S1 First Term Examination (2023-2024)

Mathematics

(1 hour 30 minutes)

Date: 12th January 2024 Name: _____

Time: 8:30 a.m. - 10:00 a.m. Class: _____ No. : ____

Instructions to students:

1. This paper consists of THREE parts, Conventional Questions, Multiple-choice Questions and Bonus Question. There are Section A and Section B in Conventional Questions. Section A carries 60 marks, Section B carries 16 marks, Multiple-choice Questions carry 24 marks and Bonus Ques

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3. Attempt AL estions. Write your answers in t

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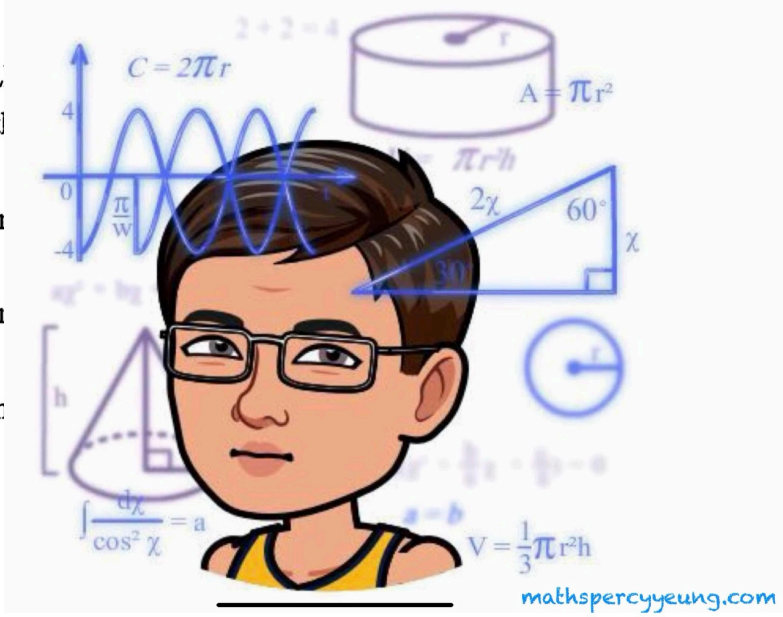
6. The diagram



Conventional Questions

Section A (60 marks)

1 (a) Express 132, 378 and 455 as prime factorization.

(b) Find the L.C.M. of 132, 378 and 455 by using prime factorization.

(4 marks)

2. Evaluate each of the following.

(a) $(+7)-(+8)+(-7)-(-5)$

(b) $[(-1.8)+(-2.1)](-4.5)$

(c) $(-120)\div(-5)-(-3)\times(+4)+(-13)$

(d) $(-2.4)\div\left(+3\frac{3}{5}\right)+\left(-5\frac{2}{3}\right)$

(8 marks)

3. Simplify the following algebraic expressions.

(a) $2xy+3y-7x-5xy-5y^2$

(b) $(-2a)(-3a)(-4a)$

(c) $(-15a)\div(+3)+(+4a)\times(-3)$

(d) $(x^3)^2-(y^3)(y^2)$

(e) $\left(\frac{2a^5b^2}{a^3}\right)^5$

(f) $\left(-2x^3y\right)^3(-3xy)^2$

(14 marks)

4. There are 15 true-or-false questions in a test. 3 marks will be awarded for each correct answer and 2 marks will be deducted for each wrong answer. It is given that Molly answered all questions and she got 15 marks in the test. Find the numbers of correct answers and wrong answers that Molly got respectively.

(4 marks)

5. Round off 4957.199 to
   (a) the nearest integer,
   (b) 3 decimal places,
   (c) 5 significant figures.

(3 marks)

6. It is given that the nth term of a sequence is $3n^2 - n^{n-2}$. Find the 5th term of the sequence.

(3 marks)

7. Find the area of the shaded region in Figure 1.

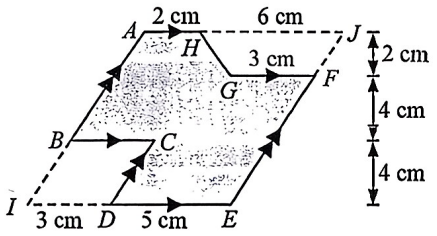


Figure 1

(4 marks)

8. In Figure 2, the area of the shaded region is 104.5 cm^2. Find x.

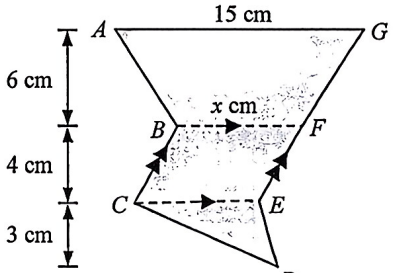


Figure 2

(4 marks)

9. Solve the following equations.

(a) $-3(2+x)=2x-7$

(b) $\frac{3p}{2}+\frac{6p+1}{4}=1$

(c) $\frac{p-1}{2}-\frac{p-2}{3}=\frac{p-3}{4}$

(d) $-2\left[\frac{4a}{3}-5(3a-7)\right]=-2a+1$

(10 marks)

10. It is given that the numbers of visitors to a theme park from January to June are 14 658, 17 553, 12 046, 13 195, 14 175 and 18 669 respectively.

(a) Estimate the total number of visitors from January to June by

(i) rounding up each number to the nearest thousand.

(ii) rounding down each number to the nearest thousand.

(b) Using the result in (a), the director claims that over 94000 visitors have visited the park from January to June. Do you agree? Explain your answer.

