PASSPORT FOUR

ANSWERS

TOPICS	ANSWERS	TOPICS	ANSWERS
1) Reverse Percentages	Multiplier – 0.86 Normal Price $\frac{326.80}{0.86} = £380$	**7) Simultaneous Equations**	**b)** $\mathbf{25x - 10y = 180}$ $\mathbf{6x - 10y = 66}$ $\mathbf{19x = 114}$ $\mathbf{x = 6}$ $\mathbf{5(6) - 2y = 36}$ $\mathbf{30 - 36 = 2y}$ $\mathbf{y = -3}$
2) Compound interest	Multiplier -0.88 3 Bounces $= 2 \times 0.88^3 = 1.36$m 8 Bounces $= 2 \times 0.88^8 = 0.72m$ 10 Bounces $= 2 \times 0.88^{10} = 0.56m$	**8) Factorising Quadratics**	*a)* $(x-3)(x-2)$ *b)* $(x+3)(x-3)$
3) Upper and Lower Bounds	Length $315 \leq l < 325$ Width $127.5 \leq w < 128.5$ Perimeter $315 + 127.5 + 315 + 127.5$ $= 885m$	**9) Changing the Subject**	*a)* $bx = p - t \;\; x = \frac{p-t}{b}$ *b)* $\frac{x}{p} = s + q \quad x = p(s+q)$ *c)* $tx - tm = y + m$ $tx = y + m + tm$ $x = \frac{y + m + tm}{t}$
4) Error Intervals	Error interval $8.25 \leq x < 8.35$	**10) Composite Functions**	*1)* $fg(x) = f(x^2 - 2)$ $= 4(x^2 - 2) + 5$ $= 4x^2 - 8 + 5 = 4x^2 - 3$ *2)* $gf(x) = g(4x + 5)$ $= (4x + 5)^2 - 2$ $= 16x^2 + 40x + 25 - 2$ $= 16x^2 + 40x + 23$
5) Direct Proportion	$y \propto x^2$ so y = kx^2 $400 = k \times 10^2$ $400 = 100k$ $k = \frac{400}{100} = 4$ $so\ y = 4x^2$ $y = 4 \times 5^2 = 100$	**11) Iterative Processes**	$x_2 = \frac{()1^3 - 3}{4} = -\frac{2}{4} = -\frac{1}{2}$ $x_3 = \frac{\left(-\frac{1}{2}\right)^3 - 3}{4} = -0.78125$
6) Calculating with Surds	*1)* $\sqrt{75} = \sqrt{25 \times 3} = 5\sqrt{3}$ $\sqrt{12} = \sqrt{4 \times 3} = 2\sqrt{3}$ $5\sqrt{3} - 2\sqrt{3} = 3\sqrt{3}$ *2)* $9 + 3\sqrt{7} - 3\sqrt{7} - \sqrt{49}$ $= 9 - 7 = 2$	**12) Quadratic Sequences**	*1)* $n^2 + n$ *2)* $3n^2 - 2n + 4$

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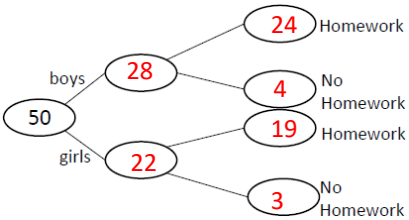
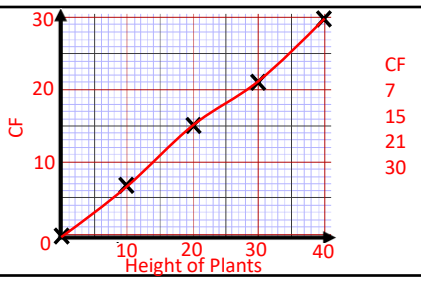
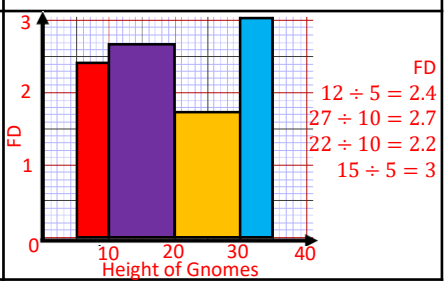
13) Bearings	Interior Angles $= 180 - 67 = 113^o$ $Bearing\ B\ to\ A = 360 - 113 = 247^o$	**19) Frequency Trees**	
14) Speed, Distance and Time	$6 + 28 = 34 miles\ total$ $10:00am\ to\ 10:40am$ is 40 mins 60mph is 1 mile per min. 28 miles is covered in 28mins $40 - 28 = 12 mins\ left$ $s = \frac{6}{12} = 0.5 mile\ per\ min$ $30\ miles\ per\ hour$	**20) Independent Events**	$P(LH) = \frac{3}{8} \times \frac{5}{8} = \frac{15}{64}$ $P(HL) = \frac{5}{8} \times \frac{3}{8} = \frac{15}{64}$ $P(Different) = \frac{15}{64} + \frac{15}{64} = \frac{30}{64} = \frac{15}{32}$
15) Volume of Prisms	Break into two rectangles. CSA= $(2 \times 3) + (4 \times 3) = 18cm^2$ or CSA=$(2 \times 6) + (2 \times 3) = 18cm^2$ $Volume = CSA \times 4$ $= 18 \times 4 = 72\text{cm}^3$	**21) Venn Diagrams**	1) Students $54 + 48 + 16 + 22 = 140$ 2) $P(right\ handed\ male) = \frac{48}{140} = \frac{12}{35}$
16)Arc Length	$\frac{120}{360} \times \pi \times 8 = \frac{8}{3}\pi = 8.38cm$	**22) Cumulative Frequency**	
17) Area of a Sector	$\frac{134}{380} \times \pi \times 6^2 = \frac{67}{5}\pi = 42.1cm^2$	**23) Box Plots**	Class 1 scored higher on average on the test because their median is 80% and Class 2 median is 74%. Class 2's results are less consistent because their IQR is (90-70=20) and CLass1's IQR is (85-70=15)
.18) Transformations	1) Translation by $\binom{-3}{-6}$ 2) Coordinates (1,4), (-5,4), (-52) and (-2,1)	**24) Drawing Histograms**	

