CREDIT 2003 – Paper I

1. $5.04 + 8.4 \div 7$
$5.04 + 1.2$
6.24

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2. $\frac{2}{7}\left(1\frac{3}{4}+\frac{3}{8}\right) \Rightarrow \frac{2}{7}\left(\frac{7}{4}+\frac{3}{8}\right) \Rightarrow \frac{2}{7}\left(\frac{14}{8}+\frac{3}{8}\right)$

$\Rightarrow \frac{\cancel{2}^{1}}{7} \times \frac{17}{\cancel{8}^{4}} \Rightarrow \frac{17}{28}$

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3. $3(2x-4)-4(3x+1)$
$\rightarrow 6x-12-12x-4$
$\rightarrow \quad -6x-16$

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4. a) $f(x) = 7-4x$
$\rightarrow f(-2) = 7-4(-2)$
$\rightarrow \quad 7+8 \quad \rightarrow \quad 15$

b) $f(t) = 7-4t$

Since $f(t) = 9 \quad \rightarrow \quad 9 = 7-4t$

$4t = -2 \rightarrow t = -\frac{1}{2}$

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5. $2x^2 - 7x - 15 \quad \rightarrow \quad (2x+3)(x-5)$

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6. a) $m = \frac{rise}{run} = \frac{3-(-7)}{4-(-1)} = \frac{10}{5} = 2$

b) $y = mx + c$, so $y = 2x - 5$ (since c = –5)

c) $(3k, k)$ must satisfy the equation

$k = 2(3k) - 5 \quad k = 6k - 5 \quad k = 1$

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7. Let cost of 1 night = £ n, breakfast = £ b

a) $3n + 2b = 145$ …… (1)
b) $5n + 3b = 240$ ……(2)

multiply (1) x 5 and (2) by 3
to eliminate n, leaving b

$15n + 10b = 725$ … (3)
$15n + 9b = 720$ … (4)

Subtract: (3) – (4) $\Rightarrow \quad b = 5$

Hence cost of one breakfast = £5

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8. 40 balls altogether

a) P(6) = $\frac{4}{40} \rightarrow \frac{1}{10}$

b) P(yellow 6) = $\frac{1}{40}$

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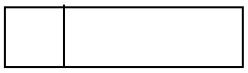
9. Each line in the box represents a quartile.



LQ Median UQ

Lower quartile is 25%

So 25% of matchboxes contain less than 50 matches

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10. i) Parents : Teacher : Pupils
1 : 3 : 15

hence for 45 pupils

3 : 9 : 45

9 teachers must accompany them

ii) Each group contains 15 + 3 + 1 = 19 persons

so 5 groups can go (5 x 19 = 95)

Hence (5 × 15 = 75) So, 75 pupils can go.

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11. i) $S_3 = 1 + 3 + 5 = 9$

ii) also $S_4 = 16$ and $S_5 = 25$

So, $S_n = n^2$

iii) the $(n + 1)^{th}$ term is the term that is added onto S_n to get S_{n+1}

Hence this term is $S_{n+1} - S_n$

$= (n + 1)^2 - n^2$

$= \quad n^2 + 2n + 1 - n^2 \quad = \quad 2n + 1$

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12. i) $8^{\frac{2}{3}} = \left(\sqrt[3]{8}\right)^2 = 2^2 = 4$

ii) $\frac{\sqrt{24}}{\sqrt{2}} = \sqrt{\frac{24}{2}} = \sqrt{12} = \sqrt{4\times 3} = \sqrt{4}\sqrt{3} = 2\sqrt{3}$

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13. Let TD = h Length DB = $3x - x = 2x$

Area of triangular pocket = ½ base x height

Area triangle = ½ × $2x$ × $h \quad \rightarrow \quad x\,h$

Area of clipboard = $3x \times 4x = 12x^2$

Area triangle = ¼ area clipboard

So, $x\,h = 3x^2$ Hence: $h = 3x$

END OF QUESTION PAPER (*Rev. March 2007)*

CREDIT - 2003 Paper II

1. $5000 \times 1.006^3 = 5090.54\ldots$

   $= 5090$ (3 sig figs)

