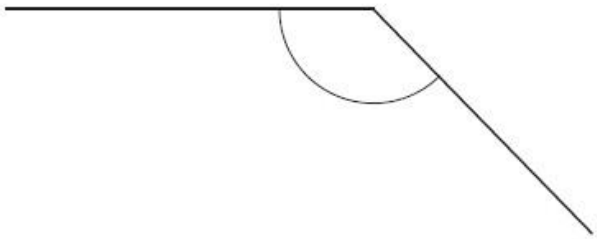
GCSE Mathematics - Paper 3 (Foundation tier)

J560/03 Paper 3 Mathematics (Foundation Tier)

Question Set 1

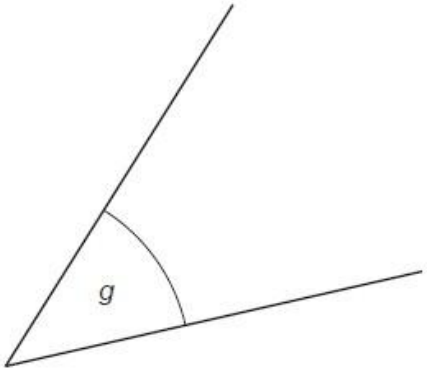
1 (a) Write down the mathematical name of this type of angle.
Choose from the list in the box.

acute	reflex	obtuse	right angle



(a) Obtuse [1]

(b) Measure angle *g*.



use protractor

(b) 45° [1]

2 (a) Write 6 : 14 as a ratio in its simplest form.

HCF = 2

÷2 (6 : 14 → 3 : 7) ÷2

(a) 3 : 7 [1]

(b) The ratio 20 : 50 can be written in the form 1 : n.

Find the value of n.

÷20 (20 : 50 → 1 : 5/2) ÷20

(b) n = 5/2 [2]

3 Work out 20% of 40.

$\frac{20}{100} \times 40 = 8$

8 [2]

4 (a) These are the first five multiples of 15.

15 30 45 60 75

Write down the first five multiples of 30.

(a) 30 , 60 , 90 , 120 , 150 [2]

(b) Write down the lowest common multiple (LCM) of 15 and 30.

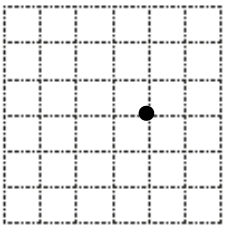
(b) 3 [1]

5 Here are the first three patterns in a sequence.

Pattern 1 Pattern 2 Pattern 3

(a) Draw Pattern 4 in the sequence.

Pattern 4



[1]

(b) Without drawing it, work out how many dots there are in Pattern 8.
Explain how you decide.

64 dots because all numbers in the sequence are square numbers. Just square the pattern number → $8^2 = 64$ → $(n)^2$ **[2]**

(c) Pattern n has 196 dots.