PASSPORT FOUR
ANSWERS
NUMBER

TOPICS	ANSWERS	TOPICS	ANSWERS
Index Notation	*a)* 1 *b)* $5 \times 5 \times 5 = 125$ *c)* $\sqrt{64} = 8$ *d)* $\frac{1}{3^7} = \frac{1}{2187}$	**Reverse Percentage**	$16.12 \div 0.55 = £29.31$
Percentage Decrease	$0.96 \times 2500 = £2400$	**Percentage Change**	$\frac{change}{original} \times 100$ $\frac{250{,}000}{1500000} \times 100$ $= 16.7\%$
Recurring Decimals	*a)* $\frac{1}{3}$ *b)* $\frac{76}{99}$ *c)* $\frac{428}{999}$	**Surds**	*a)* $\sqrt{4 \times 6} = 2\sqrt{6}$ *b)* $\sqrt{35}$ *c)* $\sqrt{9} + 4\sqrt{3} - 2\sqrt{3} - 6$ $= 3 + 2\sqrt{3} - 6$ $= 2\sqrt{3} - 3$
Fractions and Percentages	15% in school $\frac{7}{20} = \frac{35}{100} = 35\%$ shopping $100 - (15 + 35) =$ 50% cinema $0.5 \times 1400 =$ 700 students went to the cinema	**Subtracting and Multiplying Mixed Numbers**	*1)* $\frac{19}{5} - \frac{9}{4} = \frac{76-45}{20} = \frac{31}{20} = 1\frac{11}{20}$ *2)* $\frac{13}{3} \times \frac{23}{4} = \frac{299}{12} = 24\frac{11}{12}$

PASSPORT FOUR
ANSWERS
Algebra

<table>
<tr><th>TOPICS</th><th>ANSWERS</th><th>TOPICS</th><th>ANSWERS</th></tr>
<tr><td>Midpoint of Coordinates</td><td>X coordinate
$\frac{-4+10}{2}=\frac{6}{2}=3$
Y Coordinate
$\frac{6+(-8)}{2}=-\frac{2}{2}=-1$
Z Coordinate
$\frac{10+6}{2}=-\frac{16}{2}=8$
Midpoint $(3,-1,8)$</td><td>Solving inequalities</td><td>$4-8\leq 2x<12-8$
$-4\leq 2x<4$
$-\frac{4}{2}\leq x<\frac{4}{2}$
$-2\leq x<2$</td></tr>
<tr><td>Quadratic Formula</td><td>$a=1, b=-4$ & $c=-8$
$x=\frac{-(-4)\pm\sqrt{(-4)^2-4\times1\times(-8)}}{2\times1}$
$=\frac{4\pm\sqrt{16+32}}{2}$
$x=\frac{4+\sqrt{48}}{2}=5.46$
$x=\frac{4-\sqrt{48}}{2}=-1.46$</td><td>Simultaneous Equations</td><td>$12x+8y=52$
$10x-8y=36$
$22x=88$ so $x=4$
$3(4)+2y=13$
$12+2y=13$
$2y=1$ $y=\frac{1}{2}$</td></tr>
<tr><td>Factorise Expressions</td><td>1) $4(x+5)$
2) $3y(y+4)$
3) $(x+7)(x-3)$</td><td>Equation of a line parallel</td><td>a) $y=2x+C$
$E.g.$
$y=2x$ or $y=2x-1$
b) $y=-\frac{1}{2}x+c$
$E.g.$
$y=-\frac{1}{2}x$ or
$y=-\frac{1}{2}x+4$</td></tr>
<tr><td>Trial and improvement</td><td><table><tr><th>Value</th><th>Output</th><th>Big/Small</th></tr><tr><td>5</td><td>35</td><td>small</td></tr><tr><td>6</td><td>54</td><td>big</td></tr><tr><td>5.5</td><td>44</td><td>small</td></tr><tr><td>5.6</td><td>45.92</td><td>small</td></tr><tr><td>5.7</td><td>47.88</td><td>big</td></tr><tr><td>5.65</td><td>46.895</td><td>small</td></tr><tr><td colspan="3">Answer $x=5.7$</td></tr></table></td><td>Change the Subject</td><td>1) $3x=y-t$
$x=\frac{y-t}{3}$
2) $\frac{x}{p}=z+pr$
$x=p(z+pr)$
3) $tx+tr=p$
$tx=p-tr$
$x=\frac{p-tr}{t}$</td></tr>
</table>

