

Jun 23 Paper 3

- 1) $y = 2x + 7$
intersects y-axis at
A.
Coordinates A (0, 7) ✓

2) $1.875 = 1\frac{7}{8}$
 $= \frac{15}{8}$ ✓

3) Solve $5x + 11 = 3x + 19$
 $2x = 8$
 $x = 4$ ✓

4) scale map 1:5000
 $4.5 \text{ cm} \times 5000$
 $= 225 \text{ m.}$ ✓

- 5) Hedgehogs reduce by 4% annually.

$$1000000 \times 0.96^5$$

$$= 815373$$

(Say) 815000 ✓

- 6) volume ratio

 A $A:B$ 1:2

 B surface area A = 6
surface area B = 10

surface area ratio

$$6:10$$

$$\Rightarrow 3:5$$

7) a) $y = x^2 + 2x$

x	-3	-2	-1	0	1
y	3	0	-1	0	3

 ✓

- b) and draw graph

8) £2450 split 2:5

2:5	total
700	1750
	2450

each of 4 brothers receives

$$\frac{1750}{4} = £437.5$$

greater than £430 ✓

- 9) Pie chart of fair attendance

25% Thursday

80% Friday

255% Saturday

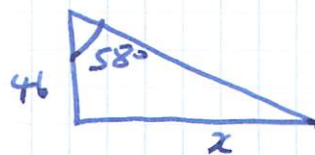
80-25 represents 132 people

55° represents 132 people

255° represents

$$\frac{132 \times 255}{55} = 612 \text{ people}$$
 ✓

- 10)



$$\tan 58^\circ = \frac{x}{46}$$

$$x = 46 \tan 58^\circ$$

$$= 73.6$$
 ✓

11) estimate $\frac{1}{(\sqrt[3]{8.34})^2 \times 10.21}$

round to 1 sig fig.

$$\Rightarrow \frac{1}{\sqrt[3]{8} \times 10}$$

$$\Rightarrow \frac{1}{4.0}$$

$$\Rightarrow 0.025 \checkmark$$

- b) As each number was rounded down final estimate must be greater than true value.

12) Biased Spinner



Carl says relative frequency red is 0.25
True statement.

- b) Relative frequency doesn't change with number of spins

c) spin spinner 125

$$\text{Red occurs } 125 \times 0.32 = 40$$

$$\text{Green occurs } 125 - 40 = 85 \text{ times} \checkmark$$

13) 293 miles to home

$$176 \text{ miles @ } 48 \text{ mph} = \frac{11}{3} \text{ hr.}$$

$$117 \text{ miles @ } 65 \text{ mph} = \frac{9}{5} \text{ hr.}$$

$$\frac{11}{3} + \frac{9}{5} = 5 \text{ hr } 28 \text{ min}$$

Home by 2:30 pm $\checkmark$

14)

Income Tax is 20% above
£12570

National Insurance is

13.25% above £9880

Kiran pays £5186 income tax

$$\frac{5186}{0.2} = £25930$$

$$\text{So salary} = £25930 + \frac{12570}{}$$

$$= £38500$$

$$\text{So N.I. is } (38500 - 9880) \times 13.25\%$$

$$= £3792.15 \checkmark$$

15. 180 runners start marathon.

Histogram blocks are

$$\text{Block ① } 20 \times 0.8 = 16$$

$$\text{② } 20 \times 1.8 = 36$$

$$\text{③ } 40 \times 1.2 = 48$$

$$\text{④ } 40 \times 0.7 = 28$$

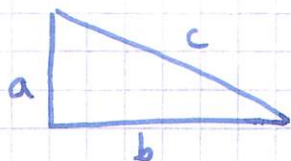
$$\text{⑤ } 60 \times 0.4 = 24$$

$$\underline{152}$$

28 runners didn't complete

b) draw box plot.

