

1.  $\frac{1}{2} \begin{pmatrix} 4 \\ -6 \end{pmatrix} + \begin{pmatrix} -5 \\ -1 \end{pmatrix}$   
 $= \begin{pmatrix} 2 \\ -3 \end{pmatrix} + \begin{pmatrix} -5 \\ -1 \end{pmatrix}$   
 $= \underline{\underline{\begin{pmatrix} -3 \\ -4 \end{pmatrix}}}$

2.  $\frac{3}{4} \left( \frac{1}{3} + \frac{2}{7} \right)$   
 $\frac{3}{4} \left( \frac{7}{21} + \frac{6}{21} \right)$   
 $\frac{3}{4} \left( \frac{13}{21} \right)$   
 $= \frac{39}{84}$   
 $= \underline{\underline{\frac{13}{28}}}$

3. A.O.S =  $\frac{45}{360} \times \pi \times 20^2$   
 $= \frac{1}{8} \times \pi \times 400$   $\left\{ \begin{array}{l} \frac{1}{8} \text{ of } 400 \\ = 50 \end{array} \right.$   
 $= 50 \times 3.14$   
 $= \underline{\underline{157 \text{ cm}^2}}$

4.a)  $2c + 3d = 9.6$

b)  $3c + 4d = 13.3$

c)  $2c + 3d = 9.6 \quad (\times 3)$   
 $3c + 4d = 13.3 \quad (\times 2)$   
 $\begin{array}{r} 6c + 9d = 28.8 \\ - 6c + 8d = 26.6 \\ \hline d = 2.2 \end{array}$

Sub  $d = 2.2$  into  
 $2c + 3d = 9.6$   
 $2c + 3(2.2) = 9.6$   
 $2c + 6.6 = 9.6$   
 $2c = 3$   
 $c = \frac{3}{2} \text{ or } 1.5$

dress = 2.2 m<sup>2</sup>      cloak = 1.5 m<sup>2</sup>  
 $D = (3, 100)$   
 $E = (15, 340)$

5a)  $m = \frac{y_E - y_D}{x_E - x_D}$   
 $= \frac{340 - 100}{15 - 3}$   
 $= \frac{240}{12}$   
 $= \underline{\underline{20}}$

$x$ : Age (A)  
 $y$ : weight (W)

at (3, 100)  
 $y - b = m(x - a)$   
 $y - 100 = 20(x - 3)$   
 $y - 100 = 20x - 60$   
 $y = 20x + 40$   
 $\therefore \underline{\underline{W = 20A + 40}}$

b) 1 year = 12 months  
 $W = 20(12) + 40$   
 $= 240 + 40$   
 $= \underline{\underline{280 \text{ kg}}}$

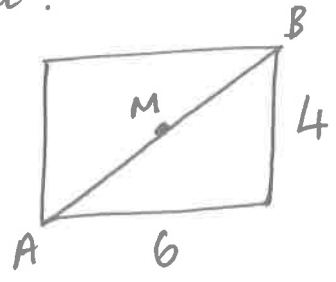
6.  $b^2 - 4ac$        $a = 7$   
 $25 - 4(7)(-1)$        $b = 5$   
 $25 - (-28)$        $c = -1$   
 $25 + 28$        $b^2 - 4ac > 0$   
 $= 53$        $\therefore$  2 real distinct roots.

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(2016)

7a) (8, 4, 0)

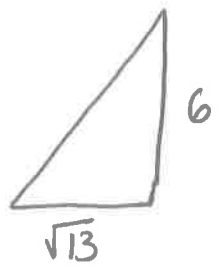
b) Face diagonal!

$$\begin{aligned}
 AB &= \sqrt{6^2 + 4^2} \\
 &= \sqrt{36 + 16} \\
 &= \sqrt{52} \\
 &= \sqrt{4 \times 13} \\
 &= 2\sqrt{13} \Rightarrow AM = \sqrt{13} \text{ (half of diagonal)}
 \end{aligned}$$



~~AV~~

$$\begin{aligned}
 AV &= \sqrt{(\sqrt{13})^2 + 6^2} \\
 &= \sqrt{13 + 36} \\
 &= \sqrt{49} \\
 &= \underline{\underline{7}}
 \end{aligned}$$



