higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICS
NQF LEVEL 2
(Second paper)

(10501042)

10 November 2023 (Y-paper)
13:00–16:00

Nonprogrammable scientific calculators and a protractor may be used.

This question paper consists of 8 pages, a formula sheet of 2 pages and 2 answer sheets.

Copyright reserved

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
MATHEMATICS
NQF LEVEL 2
PAPER 2
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Start each question on a new page.
5. Round off answers to THREE decimal places unless stated otherwise.
6. Use only a black or blue pen.
7. Write neatly and legibly.

Copyright reserved

QUESTION 1

1.1 Define each of the following terms used in data handling:

1.1.1 Discrete data

1.1.2 Mean (2 × 2) (4)

1.2 The following marks were obtained by Masonry NCV Level 2 learners at a TVET college:

95	50	97	57	98	59	85	69	70	99
63	86	70	93	65	92	77	74	70	57

1.2.1 Construct a stem-and-leaf diagram for the given data. (5)

1.2.2 Determine the mean of the data. (2)

1.2.3 Determine the median of the data. (2)

1.2.4 Write down the mode of the data. (1)

1.3 The following table shows the number of cool drink bottles sold for 12 days in a shop:

35	14	12	17	22	33
48	32	25	30	29	30



1.3.1 Find the range of the data. (1)

1.3.2 Determine the lower quartile. (2)

1.3.3 Determine the upper quartile. (2)

1.3.4 Determine the interquartile range. (2)

1.3.5 Determine the semi-interquartile range. (1)

1.3.6 Determine the 67th percentile of the data. (3)

Copyright reserved

1.4 The following data shows the different types of car registrations done in a traffic office for a certain day:

BMW	HYUNDAI	TOYOTA	BMW
HYUNDAI	BMW	KIA	KIA
HYUNDAI	NISSAN	BMW	KIA
TOYOTA	BMW	HYUNDAI	BMW
KIA	HYUNDAI	NISSAN	KIA
BMW	NISSAN	HYUNDAI	BMW
HYUNDAI	KIA	KIA	TOYOTA
NISSAN	BMW	NISSAN	KIA
KIA	TOYOTA	TOYOTA	BMW
BMW	BMW	HYUNDAI	NISSAN

1.4.1 Use the data to complete the tally and frequency column of the frequency distribution table on ANSWER SHEET A (attached). (5)

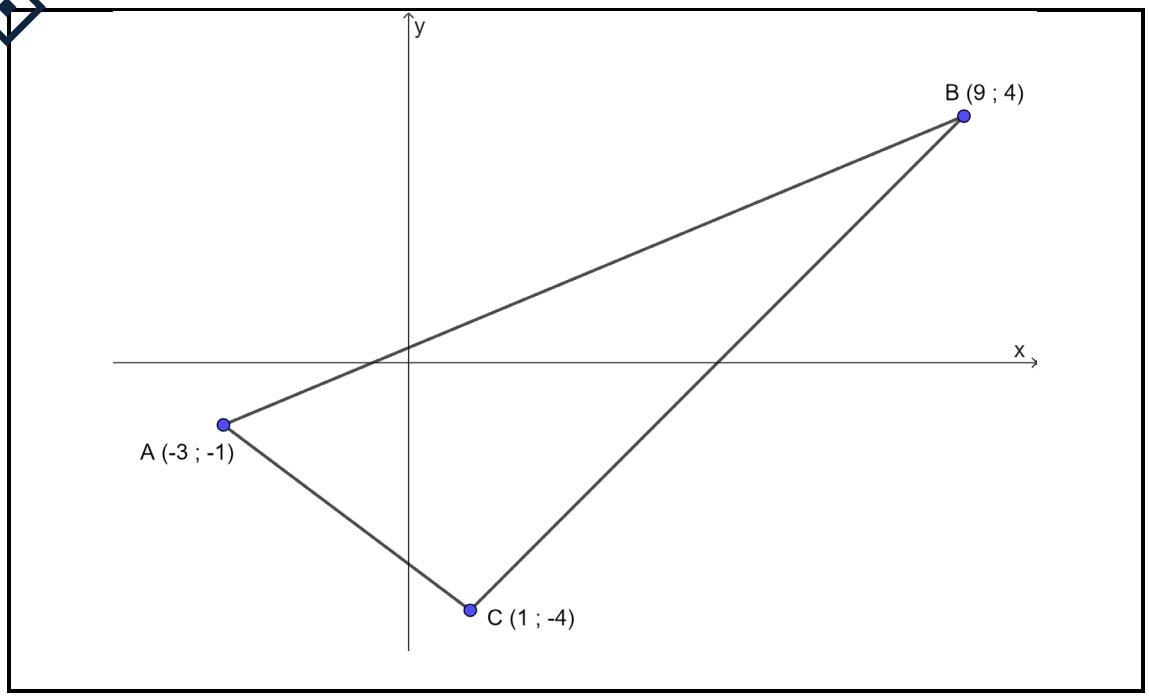
1.4.2 Use the data to draw a bar graph on ANSWER SHEET A (attached). (5)