2.

	x	$x-\bar{x}$	$(x-\bar{x})^2$
	49	3	9
	44	-2	4
	41	-5	25
	52	6	36
	47	1	1
	43	-3	9
TOTAL	276		84

a) Mean = $\frac{\sum x}{n} = \frac{276}{6} = 46$

b) S.D. = $\sqrt{\frac{84}{5}} = \sqrt{16.8} = 4.09.... = 4.1$

c) The price of the milk is more variable.
The price of the sugar is more consistent.

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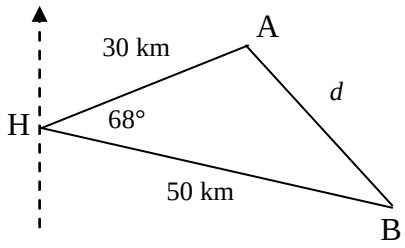
3. Draw a diagram, and mark in given bearings

which show that ∠AHB = 68° (140° - 72°)



Look at diagram - SAS - Cosine Rule

$d^2 = 30^2 + 50^2 - 2 \times 30 \times 50 \times \cos 68°$

d^2 = 3400 – 1123.819… = 2276.181…

d = 47.70933…..

yachts are 47.7 km apart when they stopped.

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4. a) Vol = $\pi r^2 h = \pi \times 5^2 \times 14 = 1099.557\ldots$

$= 1100$ cm^3 (3 sig figs) *[note: d = 10 so r = 5]*

b) $600 = \pi r^2 h$ $\quad 600 = \pi\, 5^2 \times h$

$h = \frac{600}{25\pi}$ $\quad h = 7.639\ldots$

depth of coffee = 7.6 cm (1 d.p.)

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5. Using a formula

$$d = \frac{n(n-3)}{2} \rightarrow 20 = \frac{n(n-3)}{2}$$

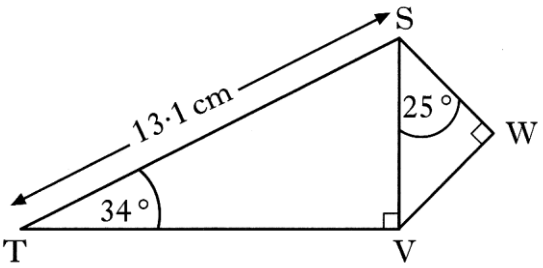
$$\rightarrow 40 = n(n-3) \rightarrow 40 = n^2 - 3n$$

$$\rightarrow n^2 - 3n - 40 = 0 \rightarrow (n+5)(n-8) = 0$$

So $n = -5$, or 8

Polygon has 8 sides (–5 is not possible – discard)

6.



Use SOH-CAH-TOA (twice)

Find SV and then SW

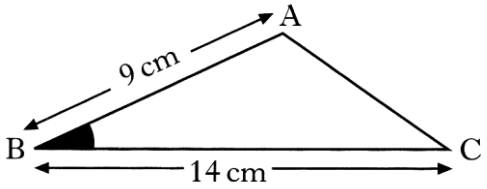
In ΔSTV $\frac{SV}{13.1} = \sin 34 \rightarrow SV = 13.1 \sin 34$

SV = 7.3254…. centimetres

In ΔSWV $\frac{SW}{SV} = \cos 25 \rightarrow SW = 7.33 \cos 25$

SW = 6.643… = 6.6 centimetres (1 d.p.)

7.



Area of triangle = $= \frac{1}{2} ab \sin C$

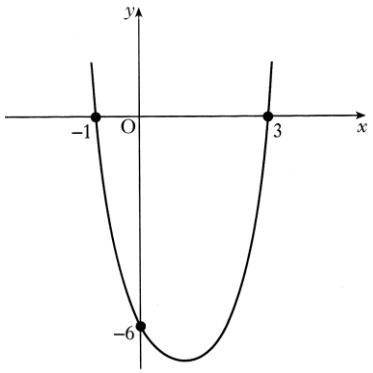
Transpose letters.

