Monster Questions – Set 3

Question 1

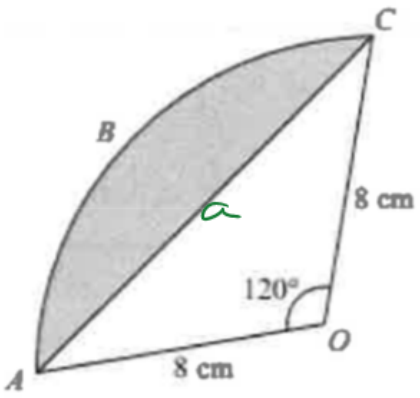


Diagram **NOT** accurately drawn

ABC is an arc of a circle with centre *O* and radius 8 cm.
AC is a chord of the circle.
Angle *AOC* = 120°

Calculate the perimeter of the shaded segment.
Give your answer correct to 3 significant figures.

$a^2 = b^2 + c^2 - 2bc\cos 120$

$a^2 = 8^2 + 8^2 - 2 \times 8 \times 8 \times \cos 120$

$a^2 = 128 - 128\cos 120$

$= 192$

$a = 8\sqrt{3}$

$AC = \frac{\pi d}{3}$

$= \frac{\pi \times 16}{3}$

$P = 8\sqrt{3} + \frac{16\pi}{3}$

$= 30.6$ cm (3 s.f.)

Question 2

When a fair dice is thrown the probability of scoring 6 is $\frac{1}{6}$

Arun throws four fair dice.

Work out the probability that he scores 6 with at least one of the four dice.

