

YEAR 2006 WORKING AND ANSWERS

SECTION A

<p>1</p> $= \left(\frac{25}{100} \times 600\right) + \left(40 \times \frac{8}{5}\right)$ $= 150 + 64$ $= 214$	<p>2</p> $y = 151^\circ (\text{corresp. angles})$ $x = 180^\circ - 151^\circ$ $= 29^\circ$	<p>3</p> $S = D \div T$ $= 100\text{km} \div \frac{4}{3}\text{hr}$ $= 100\text{km} \times \frac{3}{4}\text{hr} = 75\text{km}$																								
<p>4</p> $4 + 10 = 5x - 2x$ $10 - 4 = 3x$ $6 = 3x$ $\frac{6}{3} = \frac{3x}{3}$ $x = 2$	<p>5</p> $= \frac{11 - \frac{7}{12}}{\frac{6}{22} - \frac{12}{7}} \text{ (LCD = 12)}$ $= \frac{12}{12} = \frac{15}{12} = \frac{5}{4} = 1\frac{1}{4}$	<p>6</p> <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td>2</td><td>15</td><td>24</td><td>30</td></tr> <tr><td>2</td><td>15</td><td>12</td><td>15</td></tr> <tr><td>2</td><td>15</td><td>6</td><td>15</td></tr> <tr><td>3</td><td>15</td><td>3</td><td>15</td></tr> <tr><td>5</td><td>5</td><td>1</td><td>5</td></tr> <tr><td></td><td>1</td><td></td><td>1</td></tr> </table> $= 2 \times 2 \times 2 \times 3 \times 5$ $= 120$	2	15	24	30	2	15	12	15	2	15	6	15	3	15	3	15	5	5	1	5		1		1
2	15	24	30																							
2	15	12	15																							
2	15	6	15																							
3	15	3	15																							
5	5	1	5																							
	1		1																							
<p>7</p> $= (4 \div 2)a^{(2-1)}b^{(3-2)}$ $= 2ab$	<p>8</p> $1^{\text{st}} \text{no} = \frac{48 + 12}{2} = \frac{60}{2} = 30$ $2^{\text{nd}} \text{no} = \frac{48 - 12}{2} = \frac{36}{2} = 18$	<p>9</p> $a = 163^\circ - 80^\circ$ $a = 83^\circ$																								
<p>10</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td>3</td><td>9</td><td>6</td><td>4</td></tr> <tr><td>-</td><td>1</td><td>7</td><td>0</td></tr> <tr><td colspan="4" style="border-top: 1px solid black;"></td></tr> <tr><td>2</td><td>2</td><td>5</td><td>9</td></tr> </table> <p>Ones: $5 + 9 = 14$ (write 4) Tens: $6 - 1 = 5$, $(5 - 5 = 0)$ Hundreds = $7 + 2 = 9$ Thousands = $3 - 2 = 1$</p>	3	9	6	4	-	1	7	0					2	2	5	9	<p>11</p> $\left(0.54 = \frac{27}{50}\right), \left(\frac{32}{80} = \frac{2}{5}\right) \text{ (LCD = 150)}$ $\frac{27}{50} \times 150 = 81 \dots \dots \dots (ii)$ $\frac{2}{5} \times 150 = 100 \dots \dots \dots (iii)$ $\frac{2}{5} \times 150 = 60 \dots \dots \dots (i)$ $= \frac{32}{80}, 0.54, \frac{2}{3}$	<p>12</p> $= 3x - 6y - 2x - 2y + 15y$ $= 3x - 2x + 15y - 6y - 2y$ $= x + 15y - 8y$ $= x + 7y$								
3	9	6	4																							
-	1	7	0																							
2	2	5	9																							
<p>13</p> <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td>2</td><td>20</td><td>50</td><td>70</td></tr> <tr><td>5</td><td>10</td><td>25</td><td>35</td></tr> <tr><td></td><td>2</td><td>5</td><td>7</td></tr> </table> <p>HCD = $2 \times 5 = 10$</p>	2	20	50	70	5	10	25	35		2	5	7	<p>14</p> $= \frac{25 + 15}{4}$ $= \frac{40}{4} = 10$	<p>15</p> <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td>10</td><td>5</td><td>2</td><td>1</td></tr> <tr><td>0.1</td><td>0.2</td><td>0.5</td><td>1</td></tr> </table> $y = 1 \div xy = 1 \div x$ $y = 1 \div 5 \quad y = 1 \div 1$ $y = 0.2 \quad y = 1$	10	5	2	1	0.1	0.2	0.5	1				