38 = ½ × 9 × 14 × sin B $\quad$ 38 = 63 sin B

Re-arrange: $\sin B = \frac{38}{63}$ $\quad$ B = sin^{-1} (38 ÷ 63)

Hence B = 37.096…. $\quad$ B = 37°

8.



$$y = k(x-a)(x-b)$$

a) a and b are where the graph cuts the x-axis.

$a = -1$ and $b = 3$

b) Put these values in equation

$y = k\big(x-(-1)\big)(x-3) \quad y = k(x+1)(x-3)$

Now choose a point on the curve

Do **NOT** choose on the x-axis since $y = 0$, this will not be of much use to you.

Choose point $(0, -6)$
This point lies on the curve,
so it satisfies equation of the curve.

$-6 = k(0+1)(0-3) \rightarrow -6 = -3k$

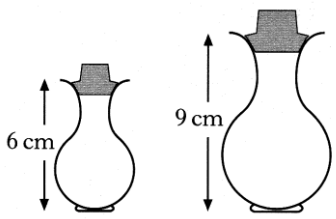
So $k = 2$

c) min. turning point lies on axis of symmetry mid way between roots. $x = 1$

when $x = 1$, $y = 2(1 + 1)(1 – 3)$ $y = –8$

co-ords of min t.p. are $(1, –8)$

9.

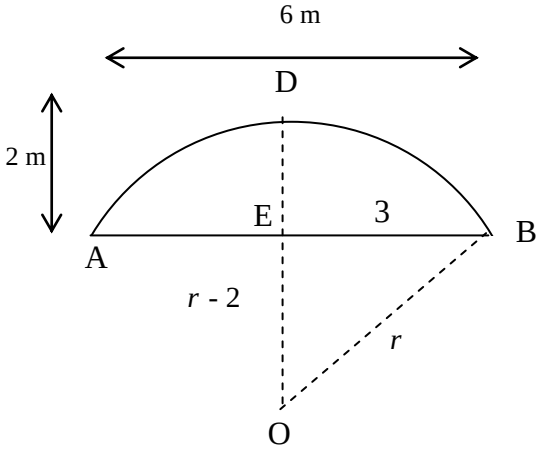


Linear Scale factor = $\frac{9}{6} \rightarrow \frac{3}{2}$

Scale factor for volume must be cubed.

Vol of perfume = $30 \times \frac{3}{2} \times \frac{3}{2} \times \frac{3}{2} = 101.25$ *mls*

10.



Let OB (radius) = r

EB = 3 metres *(symmetry – half width of shelter)*

OD = r metres *(also the radius)*

Hence, OE = $r – 2$ metres

By Pythagoras, $r^2 = (r-2)^2 + 3^2$

$r^2 = (r-2)(r-2) + 9$

$r^2 = r^2 - 4r + 4 + 9$

$4r = 13$

$r = 3.25$ metres

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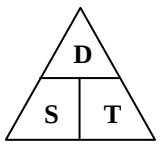
11. This question was disallowed in the examination because of the inconsistency of units – kph and miles.

However the following solution is offered, making the assumption that units are miles and mph.

a) Time =

Distance ÷ Speed $= \frac{x}{75}$



b) Average Speed = Total Distance ÷ Total Time

Average Speed = $2x \div \left(\frac{x}{75} + \frac{x}{50}\right)$

Total Distance; Total Time taken

Average Speed = $2x \div \left(\frac{2x}{150} + \frac{3x}{150}\right)$

$\rightarrow \quad 2x \div \left(\frac{5x}{150}\right) \rightarrow 2\cancel{x} \times \frac{\cancel{150}^{30}}{\cancel{5}^{1}\cancel{x}}$

= 60 mph.

END OF QUESTION PAPER (*Rev. March 2007)*