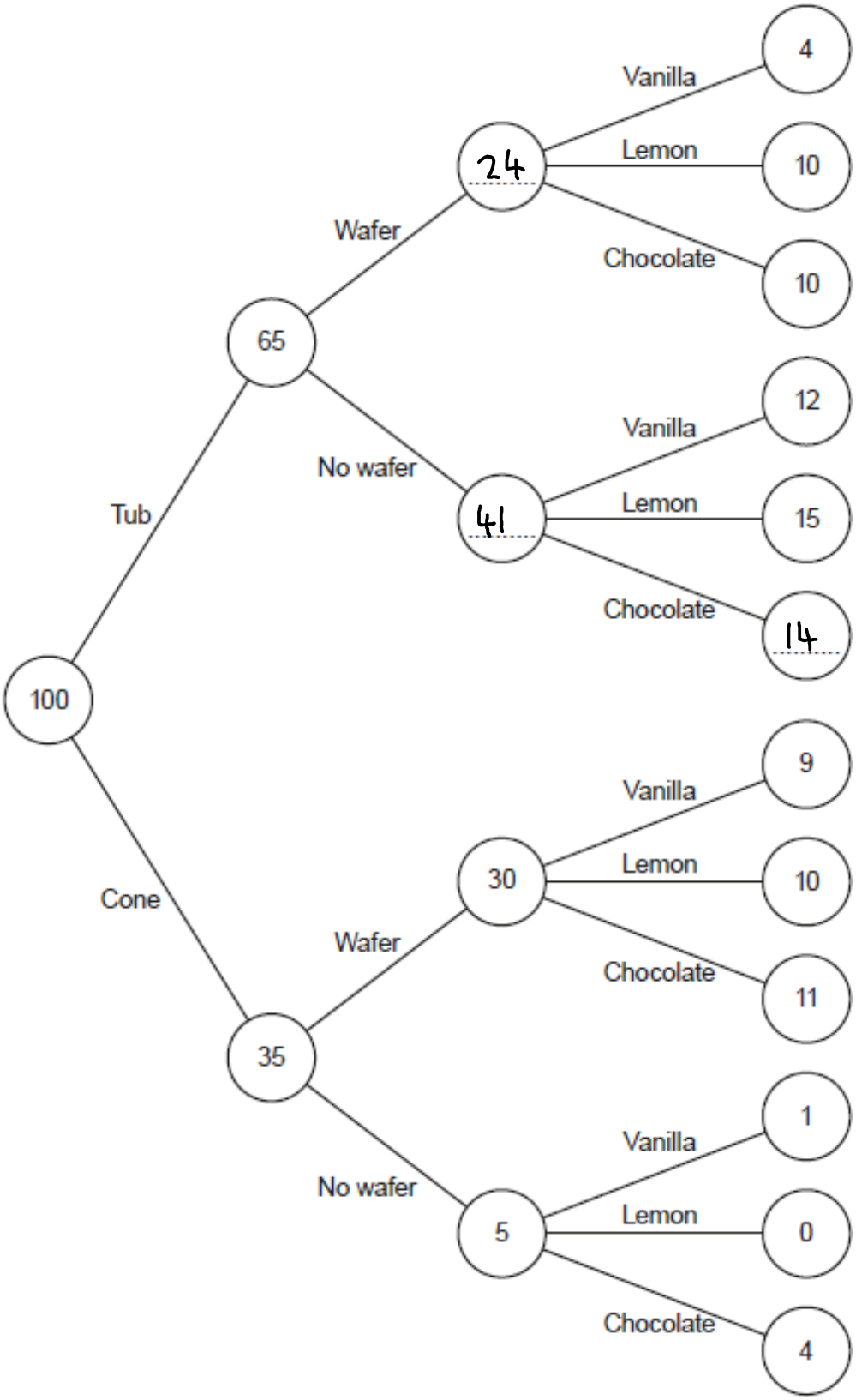
Find the value of n.

$196 = n^2 \rightarrow n = \sqrt{196} = 14$

(c) $n =$ 14 **[1]**

6 Megan's Cafe sells ice cream.
Customers choose to have a tub or a cone, and a wafer or no wafer.
They can choose vanilla, lemon or chocolate ice cream.

This frequency tree shows the number of people making some of the choices.



(a) Anaya buys an ice cream.

One choice she can make is

a cone, no wafer and vanilla.

How many different choices can she make?

$3 \times 4 = 12$

(a) 12 [1]

(b) Complete the frequency tree. [2]

(c) Which flavour of ice cream was most popular?
Show how you decide.

Vanilla $= 4 + 12 + 9 + 1 = 26$

Lemon $= 10 + 15 + 10 + 0 = 35$

Chocolate $= 10 + 14 + 11 + 4 = 39$

(c) Chocolate [3]

7 Joan makes cups of tea and coffee at a lunch club.
Each cup requires 250 ml of boiling water.
She has a kettle that boils up to 1.7 litres of water each time.

She boils 10 litres of water in an urn.
She then uses the kettle to boil the rest of the water she needs.

Find the least number of times that Joan needs to boil the kettle to make 56 cups.
Show how you decide.

56 cups → 250 ml × 56 = 14000 ml = 14 Litres

Urn = 10 Litres so 14 − 10 = 4 Litres left

4 / 1.7 = 2.3529... so she needs 3 kettles full.

3

..... [5]

8 Tom researches the weights of plant seeds.

- One poppy seed weighs 3×10^{-4} grams.
- 250 pumpkin seeds weigh 21 grams.
- One sesame seed weighs 3.64×10^{-6} kilograms.

