

Nov. 23 Paper 2

1) $5x(x^2 + 3)$
 $= 5x^3 + 15x$ ✓

NB. This is an equivalence
True for any x .

2) a) $1.52 = \frac{152}{100}$
 $= \frac{38}{25}$ ✓

b) $\frac{60}{20} \times 100 = 300\%$ ✓

3) $x^2 = 17.2^2 + 12.9^2$
($= 462.25$)
 $x = 21.5$ ✓

The () stage needn't
be written down. Just
store in your calculator.

4) Bearing C from A is
 $360 - 80 - 50 = 230$ ✓

I don't think you should
even put in the ° symbol
for bearings. Always write
three digits.

5) cost 8 sticks

Shop A: $2.30 \times 8 = \pounds 19.12$

Shop B: $(3.08 + 1.54) \times 4$
 $= \pounds 18.48$

calculator enter $3.08 \times \frac{3}{2} \times 4$

Shop C: $11.40 \times 2 \times \frac{5}{6}$
 $= \pounds 19.00$

Shop B is best value. ✓

6) a) Largest possible no. students
Matching round 2 is

$$\frac{4}{15} \times n < 1$$

$$n = 3$$
 ✓

b) Sean's pie chart angle is

$$\frac{360}{900} \times 180 = 72^\circ$$
 ✓

Angus method is incorrect.

7) Volume prism is

$$(4 \times 6 \times 5) - (3 \times 2 \times 6)$$

 $= 84$ ✓

or $(6 \times 4 \times 2) + (6 \times 3 \times 2)$
 $= 84$ (horizontal split) ✓

or $(6 \times 2 \times 5) + (2 \times 2 \times 6)$
 $= 84$ (vertical split) ✓

8) 1st $45 \text{ mph} \times 3 \text{ hr} = 135 \text{ miles.}$

2nd $31.5 \text{ mph} = \frac{198 - 135}{t}$
 $t = \frac{63}{31.5}$
 $= 2 \text{ hours.}$

Average speed = $\frac{198}{5}$
 total journey
 $= 39.6 \text{ mph.}$

9) Rule double add 3

$a+1 \quad 2a+5 \quad 4a+13$

4th term = $8a+29$

Sum terms = $15a+48$

$= 3(5a+16)$

and therefore multiple of 3.

10) Venn Diagram

Shaded Area is A'

11) $\left(\frac{1}{2}\right)^n = \frac{1}{64}$

$n = 6$ by inspection.

12) Mean Height

$= \frac{30 \times 1.6 + 20 \times 2.05}{(30+20)}$

$= 1.78 \text{ m.}$

13) $x_1 = 3 \quad y_1 = 14$
 $x_2 = 12 \quad y_2 = 32$

$\frac{y-y_1}{y_2-y_1} = \frac{x-x_1}{x_2-x_1}$

$\frac{y-14}{32-14} = \frac{x-3}{12-3}$

$(y-14)9 = (x-3)18$

$9y - 126 = 18x - 54$

$9y = 18x - 54 + 126$

$9y = 18x + 72$

$y = 2x + 8$

check. $2 \times 3 + 8 = 14$ ✓

$2 \times 12 + 8 = 32$ ✓

14. Draw a circle 14km (7cm) from P.

Join P to Q and bisect the line.

Shade the enclosed area.

{ Know how to do all the standard constructions. }

15.

Trial	25	50	75	100
Rel. freq.	0.4	0.36	0.4	0.32
No.	0.4 10	0.36 18	0.4 30	0.32 32

a) $18 - 10 = 8$ times chosen ✓

b) Est. blue disc = 1000×0.32
 $= 320$ ✓

16. $a > 0$ $b < 0$

Only true statement is

$$b^3 < 0$$

e.g. b say -5

$$b^3 \text{ is } -125$$

17. a) People spending more than £20

$$190 - 64 = 126$$

b) Criticism of curve

i) SD plotted incorrectly

ii) frequency should be cumulative frequency

18. $x^2 + 6x + 13$

$$= (x+3)^2 + 4$$

Both terms are always positive.

Therefore expression is positive.

19.

$$A \propto B^4$$

$$A = kB^4$$

$$B \rightarrow 2B$$

$$A' = k(2B)^4$$

$$= k 2^4 B^4$$

$$A' = 16kB^4$$

so Peter is incorrect.

A will be 16x larger.

20.

$$p = \frac{2m+1}{1-m}$$

$$p(1-m) = 2m+1$$

$$p - pm = 2m+1$$

$$2m + pm = 1 - p$$

$$m(2+p) = 1-p$$

$$m = \frac{1-p}{2+p}$$

21.

Max. load to date 1225

Max weight table 145

Max. possible total weight

$$= 1370$$

Therefore the table can be safely loaded.

22)

$$25a^2 - b^2$$

This is difference of two perfect squares.

Know how to recognise these.

$$= (5a+b)(5a-b)$$

23a) Split into 4 trapeziums

Area estimate is

$$10 \left\{ \frac{0+3.2}{2} + \frac{5.8+3.2}{2} + \frac{7.4+5.8}{2} + \frac{7.4+6}{2} \right\}$$

$$= 5(0 + 2 \times 3.2 + 2 \times 5.8 + 2 \times 7.4 + 6)$$

$$= 194 \text{ metres.}$$

b) acceleration = $\frac{6}{40}$

$$= 0.15 \text{ m/sec}^2$$

24) $\frac{(8x^2+4) \times 3x}{5x \times (14x^2+7)}$

$$= \frac{4(2x^2+1) \times 3x}{7(2x^2+1) \times 5x}$$

$$= \frac{12}{35}$$

25) A : B

Length 20 : 25

= 4 : 5

Vol. 64 : 125

Five smaller $\times 17.50 \times \frac{64}{125}$

$$= \pounds 8.96$$

approx. half the price.

26. $A_{n+1} = 1.02 \times A_n - 100$

$$A_0 = 1500$$

$$A_1 = 1.02 \times 1500 - 100$$

$$= 1430$$

$$A_2 = 1.02 \times 1430 - 100$$

$$= \pounds 1358.60$$

27. $g(x) = a \times b^x$

$$g(0) = 8 \text{ so } a = 8$$

$$g(3) = 343$$

$$= 8 \times b^3$$

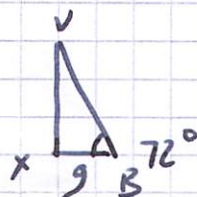
$$b^3 = \frac{343}{8}$$

$$b = \frac{7}{2}$$

$$g(1) = 8 \times \frac{7}{2}$$

$$= 28$$

28)



$$\cos 72 = \frac{9}{17.5}$$

$$17.5 = \frac{9}{\cos 72}$$

$$= 29.1 \text{ cm (3 s.f.)}$$

2). LOGIC

No. 3 letter codes are

$$\# \cdot 5^3 = 125$$

Possible actual codes are

$$\left. \begin{array}{l} LL + Y \\ OO + Y \\ GG + Y \\ II + Y \\ CC + Y \end{array} \right\} 20$$

$$\text{Not possible} = 125 - 20$$

$$= \underline{105} \checkmark$$