16)



$$a = 16 \quad a:c \quad 4:5$$

$$c = 20 \quad \text{so } b^2 = 20^2 - 16^2 = 12$$

$$\text{Area} = \frac{12 \times 16}{2}$$

$$= \underline{96} \quad \checkmark$$

$$17) \quad \frac{x+8}{2} + \frac{9-x}{5} = 4$$

$$\times 10$$

$$\Rightarrow 5(x+8) + 2(9-x) = 40$$

$$5x + 40 + 18 - 2x = 40$$

$$3x + 58 = 40$$

$$x = -6 \quad \checkmark$$

18)

$$f(x) = x^2 + 6x$$

$$g(x) = 2x + 4$$

$$fg(x) = (2x+4)^2$$

$$+ 6(2x+4)$$

$$= 4x^2 + 16x + 16$$

$$+ 12x + 24$$

$$= 4x^2 + 28x + 40 \quad \checkmark$$

b)

$$\text{solve } fg(x) = -5$$

$$4x^2 + 28x + 40 = -5$$

$$4x^2 + 28x + 45 = 0$$

$$(2x+9)(2x+5) = 0$$

$$x = -4.5 \quad \checkmark$$

$$\text{or } x = -2.5 \quad \checkmark$$

19)

$$a - b = 6$$

$$ab + 9$$

show this is a square no.

$$a = b + 6$$

$$(b+6)b + 9$$

$$= b^2 + 6b + 9$$

$$= (b+3)^2$$

so if b is an integer.

then $(b+3)^2$ is a square number.

20 a)

$$\text{Suspected } E = \frac{36}{D}$$

Graph is given.

Select one point

$$\text{when } D = 3 \quad E = 12$$

$$DE = 36$$

so TRUE $\checkmark$

b)

$$G \propto \sqrt{H}$$

$$G:H \text{ is } 3:2$$

$$\text{when } H = 16$$

$$\text{so } G = 24$$

$$G = k\sqrt{H}$$

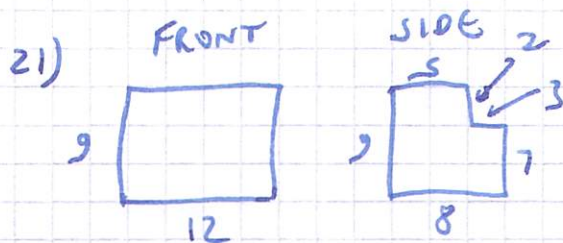
$$24 = k\sqrt{16}$$

$$24 = k \cdot 4 \quad \text{so } k = 6$$

$$\text{at } H = 100 \quad G \text{ is } 60$$

$$G:H \Rightarrow 60:100$$

$$\Rightarrow 3:5 \quad \checkmark$$



Maximum volume

$$= 9 \times 12 \times 8 - 2 \times 3 \times 12$$

$$= 864 - 72$$

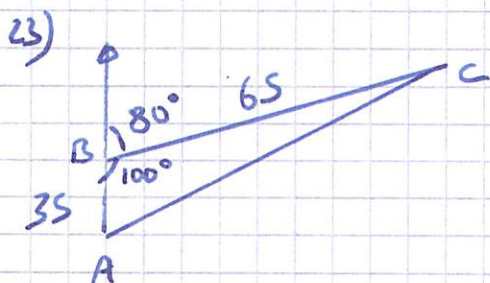
$$= \underline{792}$$

Minimum volume

22) Transformation question

Single transformation

Enlargement $\frac{1}{2}$



$$AC^2 = 35^2 + 65^2 - 2 \cdot 35 \cdot 65 \cos 100^\circ$$

$$AC = 78.954 = 79.0 \text{ km.}$$

b)

$$\frac{79}{\sin 100} = \frac{65}{\sin A}$$

$$\sin A = 65 \sin 100 / 79$$

$$A = 54.1$$

$$\text{Bearing A from C} = 180 + 54.1 = 234^\circ$$