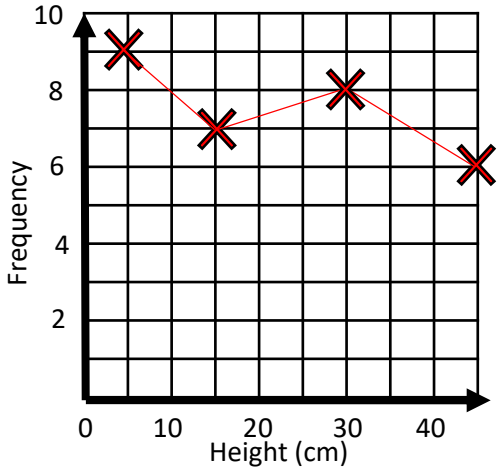
PASSPORT FOUR

ANSWERS

Shapes and Measures

TOPICS	ANSWERS	TOPICS	ANSWERS
Area of a Triangle	Sohcahtoa $opp = 11 \times \sin(67)$ $= 10.1cm\ (height\ of\ triangle)$ $adj = 11 \times \cos(67)$ $= 4.298cm\ (half\ base)$ Full base $= 8.596cm$ Area $10.1 \times 4.298 = 43.41cm^2$	**Bearings**	$180 - 75 = 105^o$
Pythagoras' Theorem	$x = \sqrt{13^2 - 9^2}$ $x = 9.38cm$	**Angles in Polygons**	Exterior Angle $180 - 156 = 24^o$ Number of sides $\frac{360}{24} = 15\ Sides$
Volume of a Cylinder	$V = \pi \times 2.5^2 \times 9$ $= 176.7cm^3$	**Perimeter of a Sector**	$360 - 72 = 288$ $\left(\frac{288}{360} \times \pi \times 18\right) + 9$ $+ 9$ $= 63.24\ cm$
Transformation – Enlargement from a point	Enlargement Scale Factor -1 Centre $(0\ ,0)$		

PASSPORT FOUR
ANSWERS
Statistics

<table>
<tr><th>TOPICS</th><th>ANSWERS</th></tr>
<tr><td>Frequency Polygon</td><td> 
</td></tr>
<tr><td>Mean from a table</td><td>
<table>
<tr><th>Height (cm)</th><th>Frequency</th><th>MP</th><th>Fx</th></tr>
<tr><td>$0 < h \leq 10$</td><td>9</td><td>5</td><td>45</td></tr>
<tr><td>$10 < h \leq 20$</td><td>7</td><td>15</td><td>105</td></tr>
<tr><td>$20 < h \leq 40$</td><td>8</td><td>30</td><td>240</td></tr>
<tr><td>$40 < h \leq 50$</td><td>6</td><td>45</td><td>270</td></tr>
</table>
$Mean = \frac{660}{30} = 22cm$
</td></tr>
<tr><td>Box Plots</td><td>Golf club A members are older because their median age is 52 and golf club B's median age is 49. Golf club A's age range is larger and less consistent because their IQR is (59-29=30) and gold club B's IQR is (59-49=10)</td><td>Cumulative Frequency</td><td>LQ is 11 mins (read at cf 25)
Median is 14 mins (read at cf 50)
UQ is 18 mins (read at cf 75)

IQR $= 18 - 11 = 7\ mins$</td></tr>
<tr><td>Expected Probability</td><td colspan="3">$\frac{2}{5} of\ 150 = \frac{150}{5} \times 2 = 30 \times 2 = 60\ games$</td></tr>
<tr><td>Sample Space</td><td colspan="3">
<table>
<tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th></tr>
<tr><td>Head</td><td>1H</td><td>2H</td><td>3H</td><td>4H</td><td>5H</td><td>6H</td></tr>
<tr><td>Tail</td><td>1T</td><td>2T</td><td>3T</td><td>4T</td><td>5T</td><td>6T</td></tr>
</table>
$P(H, Even) = \frac{3}{12} = \frac{1}{4}$
</td></tr>
</table>