1.4.3 Use the frequency table to construct a pie chart as degrees on ANSWER SHEET A (attached). Show all calculations. (5)

[40]

QUESTION 2

2.1 The figure below shows ΔABC with vertices A (-3 ; -1) ; B (9 ; 4) and C (1 ; -4).



2.1.1 Calculate the length of the line segment AC in surd form. (3)

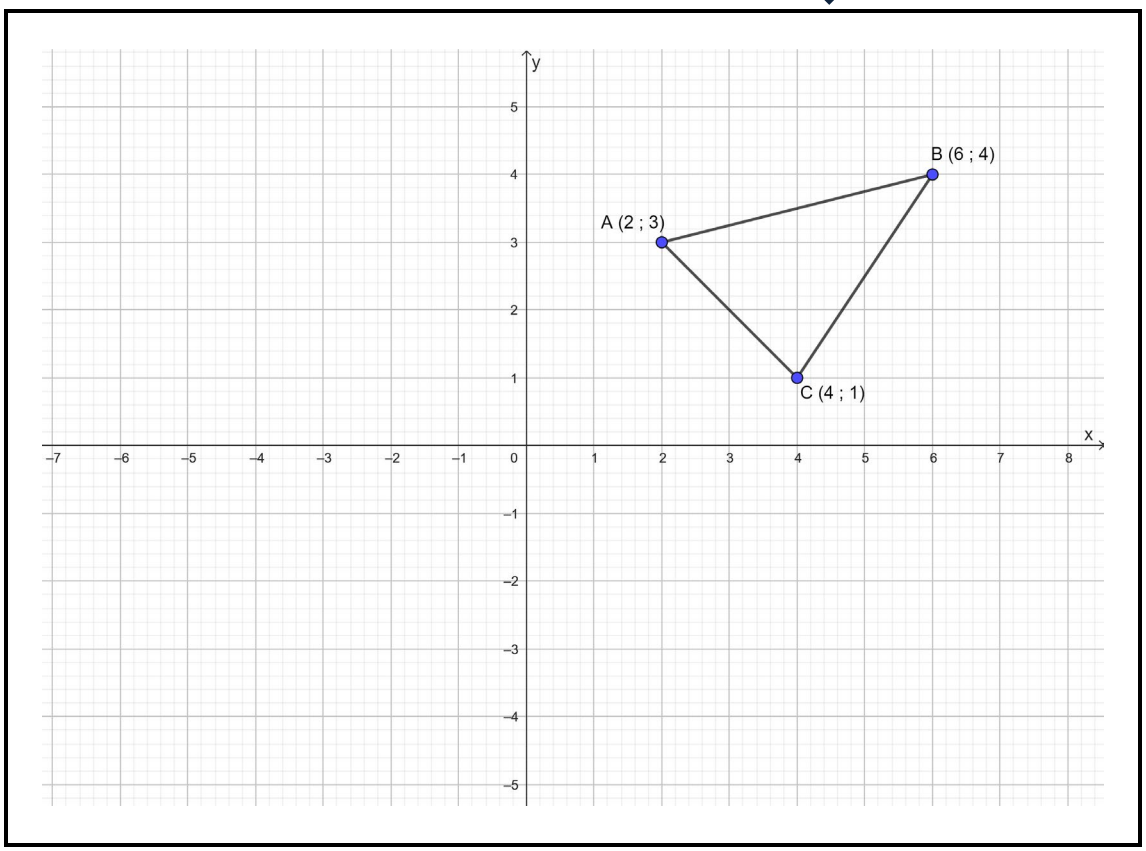
2.1.2 Determine the gradient of line BC. (2)

