

GCSE (9-1) Mathematics
J560/06 Paper 6 (Higher Tier)

Question Set 1

- 1 (a) A grain of salt weighs 6.48×10^{-5} kg on average.
A packet contains 0.35 kg of salt.

(a) Use this information to calculate the number of grains of salt in the packet.

(a) [2]

- (b) (b) Explain why your answer to part (a) is unlikely to be the actual number of grains of salt in the packet.

.....
.....
..... [1]

2

Sophie is organising a raffle.

- Each raffle ticket costs 50p.
- She sells 400 tickets.
- The probability that a ticket, chosen at random, wins a prize is 0.1.
- Each winning ticket receives a prize worth £3.

Sophie says

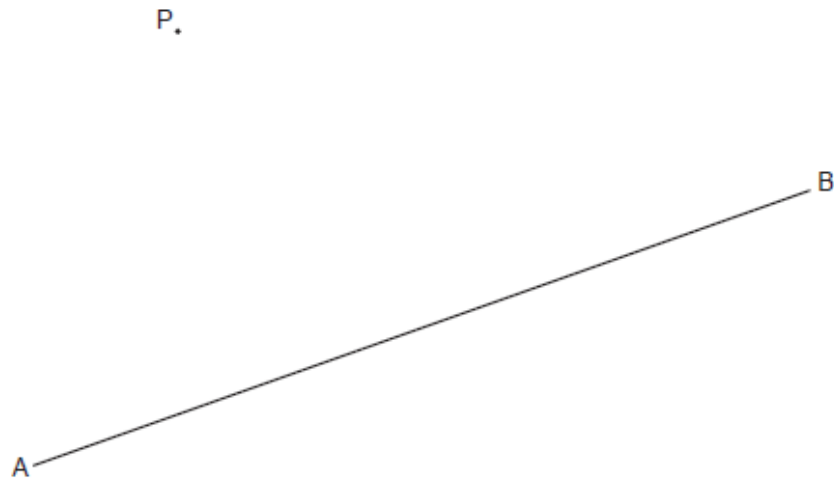
I expect the raffle to make over £100 profit.

Show that Sophie is wrong.

.....
..... [4]

3

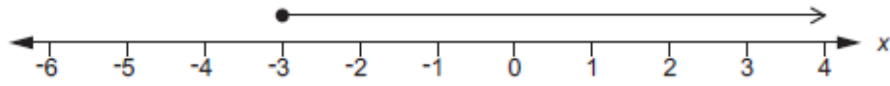
Construct the perpendicular from the point P to the line AB.
Show all of your construction lines.



[2]

4

Martha's solution to the inequality $8x + 5 \leq 3x - 10$ is shown on the number line.



Is her solution correct?
Explain your reasoning.

.....
..... [4]

5

In 2017, the value of a house increased by 4%.
In 2018, the value of the house then decreased by 3%.

Teresa says

Over the two years the value of the house increased by exactly 1% because $4 - 3 = 1$.

Show that Teresa is wrong.

.....

..... [6]

6 (a) Antonio rolls two fair six-sided dice and calculates the **difference** between the scores. For example, if the two scores are 2 and 5 or 5 and 2 then the difference is 3.

(a) Complete the sample space diagram to show the possible outcomes from Antonio's dice.

		Dice 2					
difference		1	2	3	4	5	6
Dice 1	1	0					
	2					3	
	3		1				
	4						
	5		3				
	6						

[2]

(b) Antonio rolls the two dice three times.

Calculate the probability that he gets a difference of 1 on all three rolls. Give your answer as a fraction in its lowest terms.

(b) [4]

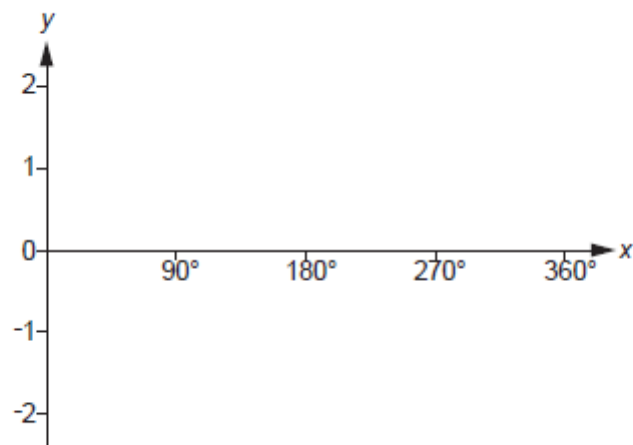
7

Prove that the mean of any four **consecutive** even integers is an integer.

[4]

8

Sketch the graph of $y = -\sin x$ for $0^\circ \leq x \leq 360^\circ$.



[3]

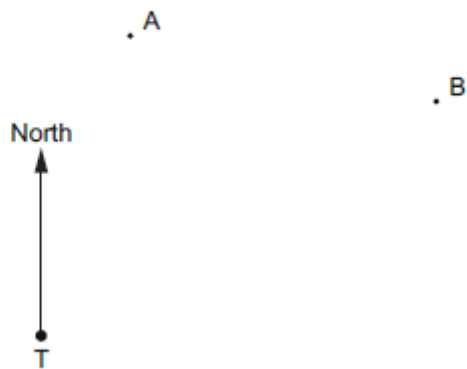
9 (a)

T is a radar tower.
A and B are two aircraft.

At 3pm

- aircraft A is 3250 km from T on a bearing of 015°
- aircraft B is 4960 km from T on a bearing of 057° .

Not to scale



(a) Aircraft A flies directly towards radar tower T at a speed of 890 km/h.

At what time will the aircraft pass over radar tower T?
Give your answer to the nearest minute.

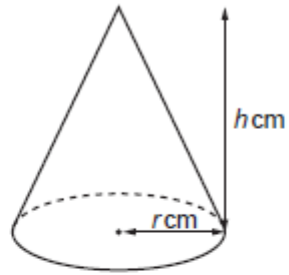
(a) [4]

(b) Calculate the distance that was between aircraft A and aircraft B at 3pm.

(b) km **[4]**

10

A cone has radius r cm and height h cm.



The height is three times the radius.
The volume of the cone is 2100 cm^3 .

Calculate the radius of the cone.

[The volume V of a cone with radius r and height h is $V = \frac{1}{3}\pi r^2 h$.]

..... cm [4]

11 (a) The point $(-5, 2)$ lies on the circumference of a circle, centre $(0, 0)$.

(a) Find the equation of the circle.

(a) [4]

(b) (b) Work out the gradient of the tangent to the circle at $(-5, 2)$.

(b) [2]

Total Marks for Question Set 1: 50

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