

S3 First Term Uniform Test (2025-2026)

Mathematics

(1 hour)

Date: 24th October 2025

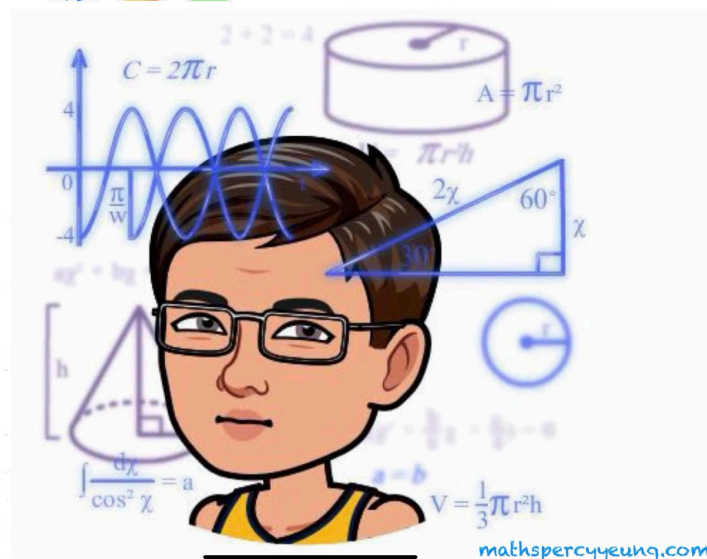
Name: _____

Time: 9:45 a.m. – 10:45 a.m.

Class: _____ No.: _____

Instructions to students:

1. This paper consists of TWO parts, Conventional Questions and Bonus Question. There are Section A and Section B in Conventional Questions. Section A carries 53 marks, Section B carries 11 marks and Bonus Question carries 4 marks.
2. The maximum score of this paper is 64.
3. Attempt ALL questions in Conventional Questions. Write your answers in the spaces provided in this Question / Answer Book.
4. Unless otherwise specified, show your workings clearly.
5. Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
6. The diagrams in this paper are not necessarily drawn to scale.



Section A (53 marks)

- [illegible]

- [illegible]

3. Factorize

(a) $6x^2 - 13xy + 6y^2$,

(b) $6x^2 - 13xy + 6y^2 - 6x + 9y$.

(3 marks)

4. (a) Solve the inequality $\frac{1}{2} - \frac{x+2}{3} \leq \frac{3-x}{4}$ and represent the solutions graphically.

(b) Write down all negative even integers satisfying the inequality in part (a).

(4 marks)

(a) $(3 \times 10^{-7}) \div (4 \times 10^{-3})$

$$(b) \quad \frac{0.000\,000\,048 - 0.000\,000\,12}{900\,000 \times 2\,000\,000}$$

(4 marks)

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

(b) Without using a calculator, express $3 \times 2^9 + 5 \times 2^6 - 2^5 + 2^0$ as a binary number.

(5 marks)

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins or other markings on the paper.

- (4 marks)

[illegible]

- (4 marks)

[illegible]

9. Felix deposited \$32 000 in bank P at a simple interest rate of 3.5% p.a. Gary deposited \$32 000 in bank Q at an interest rate of 3% p.a., compounded quarterly. Gary claims that he will receive a larger amount than Felix after 12 years. Do you agree? Explain your answer.

(4 marks)

10. Sally borrows a sum of money from a bank at an interest rate of 3% p.a., compounded half-yearly and then invests the sum of money in a bond. The value of her investment increases by 3.5% per year. After 2 years, she repays the loan that she owes the bank and she earns \$2367. How much does Sally borrow?

(4 marks)

| <u>Net chargeable income</u> | <u>Rate</u> |
|------------------------------|-------------|
| On the first \$50 000 | 2% |
| On the next \$50 000 | 6% |
| On the next \$50 000 | 10% |
| On the next \$50 000 | 14% |
| Remainder | 17% |

(a) Find her salaries tax payable.

(5 marks)

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. A small red mark or smudge is present near the center-right of the page, about halfway down. The paper appears to be from a notebook or a set of legal pads.

12. The base radius and the height of a circular cylinder are in the ratio 2 : 3. If the base radius increases by 20% and its height decreases by 30%, find the percentage change in the total surface area of the circular cylinder. (5 marks)

Handwriting practice lines consisting of multiple sets of three horizontal lines (top solid, middle dashed, bottom solid) for writing the solution.

(4 marks)

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

(a) Prove that $\frac{a^2+b^2}{2} \geq ab$.

(i) By using the result of (a), prove that $cd \leq \frac{c^2}{2e} + \frac{d^2 e}{2}$, where $e \neq 0$.

(ii) By using the result of (a), prove that $(1 + c)^2(1 + d)^2(1 + e)^2 \geq 64cde$.

(7 marks)

[illegible]

15. Let N be a 10-digit binary number. Use N to create another binary number M by changing each digit '0' in N to '1' and each '1' in N to '0' and ignore the leading '0's, e.g. if $N = 1101011100_2$ then $M = 10100011_2$. Find the number N such that the difference between N and M has the fewest number of digits '1' in its binary representation.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.