$$P = \left(\frac{5}{6}\right)^4$$

$$1 - \left(\frac{5}{6}\right)^4$$

$$= \frac{671}{1296}$$

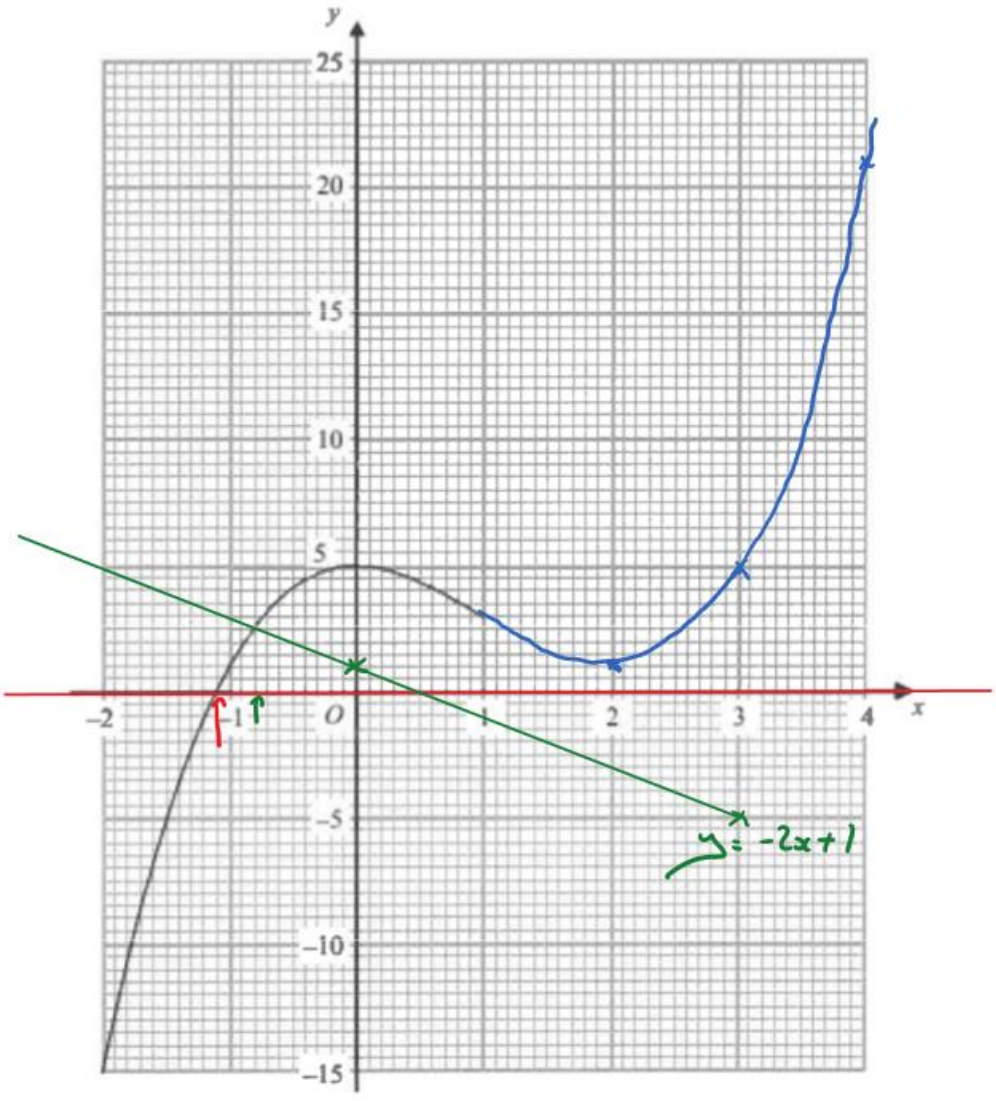
Question 3

(a) Complete the table of values for $y = x^3 - 3x^2 + 5$

x	–2	–1	0	1	2	3	4
y	–15	1	5	3	1	5	21

(1)

(b) On the grid, complete the graph of $y = x^3 - 3x^2 + 5$ for $-2 \leqslant x \leqslant 4$



(c) Use the graph to find an estimate for the solution of the equation $x^3 - 3x^2 + 5 = 0$

$x =$ −1.1

(1)

(d) By drawing a suitable straight line on the grid, find an estimate for the solution of the equation $x^3 - 3x^2 + 2x + 4 = 0$

$x^3 - 3x^2 + 5 = -2x + 1$

$y = -2x + 1$

Question 4

V is inversely proportional to the square of t

$V = 28$ when $t = 2.5$

(a) Express V in terms of t

$$V = \frac{k}{t^2} \Rightarrow$$

$$28 = \frac{k}{2.5^2} \qquad k = 2.5^2 \times 28 = 175$$

$$V = \frac{175}{t^2}$$

$$V = \frac{175}{t^2}$$

(3)

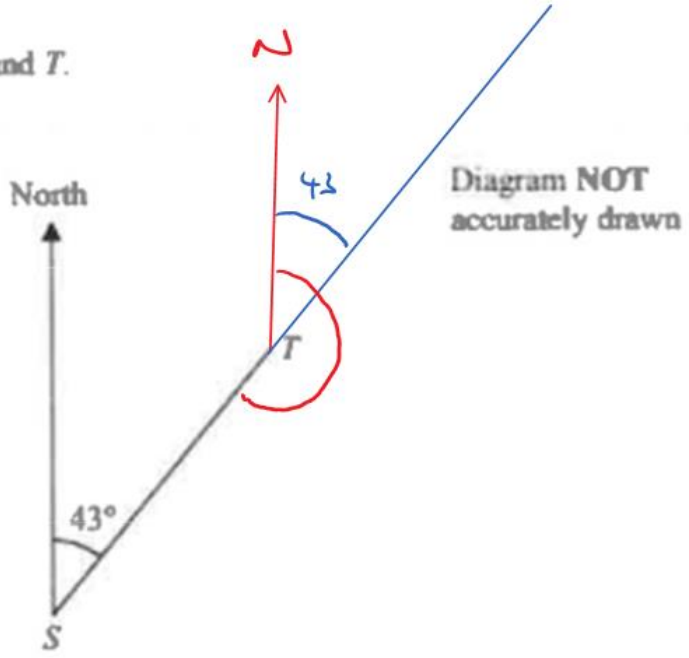
(b) Work out the value of V when $t = 6.25$

$$V = 175 \div t^2$$

$$= 175 \div (6.25)^2 = 4.48$$

Question 5

The diagram shows two points S and T.
The bearing of T from S is 043°



Work out the bearing of S from T.

180 + 43 = 223°