Write the three types of seed in order according to the weight of one seed.
Write the lightest type of seed first.
You must show how you decide.

Poppy → $3 \times 10^{-4} = \frac{3}{10000} = 0.0003$ grams

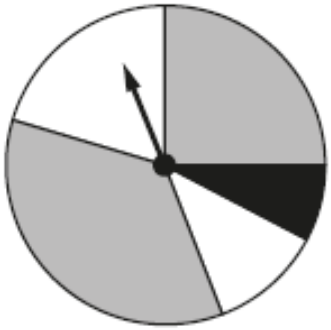
Pumpkin → $\frac{21}{250} = 0.084$ grams

Sesame → $3.64 \times 10^{-6} = \frac{3.64}{1000000} = 0.00000364$ grams

Sesame, Poppy, Pumpkin

Sesame (lightest) , Poppy , Pumpkin [4]

9 **(a)** This spinner has two grey sections, two white sections and one black section.



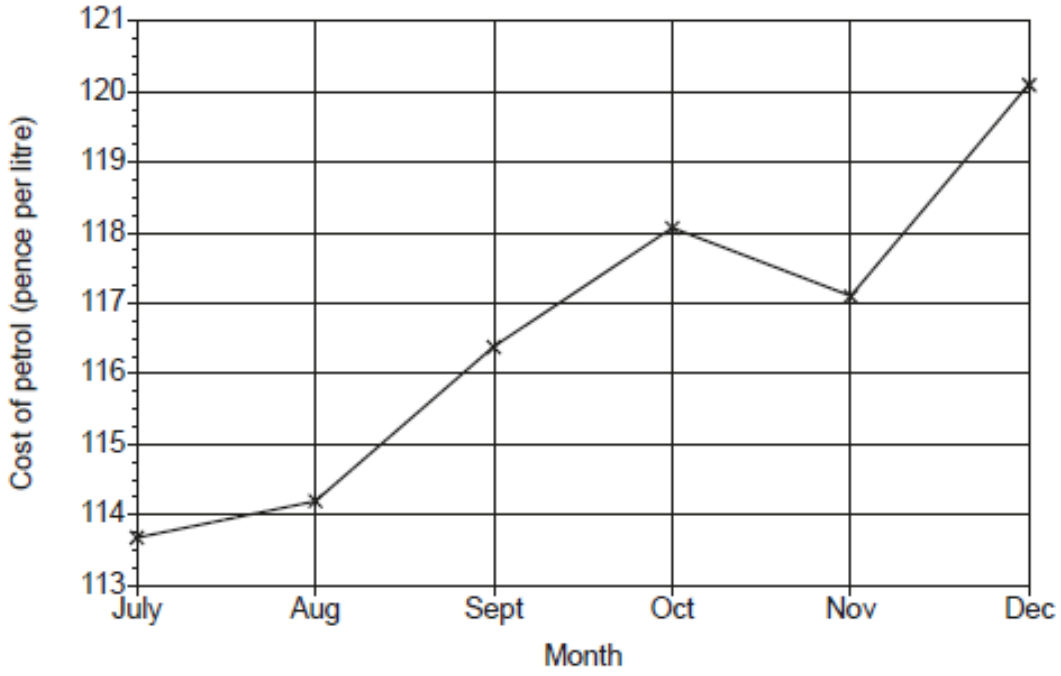
Vlad says

The probability of the spinner landing on black is $\frac{1}{5}$.

Explain why Vlad is not correct.

The parts are not equal so the black part does not equal 1/5 but less than that. [1]

(b) The graph shows the cost of a litre of petrol for the last six months of 2017.



Explain why this graph is misleading.

The graph units are going up in pences but each pence is cut into 4 parts which is not how the currency works. There are no sub-units of parts of a pence. [1]

10 A bag contains some counters.

- There are 300 counters in the bag.
- There are only red, white and blue counters in the bag.
- The probability of picking a blue counter is $\frac{23}{50}$.
- The ratio of red counters to white counters is 2 : 1.

Calculate the number of red counters in the bag.

Blue → $\frac{23}{50} \times 300 = 138$

$300 - 138 = 162$ total white and Red.