2.1.3 Prove that the midpoint of line BC lies on the *x*-axis. (4)

2.1.4 Determine the equation of the straight line AB. (4)

Copyright reserved

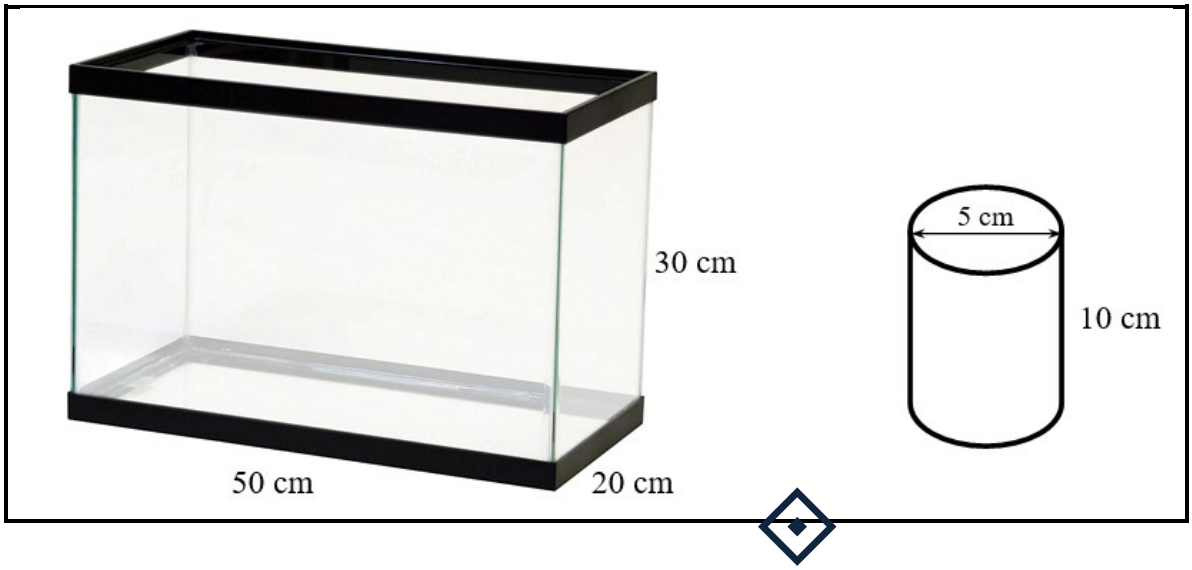
2.2 Given ΔABC with vertices A(2;3), B(6,4) and C(4;1).



2.2.1 Write down the co-ordinates of points A, B and C if the points are translated two units right and three units down. (3)

2.2.2 Determine the co-ordinates of point A if it is reflected about the line $y = -x$. (2)

2.3 The sketch below shows a glass fish tank in the shape of a rectangular prism with a length of 50 cm, a width of 20 cm and a height of 30 cm. The tank is opened at the top and has been filled with water right to the top. Tom has a solid metal cylinder that has a diameter of 5 cm and a height of 10 cm.



