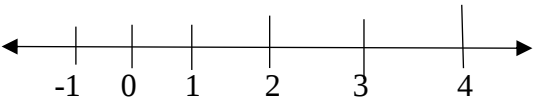
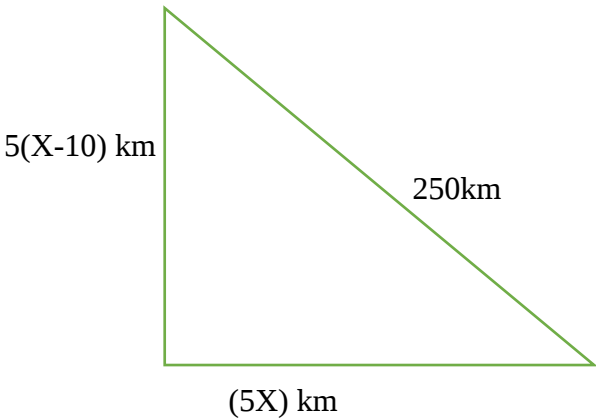


MATHEMATICS FORM 4
PAPER 1
MARKING SCHEMES

1. $\frac{9}{4} - \frac{5}{3} = \frac{27-20}{12} = \frac{7}{12}$ $\frac{1}{6} - \frac{1}{9} = \frac{3-2}{18} = \frac{1}{18}$ $\frac{7}{12} \times \frac{18}{2} = \frac{21}{2}$ $\frac{21}{2} - \frac{15}{8} = \frac{84-15}{8}$ $= \frac{69}{8}$ $= 8\frac{5}{8}$	M1 M1 M1 A1	
2. $\sqrt[3]{\frac{1.9 \times 0.032 \times 0.08}{20 \times 0.0038}} \times \frac{1000000}{1000000}$ $= \sqrt[3]{\frac{19 \times 32 \times 8}{20 \times 38}}$ $= \sqrt[3]{\frac{64}{1000}}$ $= \sqrt[3]{\frac{4^3}{10^3}}$ $= \frac{4}{10}$ $= \frac{2}{5}$	M1 M1 A1	
3. $(2n - 4) 90 = (\frac{360}{n}) 40$ $180n^2 - 360n - 14400 = 0$ $n^2 - 2n - 80 = 0$	M1 M1	

$\begin{array}{r} n=2 \pm \sqrt{324} \\ \hline 2 \\ \\ n=10 \end{array}$	A1	
4. $840 = 2^3 \times 3 \times 5 \times 7$ $396 = 2^2 \times 3^2 \times 11$ GCD = $2^2 \times 3 = 12$ Area = $12 \times 12 = 144 \text{ M}^2$	M1 M1 A1	For Both
5. $\frac{20 \times 2950000}{100}$ = 590,000 yen $\frac{590,000}{118}$ = 5000 dollars 76×5000 = sh. 380,000	M1 M1 A1	
6. $-9-3X \leq X-15$ $6 \leq 4X$ $1.5 \leq X$ $X-15 > 2X-18$ $3 > X$ $1.5 \leq x < 3$ 	B1 B1 B1	
7. $3^{3(x+1)} - 3^{3x+2} = 486$ $3^{3x} \times 3^3 - 3^{3x} \times 3^2 = 486$ $3^{2x} (27-9) = 486$ $3^{3x} = 3^3$ $3x = 3$	M1 M1	

X= 1	A1	
8. Let loss be X Profit = 3X $1040-3X=880 +X$ $1040 - 880 = 3X+X$ $160=4X$ $X=40$ Buying price = $880+40 = 920$	M1 A1 B1	
9. $\frac{12}{8} = \frac{3}{2}$ $ASF = \frac{9}{4}$ Area PST = $\frac{4}{9} \times 336 = 149 \frac{1}{3}$ Area QRST = $336-149\frac{1}{3}$ = $186 \frac{2}{3} \text{ cm}^2$	M1 M1 A1	
10.  $(5X)^2 + (5X+50)^2 = 250^2$ $25X^2+500X-60000=0$ $X^2+10X-1200=0$ $X^2 + 40X - 30X - 1200 = 0$ $X(X+40) - 30 (X+40)=0$ $(X-30) (X+40) =0$	M1 M1	

$= 48 \text{ yrs.}$	B1											
15. Let $r = 3.555\ldots$ (i) $10r = 35.55\ldots$(ii) Subtract e.g (i) from equation(ii) $9r = 32$ $r = \frac{32}{9}$ $= 3\frac{5}{9}$ 16. <table><tr><th>Class</th><th>Frequency</th></tr><tr><td>5- 9</td><td>8</td></tr><tr><td>10 - 19</td><td>24</td></tr><tr><td>20-39</td><td>16</td></tr><tr><td>40-49</td><td>16</td></tr></table>	Class	Frequency	5- 9	8	10 - 19	24	20-39	16	40-49	16	M1 M1 A1 B1 B2	For correct classes For correct frequencies
Class	Frequency											
5- 9	8											
10 - 19	24											
20-39	16											
40-49	16											
17. (a) $\left[\overline{T} \frac{1+3}{2}, \frac{-2+10}{2} \right]$ $T(2,4)$ (b) (i) $\frac{10+2}{3-1} = \frac{12}{2}$ $= 6$ Gradient of perpendicular $= -\frac{1}{6}$ (ii) $\frac{Y - 4}{X - 2} = -\frac{1}{6}$ $6Y - 24 = -X + 2$ $6Y = -X + 26$ $Y = -\frac{1}{6} X + \frac{26}{6}$ (c) $R(0, \frac{13}{3})$ $T(2,4)$	M1 A1 B1 M1 A1											

$$\text{TR} = \begin{bmatrix} 0 \\ \frac{13}{3} \end{bmatrix} - \begin{bmatrix} 2 \\ 4 \end{bmatrix}$$