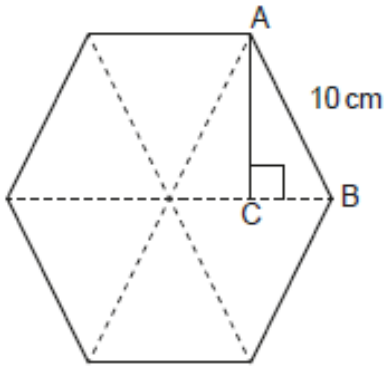
Red : White
2 : 1 → $2 + 1 = 3$ total parts $= 162$ counters

$\frac{162}{3} = 54 = 1$ part

Red : White → Red : White
$2 \times 54 : 1 \times 54$ → 108 : 54

108 ..... [4]

11 The diagram shows a regular hexagon made from six equilateral triangles.
Each side is 10 cm.
The angle ACB is a right angle.



Not to scale

(a) Show that AC = 8.66 cm, correct to 3 significant figures. **[4]**

CB is half of a side so equals $10/2 = 5\text{cm}$

$a^2 + b^2 = c^2$

In this case $\rightarrow (AC)^2 + (CB)^2 = (AB)^2$

$(AC)^2 + (5)^2 = (10)^2$

$(AC)^2 = (10)^2 - (5)^2 = 100 - 25 = 75$

$AC = \sqrt{75} = 5\sqrt{3} = 8.66\text{ cm}$

(b) **(i)** Show that the area of triangle ACB is 21.7 cm^2, correct to 3 significant figures. **[2]**

$1/2 \times \text{width} \times \text{length}$

$1/2 \times 5\sqrt{3} \times 5 = 21.650635\ldots = \frac{25\sqrt{3}}{2}$

$= 21.7\ cm^2$

(ii) Find the area of the hexagon, giving your answer to an appropriate degree of accuracy.

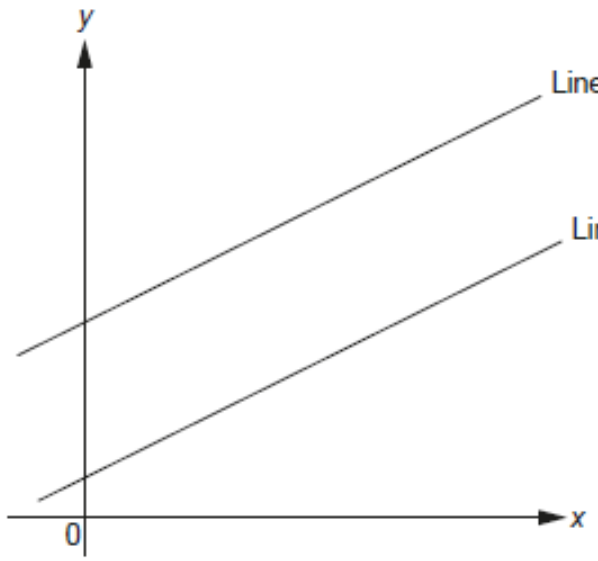
Hexagon is made up of 12 of these triangles.

$12 \times \frac{25\sqrt{3}}{2} = 259.8076211\ cm^2$

$260\ cm^2$ 3 s.f

(ii) ..... 260 ..... cm^2 **[2]**

12 The graph shows two parallel lines, Line A and Line B.



Not to scale

Line A has equation $y = 6x + 7$.
Line B passes through the point (4, 26).

Find the equation of Line B.

parallel so same gradient $= 6x$

$y = 6x + c$ Sub (4,26) in here

$26 = 6(4) + c \rightarrow 26 = 24 + c \rightarrow c = 2$

$y = 6x + 2$

$y = 6x + 2$ **[4]**

13 Solve by factorising.

$x^2 + 3x - 10 = 0$

$x^2 + 3x - 10 = 0$

Find two numbers that multiply for -10

The same two numbers need to add to 3

$-2 \times 5 = -10$ ✓

$-2 + 5 = 3$ ✓

$\rightarrow (x-10)(x+3) = 0$

$x - 10 = 0 \rightarrow x = 10$

$x + 3 = 0 \rightarrow x = -3$

$x =$ 10 or $x =$ -3 [3]

Total Marks for Question Set 1: 50

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