IB DIPLOMA · MATHS AA · SL

Functions, domain, range and graphs

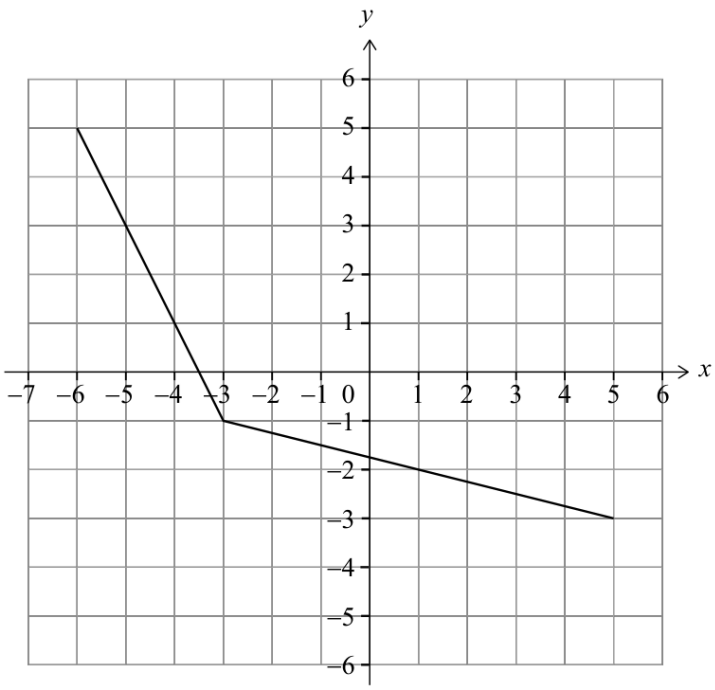
8 questions · 44 marks

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. Some questions are taken from higher level papers, where they examine the same standard level content.

1. 5 marks

[Maximum mark: 5]

The following diagram shows the graph of $y = f(x)$, for $-6 \leq x \leq 5$.



(a) Write down the value of $f(-3)$. [1]

(b) State the domain of f^{-1}, the inverse function of f. [1]

(c) Find the value of x that satisfies $f^{-1}(2x - 7) = -3$. [3]

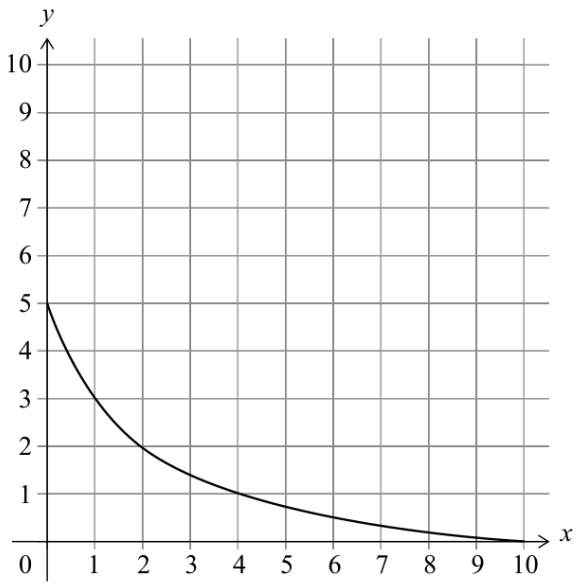
IB 2225 – 7119 Maths AA · May 2025 Paper 1 TZ3 SL, Question 3

2. 5 marks

[Maximum mark: 5]

The graph of $y = f(x)$ for $0 \le x \le 10$ is shown in the following diagram.

The graph intercepts the axes at $(10, 0)$ and $(0, 5)$.



(a) Write down the value of

(i) $f(4)$;

(ii) $f \circ f(4)$;

(iii) $f^{-1}(3)$. [3]

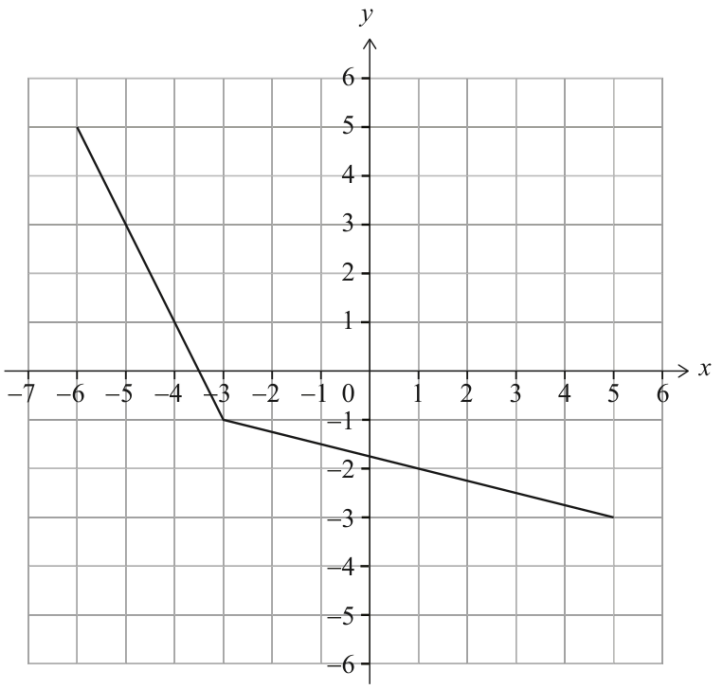
(b) On the axes above, sketch the graph of $y = f^{-1}(x)$. Show clearly where the graph intercepts the axes. [2]

