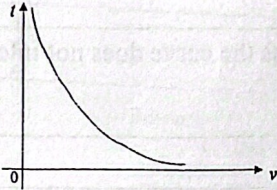
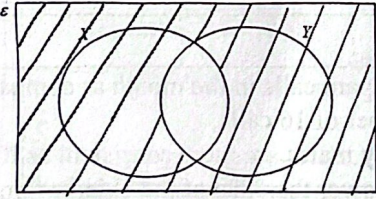
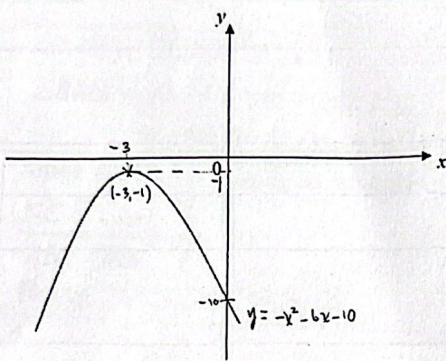
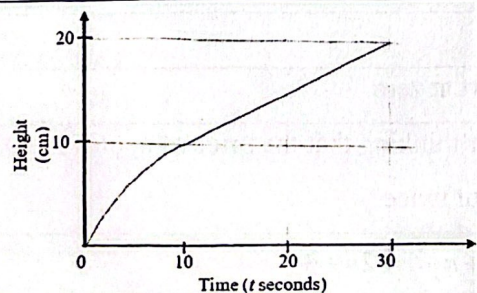
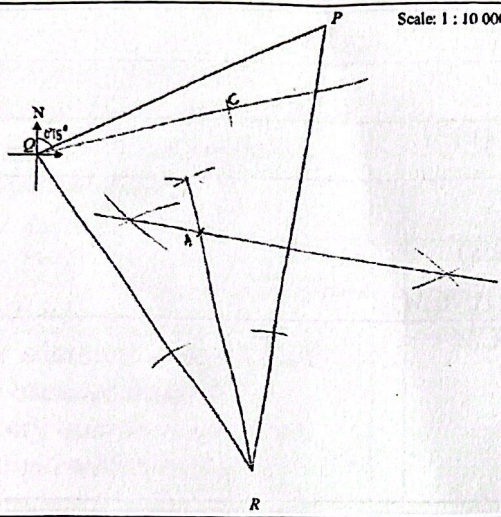


Answer Key for 2023 Sec 4 Preliminary Examinations
Paper 1

Qn	Answers
1	7
2	$18x^2 - 24x + 11$
3	$-\frac{1}{3}$
4a	$3y^a(y^a + 2)$
4b	$(4p - 3s)(5q - r)$
5	$\frac{2n - 4}{3 + n}$
6	5
7a	163.7°
7b	$-\frac{24}{25}$
8a	
8b	6.25 s
8c	-20
9a	
9b	$B \subset A$
10	{6, 9, 10, 12, 15}
11a	The vertical axis does not start at zero
11b	The graph misleads the reader thinking that the price of apples in 2020 is thrice that of 2010's when it is only about twice.
12i	$L_n : (n+2)^2 - (n+1)^2 = n+2+n+1 = 2n+3$

12ii	$2n + 3 = 1137$ $n = 567$ <u>n is an integer.</u> Hence 1137 is the 567 th term of the sequence.
112iii	10197
13i	45
13ii	25200
13iii	35
14i	$-(x+3)^2 - 1$
14ii	
14iii	$-x^2 - 6x - 10 = 0$ There are no solutions as the curve does not intersect the x -axis as shown above.
15i	70%
15ii	25.5 min
15iii	5
16i(a)	12.9375
16i(b)	5.26
16ii	The elderly females received more spam calls in the month as compared to the elderly males as they received a mean number of 16 calls. However, the results from the elderly males are more consistent as it has a standard deviation which is about 3.74 calls lower than that of the elderly females.
17a	1500 cm^3
17b	

18	$\angle ABE = \angle DBC$ (given) $\angle ABD = \angle ABE + \angle EBD$ $= \angle CBD + \angle EBD$ $= \angle CBE$ $AB = CB$ (given) $\angle BEC = \angle BDA$ (given) $\therefore \triangle ABD \cong \triangle CBE$ (AAS)
19a	$y = -3x + 13$
19b	$(-4, 25)$
19c	19.0 units
20i	6
20ii	150°
21a	$\angle BAM = \angle CNM$ (alt. $\angle$ s) $\angle BMA = \angle CMN$ (vert. opp. $\angle$ s) $\therefore \triangle ABM$ is similar to $\triangle NCM$
21b	Since $\triangle ABM$ is similar to $\triangle NCM$ $\frac{NC}{AB} = \frac{CM}{MB} = \frac{1}{2}$ Hence $2NC = AB$ (shown)
21ci	4
21cii	$\frac{1}{2}$
22i	<u>First sweet</u> $\left(\frac{7}{15}\right)$ Strawberry $\left(\frac{8}{15}\right)$ Lime <u>Second sweet</u> $\left(\frac{3}{7}\right)$ Strawberry $\left(\frac{4}{7}\right)$ Lime $\left(\frac{1}{2}\right)$ Strawberry $\left(\frac{1}{2}\right)$ Lime
22ii(a)	$\frac{7}{15}$
22ii(b)	$\frac{11}{15}$
23(i)	5 units
23ii	$\overline{AC} = \overline{AO} + \overline{OC}$ $= \begin{pmatrix} -3 \\ -7 \end{pmatrix} + \begin{pmatrix} -3 \\ 15 \end{pmatrix}$ $= \begin{pmatrix} -6 \\ 8 \end{pmatrix}$

	$\overrightarrow{AB} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$ $= \frac{1}{2} \begin{pmatrix} -6 \\ 8 \end{pmatrix}$ $= \frac{1}{2} \overrightarrow{AC}$ Since $\frac{AB}{AC} = \frac{1}{2}$, and A is a common point, A, B, C are collinear. Hence B is the midpoint of AC.
24	Scale: 1 : 10 000 
24a(ii)	$127600 \leq x \text{ m}^2 \leq 141600$
25a	\$207990
25b	I <u>agree</u> with Peter because he would have spent <u>\$37440 more</u> as shown above.
25c	2.79%