

# Knightswood Secondary School General Past Paper question Answers

**How to use the answers**

The page number from the question sheets

Page 1			
12	Speed, Distance & Time	T = 10hours, 15 minutes	$t = \frac{d}{s} = \frac{820}{80} = 10.25hours$ <p>To get 'decimal of hour (.25) into minutes, ×</p>

The Mathematics topic that the question is mainly on

Answers

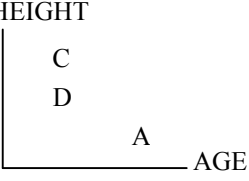
Some hints on how do the question

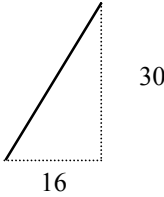
**What to do if you find a mistake?**

If you find an answer that is wrong, please do tell us. It is *very likely* that there are some mistakes in this answer booklet! Letting us know of any mistakes will help future pupils using these sheets. You can tell your Class teacher, Mr Farmer or send an email to [NFarmer@Knightswood-sec.glasgow.sch.uk](mailto:NFarmer@Knightswood-sec.glasgow.sch.uk)

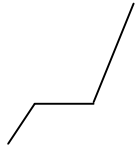
**I just can't get a question!**

Look at the hints column, if this does not help, see a Maths teacher!

Page 1			
2	Problem Solving	 <p>Darren is taller than Alexander</p>	
17	Gradient. Problem solving	$\text{Slope} = \frac{1.5}{30} = 0.05$ <p>Pool satisfies regulations as the slope is 0.05 which is less than 0.07.</p>	Change in depth over slope is: $2.5 - 1 = 1.5\text{metres}$
18	Variation	$W = kA$ $W = 0.09A$ $W = 0.09 \times 1100 = 99\text{tonnes}$	$w \propto A$ Substitute $w=54$ & $A=600$ $w = kA$ $54 = k \times 600$ $k = \frac{54}{600} = 0.09$
Page2			
10	Problem Solving	$3.99 \div 2 = 1.995$ $4.99 \div 3 = 1.663$ $6.49 \div 4 = 1.6225$ So, 4Lit is cheapest per litre  $1.995 \div 16 = 0.1246875$ $1.663 \div 14 = 0.118809521$ $1.6225 \div 13 = 0.124807692$ So, Tuffcoat (1Lit) is best value as it costs the least to paint $1\text{m}^2$	
7	Pythagoras	$x = 10.3$	$x^2 = 5^2 + 9^2$ $x^2 = 106$ $x = 10.29563014\dots$
Page 3			
8	Formula and Substitution	$R = 1.83$ (2dp)	$R = \frac{5.5 \times 4.2}{1.3(5.5 + 4.2)}$ $R = \frac{23.1}{1.3 \times 9.7}$
9	Coordinates	Last point for square is (1, 5)	Remember to plot coordinates, starting at the Origin (0, 0), go across first, then up/down.