8.  $\frac{2x}{3} - \frac{5}{6} = 2x$  (multiply by 6)

$$\frac{6 \times 2x}{3} - \frac{6 \times 5}{6} = 6 \times 2x$$

$$\frac{12x}{3} - \frac{30}{6} = 12x \text{ (simplify)}$$

$$\begin{array}{r}
 4x - 5 = 12x \\
 +5 \qquad +5
 \end{array}$$

$$\begin{array}{r}
 4x = 12x + 5 \\
 -12x \quad -12x
 \end{array}$$

$$-8x = 5$$

$$x = \underline{\underline{\frac{-5}{8}}}$$

9.  $f(x) = \frac{2}{\sqrt{x}}$

$$f(5) = \frac{2}{\sqrt{5}}$$

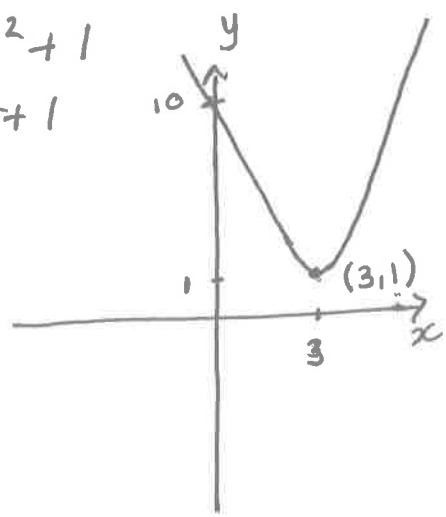
$$\frac{2}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \underline{\underline{\frac{2\sqrt{5}}{5}}}$$

10.

TP at (3, 1)

on y axis,  $x = 0$

$$\begin{aligned}
 \therefore y &= (0 - 3)^2 + 1 \\
 y &= (-3)^2 + 1 \\
 y &= 9 + 1 \\
 y &= 10
 \end{aligned}$$



11. as  $\tan^2 x = \frac{\sin^2 x}{\cos^2 x}$

$$\tan^2 x \cos^2 x$$

$$= \frac{\sin^2 x}{\cos^2 x} \times \frac{\cos^2 x}{1}$$

$$= \frac{\sin^2 x \cancel{\cos^2 x}}{\cancel{\cos^2 x}}$$

$$= \underline{\underline{\sin^2 x}}$$

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12a)  $A_r = L \times b$   
 $= (2x+1)(x+8)$   
 $= 2x^2 + 16x + 2x + 8$   
 $= \underline{\underline{2x^2 + 17x + 8}}$

b)  $A_t = \frac{1}{2}(b \times h)$   
 $= \frac{1}{2} \times 2(x+5) \times 3x$   
 $= (x+5) \times 3x$   
 $= 3x^2 + 15x$

as  $A_t = A_r$

$3x^2 + 15x = 2x^2 + 17x + 8$   
 $-2x^2 \quad -2x^2$

$x^2 + 15x = 17x + 8$   
 $-17x \quad -17x$

$x^2 - 2x = 8$

$\therefore \underline{\underline{x^2 - 2x - 8 = 0}}$

c) Solve for  $x$ :

$x^2 - 2x - 8 = 0$

$(x-4)(x+2) = 0$

$x = 4$  or  ~~$x = -2$~~

As height of triangle cannot be negative ( $3x-2 = -6$ ) disregard  ~~$-2$~~ .

length =  $4+8 = 12$  cm  
 breadth =  $2(4)+1 = 9$  cm.

N5 2016 Paper 2

1.  $100 - 8 = 92\% \Rightarrow 0.92$

$35 \times 0.92^3$

$= 27.254 \dots$

$= \underline{\underline{27 \text{ grams}}}$

2.  $12 \div (1.5 \times 10^9) = \underline{\underline{8 \times 10^{-9} \text{ g}}}$

3.  $\vec{B\bar{D}} = \underline{v} - \underline{u}$

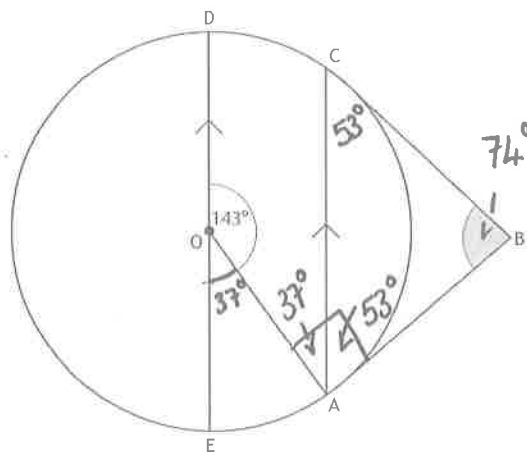
4.  $3x^2 - 48$

$3(x^2 - 16)$

$\underline{\underline{3(x-4)(x+4)}}$

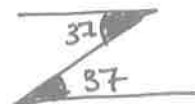
HCF  $\checkmark$   
 2 Sq  $\checkmark$   
 tri

5.



$\angle AOE: 180 - 143 = 37^\circ$

$\angle OAC$ : Z shape in parallel lines



$\angle CAB: 90 - 37^\circ = 53^\circ$

$\angle ACB = \angle CAB = 53^\circ$

$\angle ABC = 180 - 53 - 53 = \underline{\underline{74^\circ}}$

6a  $\bar{x} = (13+16+10+22+5+12) \div 6$

$\bar{x} = 13 \text{ mins}$

$x$	$x - \bar{x}$	$(x - \bar{x})^2$
13	0	0
16	3	9
10	-3	9
22	9	81
5	-8	64
12	-1	1

$\Sigma(x - \bar{x})^2 = 164$

$s = \sqrt{\frac{164}{5}}$

$= 5.727 \dots$

$= 5.7 \text{ mins.}$

b). On average, Sophie waits longer.