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<p>16</p> $= 160\text{cm} : 5\text{m}$ $= 160\text{cm} : (5 \times 1000\text{cm})$ $= 160\text{cm} : 5000\text{cm}$ $= \frac{160\text{cm}}{5000\text{cm}}$ $= \frac{8}{25}$ $= 8 : 25$	<p>17</p> $= 180^\circ(n - 2)$ $= 180^\circ(15 - 2)$ $= 180^\circ \times 13$ $= 2,340^\circ$	<p>18</p> $L = L, \quad W = (L - 2)$ $P = 24\text{cm}$ $2(L + W) = 24\text{cm}$ $2(L + L - 2) = 24\text{cm}$ $4L - 4 = 24\text{cm}$ $4L = 24\text{cm} + 4\text{cm}$ $\frac{4L}{4} = \frac{28\text{cm}}{4} \quad A = L \times W$ $L = 7\text{cm} \quad = 7\text{cm} \times 5\text{cm}$ $W = 7 - 2 = 5\text{cm} \quad = 35\text{cm}^2$																								
<p>19</p> $P = \frac{I \times 100}{T \times R}$ $= \frac{40,000 \times 100}{2 \times 5}$ $= 400,000\text{Frw}$	<p>20</p> $= 6 \times 2$ $= 12 \text{ triangles}$	<p>21</p> $30 \text{ eggs} = 1800\text{g}$ $1 \text{ egg} = \left(\frac{1800}{30}\right) \text{g}$ $12 \text{ eggs} = \left(\frac{1800 \times 12}{30}\right) \text{g}$ $= 720\text{g}$																								
<p>22</p> $5\text{km} = 1\text{cm}$ $1\text{km} = \frac{1\text{cm}}{5\text{km}} = \frac{1\text{cm}}{(5 \times 1,000,000)\text{cm}}$ $2\text{km} = \frac{(2 \times 1,000,000)\text{cm}}{(5 \times 1,000,000)\text{cm}}$ $= 0.4\text{cm}$	<p>23</p> $= 100\% + 20\%$ $= 120\%$ $\frac{120}{100} \times CP = 54,000\text{Frw}$ $CP = \frac{54,000 \times 100}{120}$ $CP = 45,000\text{Frw}$	<p>24</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td>1</td><td>3</td><td>12</td><td>60</td><td>360</td><td>2520</td></tr> <tr><td>x3</td><td>x4</td><td>x5</td><td>x6</td><td>x7</td><td></td></tr> </table>	1	3	12	60	360	2520	x3	x4	x5	x6	x7													
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x3	x4	x5	x6	x7																						
<p>25</p> <p>Let a pen cost x and a pencil y</p> $x + y = 150 \dots \dots (i)$ $4x + 5y = 650 \dots \dots (ii)$ $4(x + y = 150)$ $1(4x + 5y = 650)$ $4x + 4y = 600$ $4x + 5y = 650$ $5y - 4y = 650 - 600$ $y = 50 \text{ (A pencil costs 50Frw)}$ $x = 150 - 50$ $x = 100 \text{ (A pen costs 100Frw)}$	<p>26</p> <table style="width: 100%;"> <tr> <td style="width: 50%;"><u>1st year</u></td> <td style="width: 50%;">Amount</td> </tr> <tr> <td>$= \frac{50,000 \times 1 \times 8}{100}$</td> <td>50,000</td> </tr> <tr> <td>$I = 4,000\text{Frw}$</td> <td>+ 4,000</td> </tr> <tr> <td></td> <td style="border-top: 1px solid black;">54,000</td> </tr> <tr> <td><u>2nd year</u></td> <td>Comp. Interest</td> </tr> <tr> <td>$= \frac{54,000 \times 1 \times 8}{100}$</td> <td>4,000 Frw</td> </tr> <tr> <td>$I = 4,320\text{Frw}$</td> <td>+ 4,320 Frw</td> </tr> <tr> <td></td> <td style="border-top: 1px solid black;">8,320 Frw</td> </tr> </table>	<u>1st year</u>	Amount	$= \frac{50,000 \times 1 \times 8}{100}$	50,000	$I = 4,000\text{Frw}$	+ 4,000		54,000	<u>2nd year</u>	Comp. Interest	$= \frac{54,000 \times 1 \times 8}{100}$	4,000 Frw	$I = 4,320\text{Frw}$	+ 4,320 Frw		8,320 Frw	<p>27</p> $= 100\% - 20\%$ $= 80\%$ $\frac{80}{100} \times CP = 1,000$ $CP = \frac{1,000 \times 100}{80}$ $CP = 1,250$ $2\text{kg} = 1,250\text{frw}$ $1\text{kg} = (1,250 \div 2)\text{Frw}$ $= 625\text{Frw}$								
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28 $r = 36\text{cm}$
 $C + D = 36\text{cm}$
 $\frac{1}{2}\pi D + D = 36$
 $\frac{1}{2} \times \frac{22}{7} D + D = 36$
 $\frac{11D}{7} + D = 36$
 $11D + 7D = 36 \times 7$
 $18D = 36 \times 7$
 $\frac{18D}{18} = \frac{36 \times 7}{18}$
 $D = 14\text{cm}$

