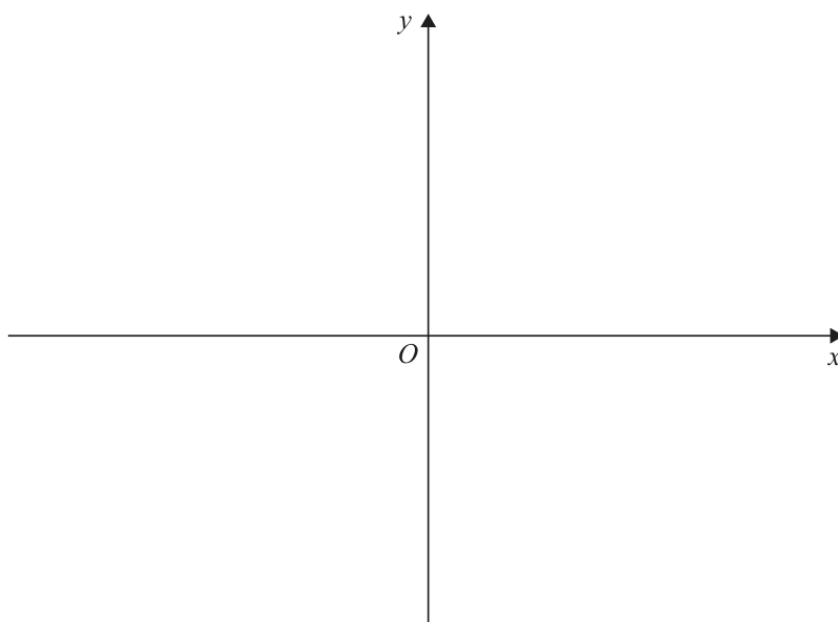
Sketch the graph of $y = f(-x)$

[2 marks]



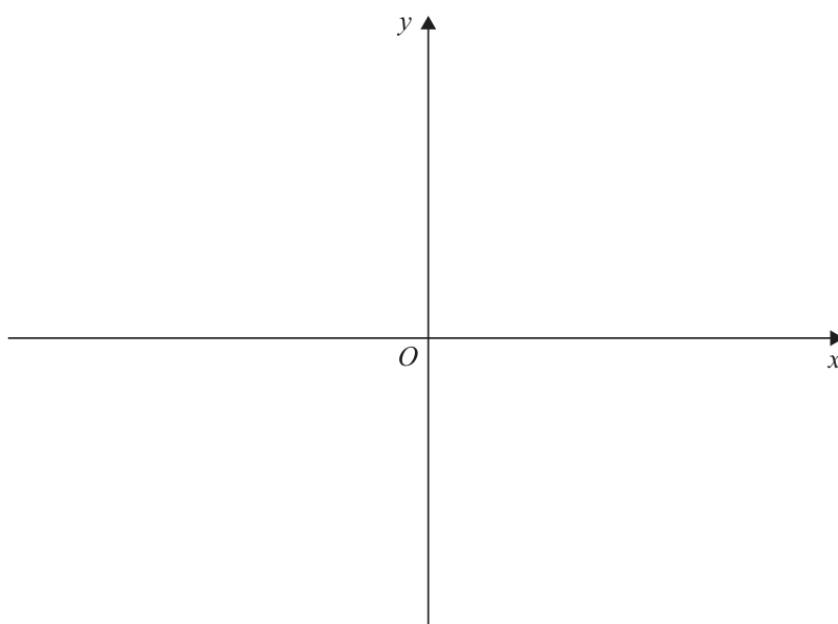
(b) Sketch the graph of $y = 2f(x) - 4$

[2 marks]



(c) Sketch the graph of $y = f'(x)$

[3 marks]



8.

The function h is defined by

11 marks

$$h(x) = \frac{\sqrt{x}}{x-3}$$

where h has its maximum possible domain.

(a)

Find the domain of h .

Give your answer using set notation.

[3 marks]

(b)

Alice correctly calculates

$$h(1) = -0.5 \text{ and } h(4) = 2$$

She then argues that since there is a change of sign there must be a value of x in the interval $1 < x < 4$ that gives $h(x) = 0$

Explain the error in Alice's argument.

[2 marks]

(c)

By considering any turning points of h , determine whether h has an inverse function.

Fully justify your answer.

[6 marks]

[illegible]