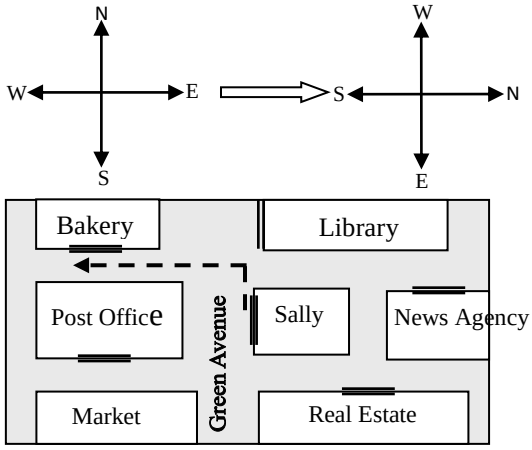
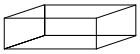
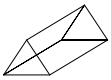
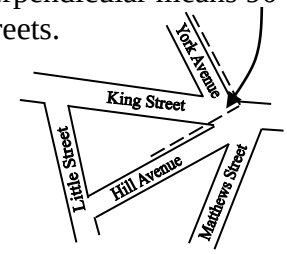
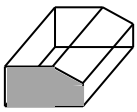
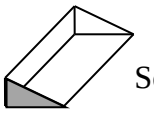
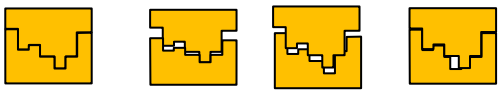
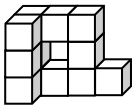
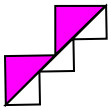
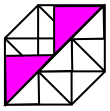
YEAR 9 – PAPER THREE
ANSWERS AND LEARNING STATEMENT

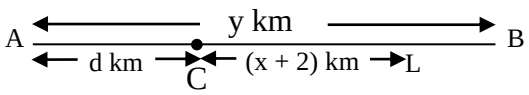
NON CALCULATOR

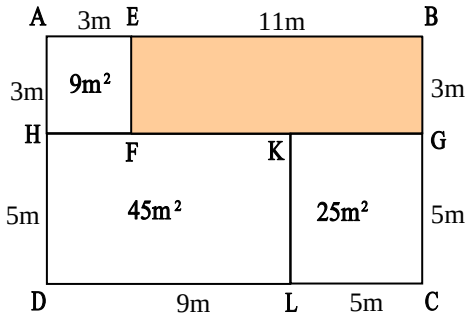
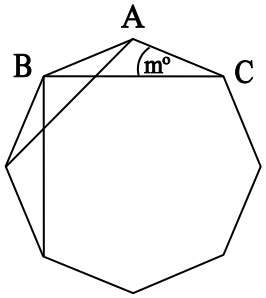
	ANSWER	WORKED SOLUTION	LEARNING STATEMENT A student can
1	Bakery	 Sally's route – she passes the Bakery	investigate different ways to produce the same transformation such as using two successive rotations. MG181
2	51, 60	Each day the number of pages Carla reads increases in the following pattern:4, 5, 6, 7. On day 6 it will increase by 8 pages and on day 7 by 9 pages. Day 6 = 43 + 8 = 51 Day 7 = 51 + 9 = 60	create algebraic expressions to find missing terms in a pattern. NA176
3	1000	10 divisions represents 2 000 animals. 1 division = 2 000÷10 = 200 Number of cows is 5 divisions more than sheep = 5 × 200 = 1 000	construct and compare data displays. SP170
4	Palm Town	Difference between maximum and minimum for each town is Hall Town = 8 – (−4) = 8 + 4 = 12 Palm Town = −2 – (−13) = −2 + 13 = 11 Shade Town = 5 – (−8) = 5 + 8 = 13 Sun Town = 6 – (−6) = 6 + 6 = 12 Smallest variation is Palm Town	carry out operations with integers, using efficient mental and written strategies. NA183

5	Rectangular pyramid	Rectangular prism  Vertices + Edges = 8 + 12 = 20 Rectangular pyramid  Vertices + Edges = 5+ 8 = 13 Triangular prism  Vertices + Edges = 6 + 9 = 15 Triangular pyramid  Vertices + Edges = 4+ 6 = 10	draw different views of prisms and pyramids to find the relationship between vertices and edges. MG161
6	York Ave	Perpendicular means 90^0 between the two streets.  York Ave is perpendicular to Hill Ave.	investigate conditions for two lines to be perpendicular. MG164
7	Triangular and pentagonal prisms	Both shapes have a uniform cross sectional area, so they are both prisms.  Cross section = pentagon So a pentagonal prism  Cross section = triangle So a triangular prism	recognise different prisms formed by cutting a solid. MG161
8	First shape		recognise which transformations create congruent figures. MG200
9	7:52pm	Time left to run = 2 h 15 min– 35 min = 1 h 40 min 1 h 40 min after 6:12pm is 7:52pm	solve problems involving duration. MG199