Page 4			
16	Circumference and Perimeters	$\text{Perimeter} = 2 \times 100 + 2 \times 94.2 = 388.4\text{m}$ $\text{Length} = 30 + 100 + 30 + 4 + 4 = 168\text{m}$	Calculate curved end of track length by $C = \pi D \div 2$ as it is a semi-circle. For length, each track 1m wide, so length of track 8m longer.
3	Area of Triangle	Area = $644\text{cm}^2$	$\text{Area}(\text{triangle}) = \frac{1}{2} \times \text{base} \times \text{height}$
Page 5			
6	Percentages	Timson = £1050 Wilson = £1000 They should use Wilson as they are £50 cheaper.	$1.5\% \text{ of } 70000 = 0.015 \times 70000$ $2\% \text{ of } 30000 = 0.02 \times 30000$
11	SOHCAHTOA	$x = 4.9\text{m}$	Triangle involves <i>opp</i> & <i>hyp</i> , so use the Sine ratio. $\sin 6.7^\circ = x / 42$
12	Speed, Distance & Time	T = 10hours, 15 minutes	$t = \frac{d}{s} = \frac{820}{80} = 10.25\text{hours}$ To get 'decimal of hour (.25) into minutes, $\times$
Page 6			
	Problem Solving	One side = 3 Top = 1 MidLeft = 2, MidRight = -2 BottomLeft = -1	
15	Pythagoras Perimeter	Diagonal length = 34 Perimeter = 212	 $\text{Perimeter} = 56+32+56+34+34$
Page 7			
16	Averages	New Average = 87%	Average for 10 people: 81 Total for 10 people: 810 Total without pupil = $810 - 27 = 783$ New Average = $783 \div 9$
1	Hire Purchase	Repayments of £350 per month	Total cost = $12 \times £750 + 500 = £9500$ $9500 - 1100 = 8400$ $8400 \div 24$
2	Indices	$3^3 = 243$	$35 = 3 \times 3 \times 3 \times 3 \times 3$

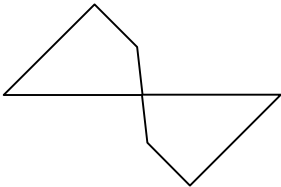
Page 8			
7	Graphs	(a) Trend is upwards (b) In the first part of the year it rose from 26000 to 34000, then in the second half it fell to 30000. (c) July 1983 - 38000	
11	Volume & Surface Area	32 bricks  Needs 160cm of plastic roll	$\text{Vol}_{\text{large cube}} = 20 \times 20 \times 20 = 800$ $\text{Vol}_{\text{small cube}} = 5 \times 5 \times 5 = 25$ $\text{Num. of bricks} = 800 \div 25 = 32$ $\text{Area of 1 face} = 25$ $\text{Area of 6 faces} = 150\text{cm}^2$ $32 \text{ bricks} = 150 \times 32 = 4800\text{cm}^2$ $\text{Plastic Roll needed} = 4800 \div 30 = 160\text{cm}$
Page 9			
9	Formula	Fr: 205, 205, 205, 205, 205, 205, 205 Ro: 145, 160, 175, 190, 205, 220, 235  See graph, Freedom line horizontal, Rover going up, crossing at 1000miles.  Cheaper with Freedom, at £205 and Rover costing £229.	$\text{Wk} = 7 \text{ days} = 7 \times 200 = 1400 \text{ miles}$ $\text{Rover} = 0.06 \times 1400 + 145 = £229$
Page 9 (the second one!!!)			
10	Algebra	David has $2x$ badges Malcolm has $x - 12$  $x = 23$	$\text{Kate} = x$ $\text{Malcolm} = x - 12 \text{ (ie 12 less)}$ $\text{David} = 2x \text{ (ie twice as many)}$ $2x + (x - 12) + x = 80$ $4x - 12 = 80$ $[ \text{Add 12 to both sides, divide by 4} ]$
8	Trigonometry	Yes it is ok as the angle is $73.3^\circ$ which is between $71^\circ$ and $76^\circ$	SOHCAHTOA Chose Sine Ratio (opp and hyp) $\text{Sin } x = 4.8/5$
Page 10			
1	Percentages and Simple Interest	Interest = £110.88	$\text{Annual} = 8.4\% \text{ of } £2640$ $6 \text{ Months} = \times \frac{6}{12}$
2	Scientific Notation	0.000 001 5	
3	Negative Numbers	(a) $7^\circ$ (b) The temperature fall until 4am and then rose.	
4	Ratio	16 Litres	$1 : 4 = 5 \text{ shares}$ $1 \text{ share} = 80 \div 5 = 16$ Orange Juice is 1 share