2.3.1 Calculate the outside surface area of the fish tank. (4)

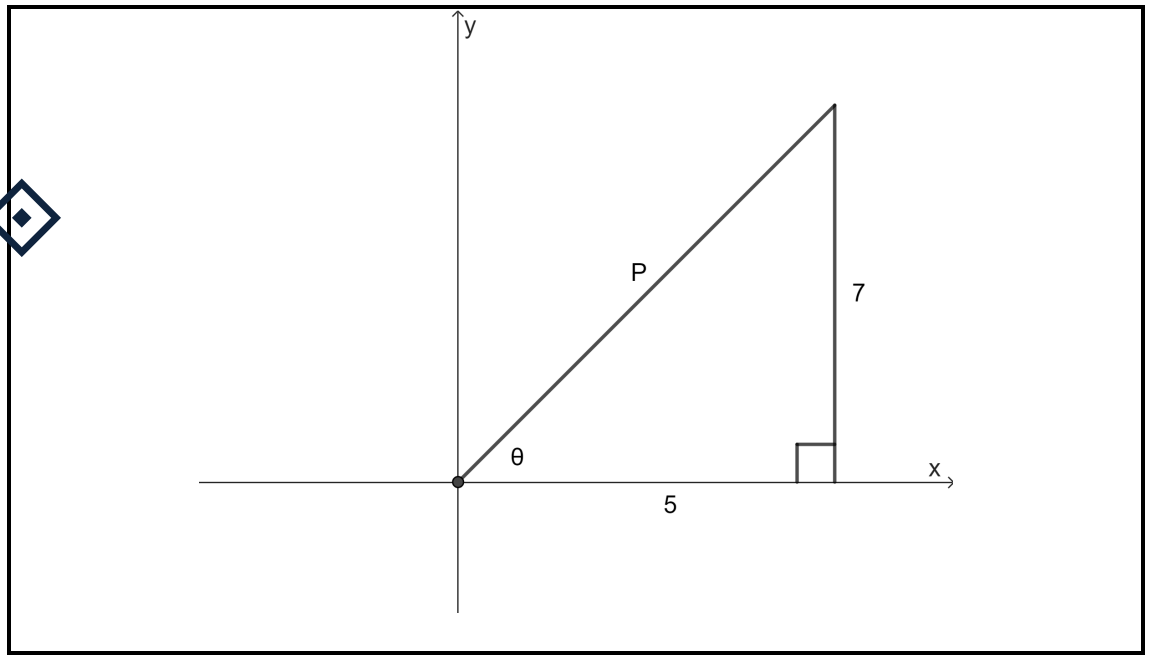
2.3.2 Determine the surface area of the cylinder. (3)

2.3.3 Calculate the volume of water (in cm^3) that will remain in the tank if Tom places the ball into the tank. (5)

[30]

QUESTION 3

3.1 Given $\tan\theta = \frac{7}{5}$ and $0° \leq \theta \leq 90°$.



3.1.1 Calculate the value of P. (3)

3.1.2 Calculate the value of $\frac{\cos\theta}{\sin\theta}$. (4)

3.1.3 Calculate the value of θ. (3)

3.2 3.2.1 Draw the graph of $f(x) = 2\sin x$ and $g(x) = 2\sin x - 1$ on the same system of axes where $0° \leq x \leq 360°$ on ANSWER SHEET B (attached). Complete the table for the values of $f(x)$ and $g(x)$. (6)