- Sophies waiting times were more consistent.

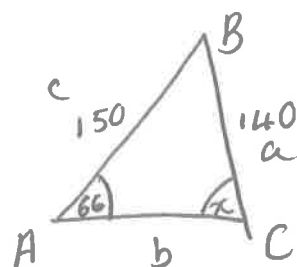
7.  $V_{\text{large}} = \frac{1}{3} \pi (16^2) \times 24$   
 $= 6433.98 \dots$

$V_{\text{small}} = \frac{1}{3} \pi (9^2) \times 13.5$   
 $= 1145.11 \dots$

$V_{\text{large}} - V_{\text{small}} = 5288.87$

$V = 5300 \text{ cm}^3$

8.



$\frac{a}{\sin A} = \frac{c}{\sin C}$

$\frac{140}{\sin 66} \neq \frac{150}{\sin x}$

$140 \sin x = 150 \sin 66$

$\sin x = \frac{150 \sin 66}{140}$

$= 0.978 \dots$

$x = \sin^{-1}(0.978 \dots)$

$x = 78.2^\circ$

9.  $x^2 + 8x - 7 = (x+4)^2 + b$

$(4^2 = 16)$

$16 - (-7) = 23$

$\therefore (x+4)^2 - 23$

10.  $(n^2)^3 \times n^{-10}$

$= n^6 \times n^{-10}$

$= n^{(6-10)}$

$= n^{-4}$

$= \frac{1}{n^4}$

N5 Paper 2 2016 ctd

11. SF - reduction  $\frac{60}{100}$

~~area~~

- area  $(\frac{60}{100})^2$

$(\frac{60}{100})^2 \times 13.75$

= £4.95

12.  $L = \sqrt{4kt - p}$

$L^2 = 4kt - p$

$L^2 + p = 4kt$

$\frac{L^2 + p}{4t} = k$

$\left. \begin{aligned} 4kt &= \\ 4t \times k & \end{aligned} \right\}$

13.  $\frac{3}{x-2} + \frac{5}{x+1}$

$\frac{3(x+1)}{(x-2)(x+1)} + \frac{5(x-2)}{(x-2)(x+1)}$

$\frac{3x+3}{(x-2)(x+1)} + \frac{5x-10}{(x-2)(x+1)}$

$\frac{3x+3+5x-10}{(x-2)(x+1)}$

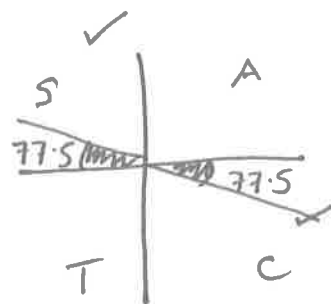
$\frac{8x-7}{(x-2)(x+1)}$

14.

$2 \tan x^\circ + 5 = -4$

$2 \tan x = -9$

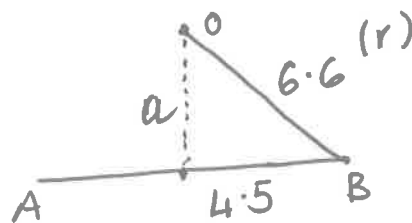
$\tan x = \frac{-9}{2}$



$\tan^{-1}(9 \div 2) = 77.47 \dots$   
 $= 77.5$

$x = 180 - 77.5, 360 - 77.5$   
 $= 102.5^\circ, 282.5^\circ$

15.

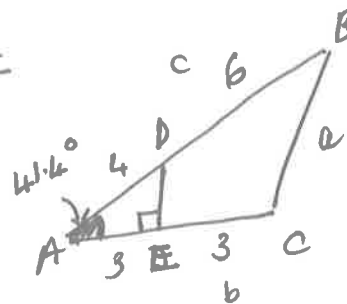


$a^2 = 6.6^2 - 4.5^2$

$a = \sqrt{6.6^2 - 4.5^2}$   
 $= 4.8 \dots$

height =  $a + r$   
 $= 4.8 + 6.6$   
 $= 11.4 \text{ cm}$

16. Find angle A



$\cos A = \frac{\text{adj}}{\text{hyp}} = \frac{3}{4}$

$A = \cos^{-1}(3 \div 4) = 41.4^\circ$

$a^2 = b^2 + c^2 - 2bc \cos A$   
 $= 6^2 + 10^2 - 2(6)(10) \cos 41.4^\circ$

$a^2 = 46$

$a = 6.8 \text{ cm}$