Page 11			
15	Area	Area = $611\text{cm}^2$	Kite = $\frac{1}{2} \times \text{diagonal}_1 \times \text{diagonal}_2$
16	Proportion & Variation	$C = 4.166 \times P$ $C = 5 \text{ amps}$	$C \propto P; C = kP$ Substitute $C=12.5$ & $P = 3$ $K = 4.166\dots$ Then substitute into formula.
5	Graphs	 <p>Horizontal part at 20, level with Granton. Third part steeper.</p> <p>Ship reached Aberdeen @5am</p>	
Page 12			
6	Proportion	12 pupils take half an hour	3 pupils take 2 hours 6 pupils take 1 hour [*think*]
7	Equations	$x = 4$	$6x = 27 - 3$ $6x = 24$
14	Trigonometry	$x = 1157.9\text{metres}$	Sine Ration $\text{Sine } 36^\circ = x / 1970$ $x = 1970 \times \text{Sin } 36^\circ$
Page 13			
9	Formula	$P = 14 + 1.50N$  $N = 7 \text{ shoes sold}$	Replace 'P' with '24.50' $24.50 - 14 = 1.50N$
10	Fractions	$\frac{9}{20}r = \sqrt{\frac{340}{3.14}}$	Need to find: $\frac{3}{4}$ of $\frac{3}{5}$
11	Brackets and Equations	$13x - 10$	$2(3x - 5) = 6x - 10$ $6x - 10 + 7x$
12	Angles	$\text{PRQ} = 90^\circ$  $\text{PST} = 135^\circ$	Angle in a semicircle $\text{RST} = 45^\circ$ [isosceles triangle] $\text{PST} = 180^\circ - 45^\circ$
Page 14			
19	Volume	Total Area of end = $11250\text{mm}^2$ Volume = $11\,250\,000\text{mm}^3$ $= 11.25\text{m}^3$	Split into rectangle and triangle
3	Patterns	Table: 5, 8, 11, 14, 17, ... 50 $d = 3s + 2$ $s = (101 - 2) \div 3$	Going up in 3's => $\times 3$ Formula must use d&s Put 101 in for s.

Page 15											
17	Area	36 circles  Area = $1482.64\text{cm}^2$	2cm left at start. 48cm remaining. Therefore $48 \div 6 = 36$  Area <sub>circle</sub> = $\pi \times 3^2 = 28.26$ Area <sub>36 circles</sub> = 1017.36 Area <sub>rectangle</sub> = 2500 Area left = $2500 - 1017.36$								
6	Problem solving	Left number = -3 Right number = -6  Top row = 1 Bottom row = 3, 1, -2									
Page 16											
13	Similar Triangles	$x = 5.6\text{metres}$	Scale Factor = $\frac{12}{15} = \frac{4}{5}$  $x = 7 \times \frac{4}{5} = \frac{28}{5} = 28 \div 5$								
10	Angles in Circles	Angle BPO = $22^\circ$  $x^\circ = 46^\circ$	OPT = $90^\circ$ [angle in a semicircle] BPO = $90 - 68 = 22^\circ$ OBP = $22^\circ$ [isoscelles triangle] ABP = $68^\circ$ [alternate z-shape to BPT] X = $68 - 22 = 46^\circ$								
Page 17											
9	Straight Line	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>x</td> <td>-3</td> <td>0</td> <td>3</td> </tr> <tr> <td>y</td> <td>-8</td> <td>1</td> <td>10</td> </tr> </table> Plot points and draw line on graph. Coordinates go x (across) first and then y, up/down.	x	-3	0	3	y	-8	1	10	If $x = -3$ ; $y = 3(-3) + 1 = -9 + 1 = -8$ If $x = 0$ ; $y = 3(0) + 1 = 1$ If $x = 3$ ; $y = 3(3) + 1 = 9 + 1 = 10$
x	-3	0	3								
y	-8	1	10								
14	Brackets, Simplification & equations	$14a - 15$  $x = \frac{8}{3} = 2.667$	$2a + 12a - 15$  $4x - x = 5 + 3$ $3x = 8$								
Page 18											
6	Time	Finishes at 1pm	Mon-Thu = 7h45m each day Total of 31hours, Leaves 4 hours, starts at 9....								
7	Area of Triangle and Rectangle	Area = $2100\text{cm}^2$	Area <sub>rectangle</sub> = $60 \times 30 = 1800\text{cm}^2$ Area <sub>triangle</sub> = $0.5 \times 30 \times 20 = 300\text{cm}^2$								
8	Graphs	Brothers meet at 8.25 Distance of 3km Speed <sub>Alan</sub> = 4km/h	$s = \frac{d}{t} = \frac{3}{0.75}$ 45minutes = 0.75hours (45÷60)								