3.2.2 What is the amplitude of $f(x)$? (2)

3.2.3 What is the amplitude of $g(x)$? (2)

3.2.4 What is the range and domain of $g(x)$? (2)

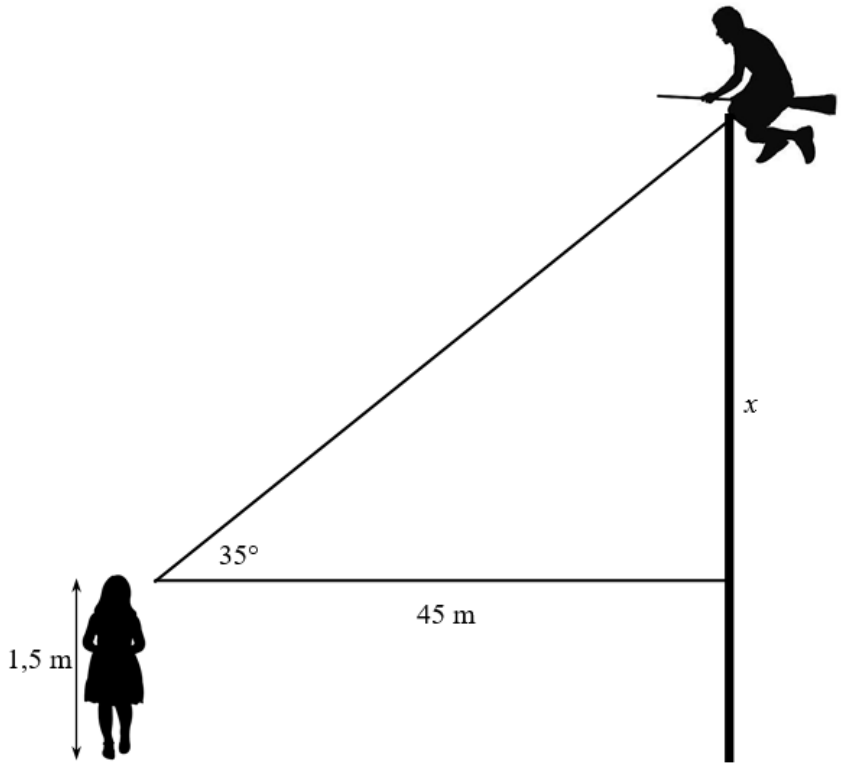
Copyright reserved

3.2.5 What is the period of $f(x) = 2\sin x$? (2)

3.2.6 Is there any point of intersection of the graphs $f(x)$ and $g(x)$. If so, give the point of intersection. (1)

3.3 During a local event at Pogwarts, Lermione, on the ground is looking at Larry who is at the top of the pole. Lermione is 1,5 m tall and the angle of elevation from her line of sight to the top of the pole is 35°. She is standing 45m away from the base of the pole.

Calculate the height of the pole (x).



(5)
[30]

TOTAL: 100

Copyright reserved

FORMULA SHEET

1. $A_{square} = l \times l = l^2$

2. $A_{rectangle} = l \times w$

3. $A_{triangle} = \frac{1}{2} b \times h$

4. $A_{circle} = \pi r^2$

5. $C = 2\pi r$

6. Area of parallelogram = base × perpendicular height

7. $A_{hexagon} = \frac{3\sqrt{3}}{2} L^2$

8. $A_{hexagon} = \frac{\sqrt{3}}{2} W^2$

9. $A_{cylinder} = 2\pi r(h + r)$

10. Volume = area of base × perpendicular height

11. $A_{cylinder} = \pi r^2 h$

12. Total surface area of a triangular prism = (height of prism × perimeter of base) + 2(area of base)

13. $m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

14. $D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

15. $M = \left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2} \right)$

16. $\theta = \tan^{-1} m$

17. $\bar{x} = \sum \frac{f_i x_i}{n}$ **OR** Mean = (total or sum of all items) ÷ (number of items)