(6 marks)

Section B (16 marks)

11. In Figures 3 and Figure 4, a solid metal cube of side 18 cm is melted and recast into a right prism as shown.

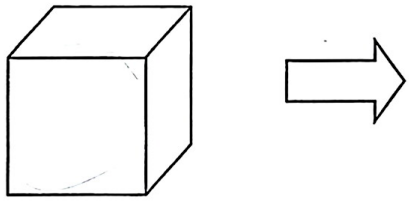


Figure 3

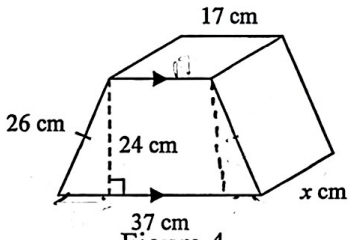


Figure 4

(a) Find x.

(b) Find the total surface area of the prism in Figure 4.

(c) Find the change in total surface area after the recasting.

(9 marks)

12. (a) Express 180 as prime factorization.

(b) If $2^n = k$, $3^n = p$ and $5^n = m$, where n is a positive integer, express each of the following in terms of k, p and m.

(i) 180^n

(ii) $\left(\frac{72}{5}\right)^{2n}$

(7 marks)

Multiple-choice Questions (24 marks)

Each question carries 2 marks. Put ✓ in the correct boxes.

	13	14	15	16	17	18	19	20	21	22	23	24
A												
B												
C												
D												

13. Which of the following number is not divisible by 8 or 9?

A. 4432
B. 6849
C. 10 778
D. 64 584

14. Consider a 6-digit number $E = 24X35Y$, where X and Y are integers from 0 to 9 inclusive. If E is divisible by 6 but not divisible by 9, which of the following sets of values can be the possible values of X and Y?

I. $X = 2$ and $Y = 5$.
II. $X = 4$ and $Y = 6$.
III. $X = 5$ and $Y = 8$.

A. I only
B. II only
C. I and III only
D. II and III only

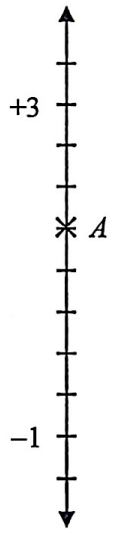
15. Represent 'divide the sum of a and 2 by b, and then subtract 1 from the quotient' by an algebraic expression.

A. $\frac{a+2}{b}-1$
B. $a+\frac{2}{b}-1$
C. $\frac{a}{b}+1$
D. $\frac{a+1}{b}$

16. Ted has p \$50 notes and q \$20 notes. After he bought some snacks, \$$r$ is left. How much did he pay for the snacks?

A. $\$(p+q-r)$
B. $\$[70(p+q)-r]$
C. $\$(50p+20q-r)$
D. $\$[r-(50p+20q)]$

17. Which directed number does letter A on the following number line represent?



A. −0.5
B. +0.5
C. +1.5
D. +2

18. Which of the following expressions gives the greatest result?

A. $\left(+1\frac{2}{3}\right)\left(-4\frac{5}{6}\right)\left(+7\frac{8}{9}\right)$
B. $\left(-1\frac{2}{3}\right)\left(+4\frac{5}{6}\right)\left(+7\frac{8}{9}\right)$
C. $\left(-1\frac{2}{3}\right)\left(-4\frac{5}{6}\right)\left(-7\frac{8}{9}\right)$
D. $\left(-1\frac{2}{3}\right)\left(+4\frac{5}{6}\right)\left(-7\frac{8}{9}\right)$

19. The sum of three consecutive negative numbers is –45. Find the largest number.

A. –13
B. –14
C. –15
D. –16

20. Estimate the value of 3.12 + 1.67 + 12.35 + 2.89 + 8.63 by rounding up each number to the nearest integer.

A. 26
B. 29
C. 31
D. 33

21. If 0.031 45 < k < 0.031 55, then k =

A. 0.031, *cor. to 2 d.p.*.
B. 0.031, *cor. to 2 sig. fig.*.
C. 0.0315, *cor. to 3 d.p.*.
D. 0.0315, *cor. to 3 sig. fig.*.

22. If $b^n = 5$, where n is a positive integer, find b^{4n}.

A. 1024
B. 625
C. 20
D. 9

23. $\frac{27^{444}}{9^{666} \times 3^{777}} =$

A. $\frac{1}{3^{2109}}$.
B. $\frac{1}{3^{1332}}$.
C. $\frac{1}{3^{777}}$.
D. 3^{777}.

24. It is given that the perimeter of the base of a right prism is 20 cm. If the height and the volume of the prism are 6 cm and 60 cm^3 respectively, then the total surface area of the prism is

A. 120 cm^2.
B. 140 cm^2.
C. 160 cm^2.
D 180 cm^2.

Bonus Question (3 marks)

25. In Figure 5, a corner of a sheet of rectangular paper is folded down such that triangles *A*, *B* and *C* are formed. Find the value of x.

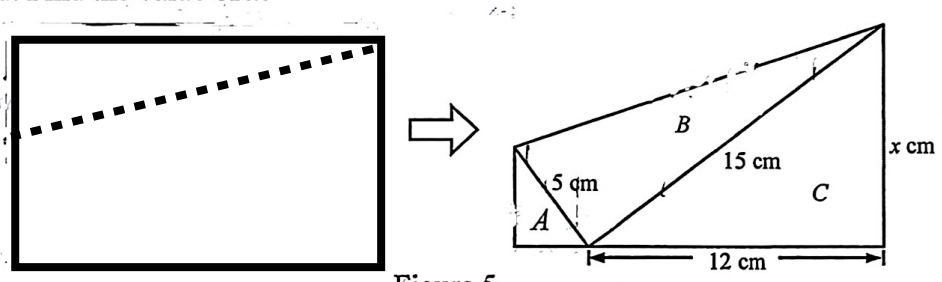


Figure 5

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