Page 19													
10	Patterns	(a) L-outline = 96 (b) <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>21</td><td>24</td><td>27</td><td>30</td><td>33</td></tr></table> (c) $T = 3N + 15$ (d) 38 is number at top, 45&46	2	3	4	5	6	21	24	27	30	33	Numbers are 27, 34, 35  Pattern goes up in 3's, so $\times 3$ Replace $T$ with 129 and solve
2	3	4	5	6									
21	24	27	30	33									
1	Simple Interest	£260	$6.5 \div 100 \times 16\,000$ Then, for 3 months out of 12.... $\times \frac{3}{12}$ or $\div 12 \times 3$										
Page 20													
13	Angles in a circle	QRS = $90^\circ$ PSR = $30^\circ$	[Angle between tangent and radius] [Angles in quadrilateral = $360^\circ$ ]										
14	Reading Graphs	45 minutes											
	Percentages	<u>Method 1</u> Yes it is effective because softening agents are 20%, between limits of 15%&30%.  <u>Method 2</u> Yes it is effective because lower limit is 96ml and upper limit is 192ml. 128ml is between them.	$\%SofteningAgent = \frac{128}{640} \times 100 = 20\%$  $15\%of\ 640 = 0.15 \times 640 = 96$ $30\%of\ 640 = 0.30 \times 640 = 192$										
Page 21													
16	Trigonometry	$x = 23.6^\circ$	SOHCAHTOA Chose Sine ratio $Sinx = \frac{0.8}{2} = 0.4$ $x = Sin^{-1}(0.4) = 23.61$										
7	Algebra	$11x + 10y$  $x = \frac{12}{5} = 12 \div 5 = 2.4$	$15x + 10y - 4x$  $7x - 2x = 15 - 3$ $5x = 12$										
18	Volume of a Prism	Volume = $501.4737\text{cm}^3$  Length = 11.9cm (to 1dp)	$Area_{circle} = \pi r^2 = 3.14 \times 3.9 \times 3.9$ $= 47.7594$ $Volume_{Prism} = Ah$ $= 47.7594 \times 10.5$ $V = l \times b \times h$ $6.5 \times 6.5 \times h = 501.4737$ $h = 501.4737 \div 42.25$ $h = 11.8692...$										