Copyright reserved

18. $R = X_n - X_1$ **OR** Range = highest value – lowest value

19. $Q_{jposition} = \frac{j}{4}(n+1)$

20. Interquartile range = upper quartile – lower quartile = $(Q_3 - Q_1)$

21. Semi-interquartile range = $\frac{1}{2}(upperquartile - lowerquartile) = \frac{Q_3 - Q_1}{2}$ k

22. $P_{jposition=\frac{j}{100}}(n+1)$

Copyright reserved

ANSWER SHEET A

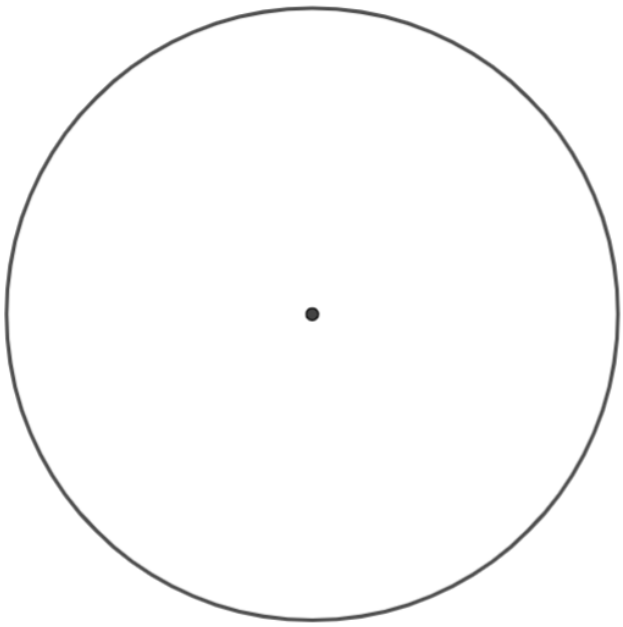
1.4 1.4.1

CARS	TALLY	FREQUENCY

1.4.2



1.4.3

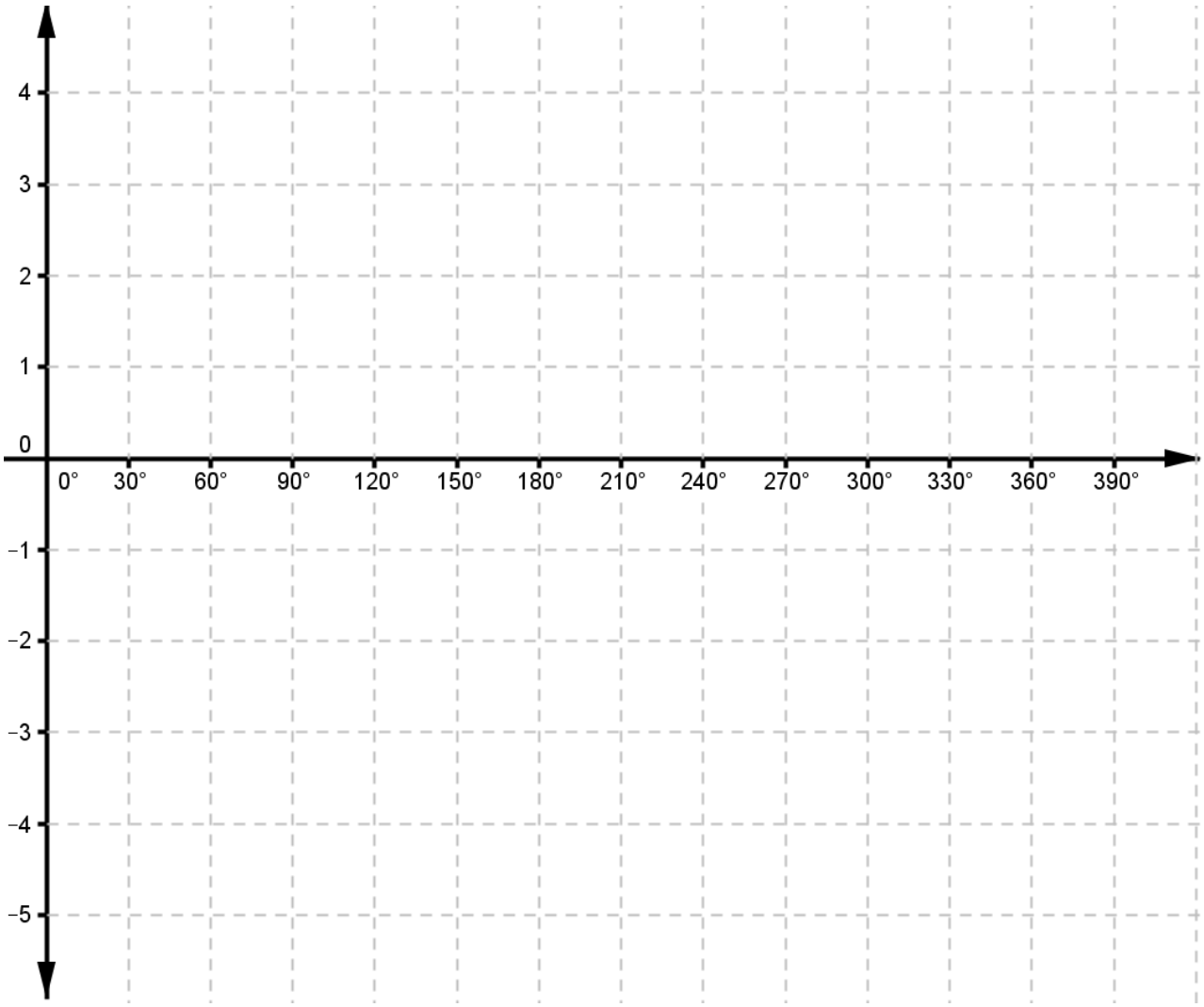


Copyright reserved

ANSWER SHEET B

3.2 3.2.1

x	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$f(x) = 2\sin x$													
$g(x) = 2\sin x - 1$													



Copyright reserved