

Main Examination period 2024 – January – Semester A

SEF026: Essential Foundation Mathematical Skills

Examiners: A. Mainou, M. Hanada

Apart from this page, you are not permitted to read the contents of this question paper until instructed to do so by an invigilator.

You will have a period of **3 hours** to complete the exam and submit your solutions.

You should attempt ALL questions. Marks available are shown next to the questions.

You are allowed to bring **one A4 sheet of paper (i.e., 2 faces in total)** as notes for the exam. **Calculators are not permitted** in this examination. The unauthorised use of a calculator constitutes an examination offence.

Record each answer by ticking the corresponding box on the answer sheet provided. **Do not use pencil or red ink.**

To correct your answer on the answer sheet, tick the cancel box AND, at the bottom of the answer sheet, write down the relevant question number and tick the chosen box.

Include any rough work in the answer book and **cross through any work that is not to be assessed.**

Possession of unauthorised material at any time when under examination conditions is an assessment offence and can lead to expulsion from QMUL. Check now to ensure you do not have any unauthorised notes, mobile phones, smartwatches or unauthorised electronic devices on your person. If you do, raise your hand and give them to an invigilator immediately.

It is also an offence to have any writing of any kind on your person, including on your body. If you are found to have hidden unauthorised material elsewhere, including toilets and cloakrooms, it will be treated as being found in your possession. Unauthorised material found on your mobile phone or other electronic device will be considered the same as being in possession of paper notes. A mobile phone that causes a disruption in the exam is also an assessment offence.

Exam papers must not be removed from the examination room.

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Question 1 [4 marks]. Let L be the least common multiple of 44 and 56. Then

- [a] $200 \leq L < 600$ [b] $600 \leq L < 1000$
 [c] $1000 \leq L < 2000$ [d] $2000 \leq L < 2500$ [e] not in the list

Question 2 [4 marks]. Compute the quotient of the following division:

$$(3x^5 - x^3 + 1) \div (x^3 - x^2 + 1).$$

- [a] $3x^2 - x + 6$ [b] $3x^2 + x + 6$
 [c] $3x^2 + 3x + 2$ [d] $3x^2 - 6x + 1$ [e] not in the list

Question 3 [4 marks]. Solve the simultaneous equations $5x + y = 4$, $x + 2y = 2$.

- [a] $x = \frac{1}{3}$, $y = \frac{5}{9}$ [b] $x = \frac{2}{3}$, $y = -\frac{2}{3}$
 [c] $x = y = \frac{2}{3}$ [d] $x = \frac{2}{9}$, $y = \frac{7}{9}$ [e] not in the list

Question 4 [4 marks]. Find all solutions of the equation $x + \sqrt{2x + 1} = 2$.

- [a] $x = 3 + \sqrt{6}$ [b] $x_{1,2} = \frac{-6 \pm \sqrt{24}}{2}$
 [c] $x = 3 - \sqrt{6}$ [d] no solution [e] not in the list

Question 5 [4 marks]. Simplify, eliminating radicals at denominator, $\frac{1}{1 + \sqrt{1 + \sqrt{3}}}$.

- [a] $\frac{1}{3}(\sqrt{3} - 1)$ [b] $\sqrt{2 + \sqrt{3}} - 3$
 [c] $\frac{1}{3}(\sqrt{3} + 1)$ [d] $\frac{1}{3}(\sqrt{3 + 3\sqrt{3}} - \sqrt{3})$ [e] not in the list

End of Paper.