$$\begin{bmatrix} -2 \\ 1/3 \end{bmatrix}$$

$$/TR/ = \sqrt{(-2)^2 + (1/3)^2}$$

$$\sqrt{4 + \frac{1}{9}}$$

$$= 2.028 \text{ units}$$

$$(d) \begin{bmatrix} 1 \\ -2 \end{bmatrix} + \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 10 \end{bmatrix}$$

$$\begin{bmatrix} X \\ Y \end{bmatrix} = \begin{bmatrix} 2 \\ 12 \end{bmatrix}$$

$$\begin{bmatrix} 0 \\ \frac{13}{3} \end{bmatrix} + \begin{bmatrix} 2 \\ 12 \end{bmatrix} = \begin{bmatrix} 2 \\ \frac{49}{3} \end{bmatrix}$$

$$R(2, 16\frac{1}{3})$$

M1

M1

A1

M1

A1

18.

(a) (i) $A = \mathbb{Z}[t]$

$$3.142 \times 3 \times 5$$
$$= 47.13$$

M1

(ii) $3.142 \times 6 \times 8$

M1

$1000 - 800$ $= \text{Sh.}200$	A1 M1 A1	
20. (a) $\frac{dy}{dx} = 9X^2 - 8X$ (b) Gradient $= 9(1)^2 - 8(1)$ $\quad 9-8$ $\quad = 1$ (c) $9(2^2) - 8(2)$ $\quad 36-16$ $\quad G=20$ (x,y) (2,3) $G=20$ $\frac{y-3}{x-2} = 20$ $y - 3 = 20x - 40$ $y = 20x - 37$ (d) Tan $\Theta = \text{Gradient}$ Tan $\Theta = 20$ $\Theta = 87.1^\circ$ (e) Gradient of L $= -\frac{1}{20}$ $\frac{y-3}{x-2} = -\frac{1}{20}$ $20y - 60 = -x + 2$ $20y = -x + 62$ $Y = -\frac{1}{20}x + \frac{62}{20}$ $y = -\frac{1}{20}x + 3.1$	B1 M1 A1 B1 M1 A1 A1 B1 M1 A1	
21. (a) Plotting ABC Plotting $A^1B^1C^1$ (b) Rotation about	B1 B1 B1	

(0,0) through + 90°	B1	
(c) Location of A ¹¹ B ¹¹ C ¹¹ Plotting A ¹¹ B ¹¹ C ¹¹	B1 B1	
(d) Reflection Y= -X	B1 B1	
(e) ABC and A ¹¹ B ¹¹ C ¹¹ A ¹ B ¹ C ¹ and A ¹¹ B ¹¹ C ¹¹	B1 B1	
22. (a) $\tan 11.3 = \frac{20}{BP}$ $BP = \frac{20}{\tan 11.3}$ $BP = 100.1 \text{ M}$	M1 A1	
(b) (i) $\frac{36000}{3600} = 10\text{m/s}$ Distance = 10×5 = 50m	 B1	
(ii) $\tan x = \frac{20}{150.1}$ $\tan X = 0.1332$ X= 7.6°	M1 A1	
(c) (i) $CD = \sqrt{50.9^2 - 49.9^2}$ $\sqrt{2590.81 - 2490.01}$ $\sqrt{100.8}$ = 10.04	M1 A1	
(ii) $\tan y = \frac{9.96}{200.0}$	M1 M1	

Tan y = 0.0498 Y= 2.85°	A1																																									
23. (a) 3+15+19+2+x=50 39 + X = 50 X= 11 (b) 150 ≤ x < 155 150- 154 (c) F= 19 (d) <table><tr><td>Class</td><td>X</td><td>Freq</td><td>Fx</td><td>Cum fre</td></tr><tr><td>140-144</td><td>142</td><td>3</td><td>426</td><td>3</td></tr><tr><td>145-149</td><td>147</td><td>15</td><td>2205</td><td>18</td></tr><tr><td>150-154</td><td>152</td><td>19</td><td>2888</td><td>37</td></tr><tr><td>155-159</td><td>157</td><td>11</td><td>1727</td><td>48</td></tr><tr><td>160-164</td><td>162</td><td>2</td><td>324</td><td>50</td></tr><tr><td></td><td></td><td>Σf=50</td><td>Σfx=7570</td><td></td></tr><tr><td></td><td></td><td></td><td>B1</td><td>B1</td></tr></table> $\bar{x} = \frac{\sum fx}{\sum f} = \frac{7570}{50}$ = 151.4 (e) Median class = 150 - 154 (f) $L + \left(\frac{N - C.F}{2 \quad F} \right) i$$149.5 + \frac{7.5}{19} \times 5$ = 151.47	Class	X	Freq	Fx	Cum fre	140-144	142	3	426	3	145-149	147	15	2205	18	150-154	152	19	2888	37	155-159	157	11	1727	48	160-164	162	2	324	50			Σf=50	Σfx=7570					B1	B1	B1 B1 B1 M1 A1 B1 M1 A1	
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			B1	B1																																						

24.		
(a) $Ps = \sqrt{34^2 - 256}$	M1	
$\sqrt{1156 - 256}$	M1	
$\sqrt{900}$		
PS = 30 cm	A1	
(b) $\sin S = \frac{16}{34}$	M1	
S = 28.1		
$28.1 \times 2 = 56.2$		
180 – 56.2	M1	
POS = 123.8	A1	
(c) $\left(\frac{123.8}{360} \times 3.142 \times 17 \times 17 \right)$	M1	
$\frac{1}{2} \times 17 \times 17 \sin 123.8$	M1	
312.26 – 120.08	M1	
= 192.18 cm ²	A1	