Page 22			
19	Pythagoras	$h = 110$ Yes, box can be delivered as 890cm does not exceed 900.	$h^2 = 610^2 - 600^2$ $h = \sqrt{12100}$ $L + B + H = 110 + 600 + 180 = 890$
1	Number Words & Scientific Notation	2 330 000 $2.3 \times 10^6$	
2	Mean and Negative numbers	Mean = $1^\circ\text{C}$	Total = 7 Mean = $7^\circ\text{C} \div 7 = 1^\circ\text{C}$
Page 23			
3	Wages	Time and a half = £7.20per hour. Gross Pay = £237.60 Adam loses £3.60	Half of 4.80 = 2.40. Time & a half = 7.20 $39 \times £4.80 = £187.20$ $7 \times £7.20 = £50.40$ Adam late 3 days (M/W/F). Loses $\frac{3}{4}$ of an hours pay. $4.80 \div 4 \times 3 = £3.60$
	Combinations	$5\ 5\ 5 = 15\checkmark$ $5\ 5\ 4 = 14\checkmark$ $5\ 4\ 5 = 14\checkmark$ $5\ 4\ 4 = 13\checkmark$ $5\ 4\ 3 = 12\text{x}$	Must start with 5 (prime >3)
4	VAT and Bills	£199.76	296 Peak Rate minutes $296 \times 0.42 = £124.32$ <u>183 Off-Peak minutes</u> $183 \times 0.18 = £32.94$ Sub Total = £170.01 VAT = $17.5 \div 100 \times £170.01$
Page 24			
6	Pythagoras	Diagonal = 196.98cm Yes it is long enough as 2metres for the metal strip is 3.02cm too long.	$a^2 = 180^2 + 80^2$ $a = \sqrt{38800}$
8	Area	Area = $3192.28\text{cm}^2$	$\text{Area}_{\text{rectangle}} = 70 \times 50 = 3500\text{cm}^2$ $\text{Area}_{\text{semicircle}} = \pi \times 14^2 \div 2 = 307.72$

Page 25															
7	Coordinates and properties of quadrilaterals	D (-3, -2) $Gradient_{AB} = \frac{vertical}{horizontal} = -\frac{8}{3}$	Kite has one line of symmetry/ Negative gradient as it is 'going downhill'.												
9	Patterns	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td></td> <td>20</td> </tr> <tr> <td>0</td> <td>2</td> <td>4</td> <td>6</td> <td></td> <td>38</td> </tr> </table> $C = 2P - 2$ 16 posts needs 30 chains	1	2	3	4		20	0	2	4	6		38	Rule going up in 2's => $\times 2$  Use formula to get: 18 posts = 34 chains (too many) 19 posts = 32 chains (too many) 18 posts = 30 chains (OK).
1	2	3	4		20										
0	2	4	6		38										
Page 26															
11	Pie Charts	£10 million	$Magazines = \frac{110}{360} = 34,000,000$ $= 10,388,888.89$												
12	Trigonometry	$x = 4.51$ metres	SOHCAHTOA Use Tan ratio. $Tan 61^\circ = \frac{x}{2.5}$ $x = 2.5Tan 61^\circ$												
13	Problem Solving	28 tins for a stack of 105cm	$1.05m = 105cm$ If each tin is 15cm high, $105 \div 15 = 7$ rows needed. $1 + 2 + 3 + 4 + 5 + 6 + 7 = 28$ tins.												
Page 27															
14	Inequalities and Factorising	$x \geq \frac{19}{6} = 3\frac{1}{6}$  $4(3ab - 2c)$	$6x \geq 19$												
15	Rotational Symmetry														
16	Formula & Area	$r = 10.4cm$  No, as you would need a length of $(2 \times 10.4) \times 3 = 62.4cm$ which is too long.	$r = \sqrt{\frac{340}{3.14}}$												

Page 28			
	Formula and Volume	Volume = $3014.4\text{cm}^3$	Area <sub>ellipse</sub> = $\pi \times 8 \times 4 = 100.48\text{cm}^2$ Volume = $Ah = 100.48 \times 30$
5	Exchange Rate	(a) £45 (b) Greece is cheapest by £1.50	Spain: $9900 \div 220 = \text{£}45$ Greece: $18531 \div 426 = \text{£}43.50$ Germany: $121.9 \div 2.65 = 46.00$
Page 29			
6	Inequalities	$y < 3$	$7y < 21$
7	Time and Problem Solving	(a) 3pm (b) She meets the deadline because she calls at 5.30pm Aberdeen time.	$10\text{am} + 5 = 1500\text{hours} = 3\text{pm}$ $6\text{pmUK} = 1\text{pmNY} = 10\text{amLA}$ $9.30\text{amLA} = 5.30\text{pmUK}$
8	Rotational Symmetry	