$r = \frac{D}{2} = \frac{14\text{cm}}{2} = 7\text{cm}$
 $A = \frac{1}{2}\pi r^2 = \frac{1}{2} \times \frac{22}{7} \times 7 \times 7 = 77\text{cm}^2$

29 Tiles = $\frac{\text{Area of rectangular path}}{\text{Area of each square tile}}$
 $= \frac{L \times W}{S \times S}$
 $= \frac{40\text{m} \times 1.2\text{m}}{20\text{cm} \times 20\text{cm}}$
 $= \frac{48\text{m}^2}{400\text{cm}^2}$
 $= \frac{(48 \times 10,000)\text{cm}^2}{400\text{cm}^2}$
 $= 1,200 \text{ tiles}$

30

A	+	B	=	Ans.
100	+	200	=	300
180		150		x

$(100 \times 180) + (200 \times 150) = (300 \times x)$
 $18,000 + 30,000 = 300x$
 $48,000 = 300x$
 $\frac{48,000}{300} = \frac{300x}{300}$
 $x = 160F$

SECTION B

31 $h = \sqrt{H^2 - b^2}$
 $= \sqrt{(10 \times 10)\text{cm}^2 - (6 \times 6)\text{cm}^2}$
 $= \sqrt{100\text{cm}^2 + 36\text{cm}^2}$
 $= \sqrt{64\text{cm}^2}$
 $= 8\text{cm}$
 $P = b + h + H$
 $= 6\text{cm} + 8\text{cm} + 10\text{cm}$
 $= 24\text{cm}$
 $A = \frac{b \times h}{2} = \frac{6\text{cm} \times 8\text{cm}}{2} = 24\text{cm}^2$

32 Part (a)
 $5(x + 1) = 4(x + 3)$
 $5x + 5 = 4x + 12$
 $5x - 4x = 12 - 5$
 $x = 7$

Part (b)
 substitution $x = 7$
 $= \frac{x \times x - 2 \times x - 14}{7 \times 7 - 2 \times 7 - 14}$
 $= \frac{49 - 14 - 14}{49 - 28} = \frac{21}{7} = 3$

33 $D = 44\text{cm}, R = (44 \div 2) = 22\text{cm}$
 $d = 40\text{cm}, r = (40 \div 2) = 20\text{cm}$
 $h = 10\text{m} = (10 \times 100) = 1000\text{cm}$

$V = \text{Vol of outer - inner cylinder}$
 $= \pi R^2 h - \pi r^2 h$
 $= \pi h(R^2 - r^2)$
 $= 3.14 \times 1000(22^2 - 20^2)$
 $= 3140\text{cm}(484 - 400)\text{cm}^2$
 $= 3140\text{cm} \times 84\text{cm}^2$
 $= 263,760\text{cm}^3$

34 $\text{Time} = \frac{\text{Product of time (POT)}}{\text{Sum of time (SOT)}}$
 $= \frac{5 \times 7}{5 + 7} = \frac{35}{12} = 2\frac{11}{12}\text{hrs}$
 $= 2\text{hr} \left(\frac{11}{12} \times 60\right) \text{min}$
 $= 2\text{hr } 55\text{min}$

35 $\text{Boxing} = 360^\circ - (108 + 126 + 54)$
 $= 360^\circ - 288^\circ$
 $= 72^\circ$

$\text{Fraction to be used} = \frac{40}{360} = \frac{1}{9}$

$\text{Boxing} = \frac{1}{9} \times 72 = 8 \text{ students}$
 $\text{Tennis} = \frac{1}{9} \times 54 = 6 \text{ students}$
 $\text{Football} = \frac{1}{9} \times 126 = 14 \text{ students}$
 $\text{Volleyball} = \frac{1}{9} \times 108 = 12 \text{ students}$

36 Part (a)
 $1\text{day} = 10\text{kg}$
 $(1\text{ week}) 7\text{days} = (10 \times 7)\text{kg}$
 $= 70\text{kg}$

Part (b)
 $1\text{kg} = 600\text{Frw}$
 $70\text{kg} = (600 \times 70)\text{Frw}$
 $= 42,000\text{Frw}$

Part (c)
 $\text{Not used} = (50,000 - 42,000)\text{F}$
 $= 8,000\text{Frw}$
 $\% \text{Not used} = \frac{8,000}{50,000} \times 100$
 $= 16\%$

37 x-axis
 $10\text{sq} = 1\text{hr}$
 $10\text{sq} = 60\text{min}$
 $1\text{sq} = (60 \div 10)\text{min}$
 $1\text{sq} = 6\text{min}$

y-axis
 $10\text{sq} = 10\text{km}$
 $1\text{sq} = (10 \div 10)\text{km}$
 $1\text{sq} = 1\text{km}$

(a). $6\text{min} = 1\text{km}$ (The car travels 1km in 6 minutes)

(b). $15\text{km} = (15 \times 6)\text{min}$
 $= 90\text{min}$
 $= \frac{90}{60}\text{hr} = 1\frac{1}{2}\text{hr}$ (The car takes 1hr 30min to travel 15km)

(c). $= 10 \text{ sq on } x\text{-axis}$
 $= (10 \times 6)\text{min}$
 $= 60\text{min} = 1\text{hour}$ (The car stops for 1 hour)

(d). $AS = \frac{\text{Total distance}}{\text{Total time taken}} = \frac{20\text{km} + 30\text{km}}{2\text{hr} + 1\text{hr} + 2\text{hr}} = \frac{50\text{km}}{5\text{hr}} = 10\text{km/hr}$
 (The average speed of the car for the whole journey was 10km/hr)