IB 2224 – 7109 Maths AA · May 2024 Paper 1 TZ2 SL, Question 1

3. 5 marks

[Maximum mark: 5]

The following diagram shows the graph of $y = f(x)$, for $-6 \le x \le 5$.



(a) Write down the value of $f(-3)$. [1]

(b) State the domain of f^{-1}, the inverse function of f. [1]

(c) Find the value of x that satisfies $f^{-1}(2x - 7) = -3$. [3]

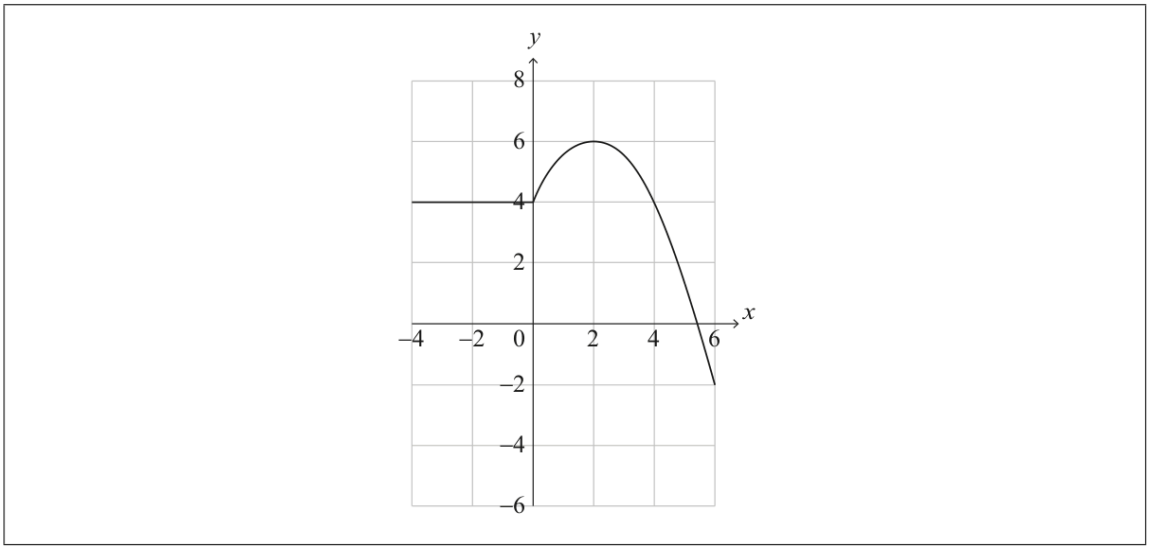
IB 2225 – 7116 Maths AA · May 2025 Paper 1 TZ3 HL, Question 2

4.

5 marks

[Maximum mark: 5]

The graph of $y = f(x)$ for $-4 \le x \le 6$ is shown in the following diagram.



(a) Write down the value of

(i) $f(2)$;

(ii) $(f \circ f)(2)$. [2]

(b) Let $g(x) = \frac{1}{2} f(x) + 1$ for $-4 \le x \le 6$. On the axes above, sketch the graph of g. [3]

IB 2221 – 7109 Maths AA · May 2021 Paper 1 TZ1 SL, Question 1

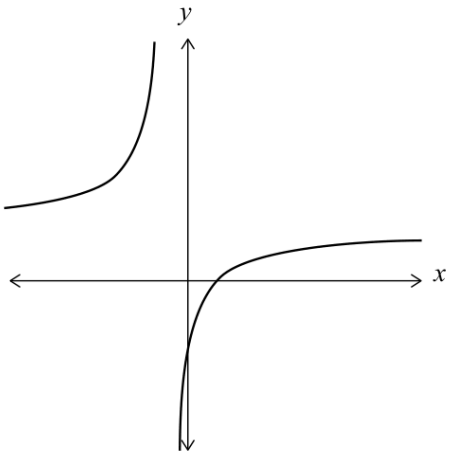
5.

5 marks

[Maximum mark: 5]

The function f is defined by $f(x)=\frac{3x-2}{2x+1}$ for $x \in \mathbb{R},\ x \neq -\frac{1}{2}$.

The following diagram shows part of the graph of $y=f(x)$.



(a) Write down the value of $f(0)$. [1]

(b) Write down the equation of the horizontal asymptote. [1]

The function g is defined by $g(x)=-f(x)$ for $x \geq 0$.

(c) Find the range of g. [3]

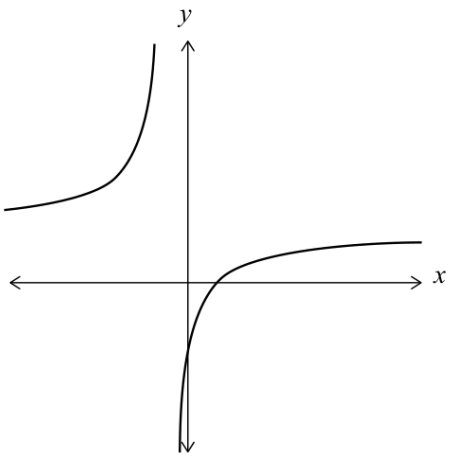
IB 2225 – 7114 Maths AA · May 2025 Paper 1 TZ2 SL, Question 3

6. 5 marks

[Maximum mark: 5]

The function f is defined by $f(x)=\frac{3x-2}{2x+1}$ for $x \in \mathbb{R},\ x \neq -\frac{1}{2}$.

The following diagram shows part of the graph of $y=f(x)$.



(a) Write down the value of $f(0)$. [1]

(b) Write down the equation of the horizontal asymptote. [1]

The function g is defined by $g(x)=-f(x)$ for $x \geq 0$.

(c) Find the range of g. [3]

— IB 2225 – 7111 Maths AA · May 2025 Paper 1 TZ2 HL, Question 1

7. 7 marks

[Maximum mark: 7]

Consider the function $f(x) = 7\sqrt{x} - x - 7$, where $0 \le x \le 60$.

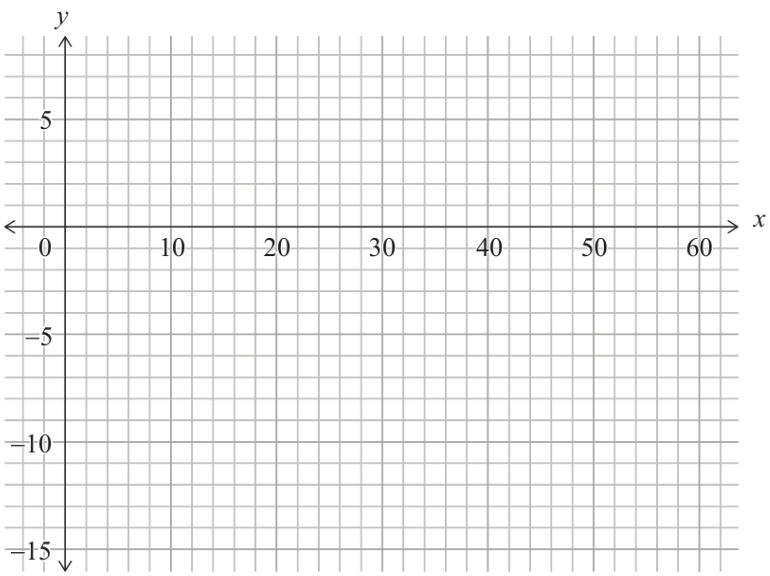
(a) Find the value of

(i) $f(0)$;

(ii) $f(60)$. [2]

(b) Find the two roots of $f(x) = 0$. [2]

(c) Sketch the graph of $y = f(x)$ on the following grid. [3]



IB 8824 – 7105 Maths AA · November 2024 Paper 2 TZ1 SL, Question 1

8.

7 marks

[Maximum mark: 7]

Consider the function $f(x) = 11\sqrt{x} - 2x - 11$, where $0 \le x \le 20$.

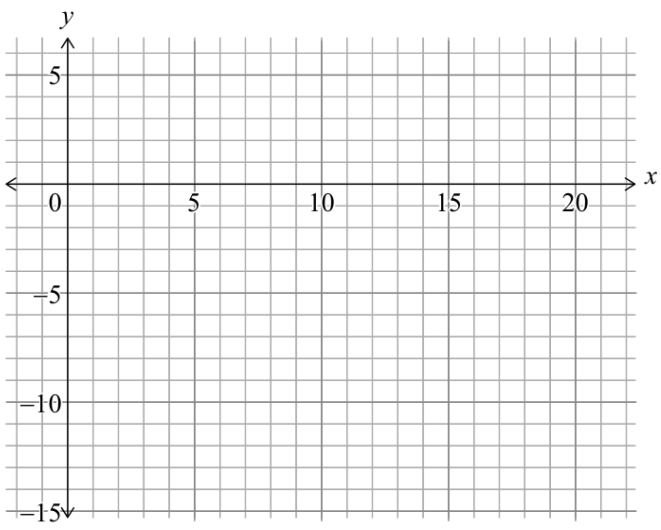
(a) Find the value of

(i) $f(0)$;

(ii) $f(20)$. [2]

(b) Find the two roots of $f(x) = 0$. [2]

(c) Sketch the graph of $y = f(x)$ on the following grid. [3]



IB 8824 – 7110 Maths AA · November 2024 Paper 2 TZ2 SL, Question 1