10	First graph	Number of vehicles in decreasing size is: Cars, trucks, motor cycles, semi-trailers Graphs 1: correct order Graph 2: Trucks shown are most - incorrect Graph 3: Trucks and motor cycles equal – incorrect Graph 4: Trucks less than motor cycles – incorrect	construct and compare data displays. SP170
11	12	Comparing speeds: Human = 3 × Chicken Wildebeest = 2 × Human = 6 × Chicken Cheetah = 2 × Wildebeest = 12× Chicken	solve problems involving direct proportion. NA208
12	3rd structure		recognise a solid given three of its views. MG161
13	Second rectangle	Each rectangle has a total 4 × 5 = 20 squares First rectangle has 11 shaded $\frac{11}{20} \times 100 = 11 \times 5 = 55\%$ Second rectangle has 11 ½ shaded $\frac{11\frac{1}{2}}{20} \times 100 = 11\frac{1}{2} \times 5 = 57\frac{1}{2}\%$ Third rectangle has 13 shaded $\frac{13}{20} \times 100 = 13 \times 5 = 65\%$ Fourth rectangle has 13 shaded = 65%	solve problems involving the use of percentages. NA187
14	50 × 36 − 10 × 8	Dimensions of backyard: Length = 42 + 8 = 50 Width = 26 + 10 = 36 Backyard area = 50 × 36 Barbecue area = 10 × 8 Grass area = 50 × 36 − 10 × 8	calculate the area of composite shapes. MG216
15		This logo cannot be produced. 	experiment with, create and recreate patterns. MG181

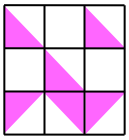
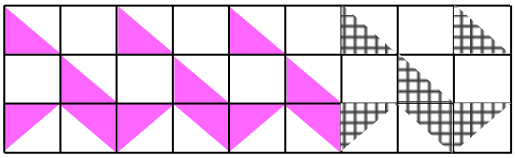
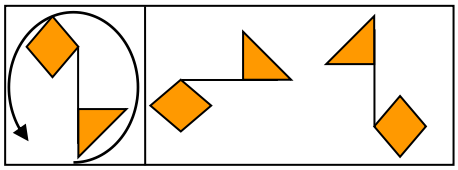
16	40	The bag of hooks cost $23.95 which is about $24 or 2400 cents. Therefore, the cost of one fishing hook is: 2400 ÷ 60 = 240 ÷ 6 = 40 cents.	carry out operations with rational numbers using efficient mental and written strategies. NA183
17	5kg	Total mass of 4 boxes = 4.5 × 4 = 18kg Heaviest box is less than 18kg. Heaviest mass could be 5kg.	calculate the mean for a set of data. SP171
18	40g	Weight of 1 cake = 150 ÷ 5 = 30g Add the two scales together: LHS = 5cakes = 150g RHS = 1cake (30g) + 3doughnuts + 3hearts ∴ 150g = 30g + 3doughnuts + 3hearts 120g = 3doughnuts + 3hearts ∴1doughnut + 1 heart = 120g ÷ 3 = 40g  +  = 40g	solve equations using concrete materials, such as the balance model. NA179
19	9	The last two digits could be 3□ or □3 Since the digits are odd then □ could be 1, 3, 5, 7 or 9. So the last two digits could be i) 31, 33, 35, 37, 39 or ii) 13, 33, 53, 73, 93 This would be 10 possible ways but since 33 appears in both i) and ii) then there are only 9 possible ways. Maximum number of calls he needs to make is 9.	construct a sample space. SP167
20	A rectangle with diagonals bisecting the angles they cut through	It is impossible to draw a rectangle with diagonals bisecting the angles they cut through as it becomes a square. All other options are possible.	establish properties of quadrilaterals. MG202

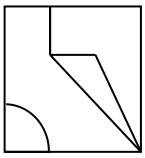
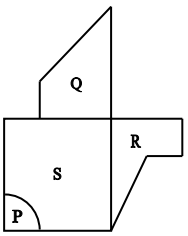
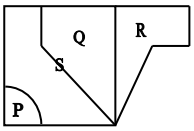
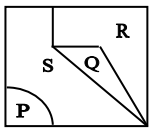
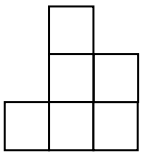
21	68	Saturday's total = 68 + 86 = 154 Saturday's total = 110% × Sunday's total. Sunday's total = Saturday's total ÷ 110% $= 154 \div \frac{110}{100} = 154 \times \frac{100}{110} = 154 \times \frac{10}{11}$ = 14 ×10 = 140 Supremeson Sunday = 140 – 72 = 68	solve problems involving the use of percentages, including percentage increases. NA187
22	(58 × 40) + (58 × 3)	Money made = 58 × 43 =58 × (40 + 3) = 58 × 40 + 58 × 3 = (58 × 40) + (58 × 3)	apply the distributive law to aid written computation. NA151
23	70	3 parts gold fish = 21 1 part = 21 ÷ 3 = 7 7 parts koi = 7 × 7 = 49 Total fish = 21 + 49 = 70	solve a range of problems involving rates and ratios. NA188
24	3	The fewest number of girls who wear glasses will occur when the most number of boys wear glasses. If all 9 boys wear glasses then the number of girls who wear glasses is 12 – 9 = 3.	carry out operations with rational numbers and integers. NA183
25	5.4×10^{8}	540 000 000 If the decimal point is placed here then move 8 places to the right to obtain original number i.e. multiply by 10^{8}. 540 000 000 = 5.4×10^{8}	express numbers in scientific notation. NA210
26	y – d – x – 2	 L = lunch stop Peter is (d + x + 2) km from A when he stops for lunch. Distance left to B = y − (d + x + 2) = y – d – x – 2	simplify algebraic expressions. NA192

27	24	Let B = black cars, W = white cars and R = red cars. R = 2 × W = 2W B = 1 + ¼ W Total cars (black + red + white) = 1 + ¼ W + 2W + W = 1 + 3 ¼ W = 1 + $\frac{13}{4}$W ∴ 1 + $\frac{13}{4}$W = 79 , $\frac{13}{4}$W = 78 W = $\frac{4}{13}$ × 78 = 4 × 6 = 24	solve linear equations using algebraic techniques. NA194
28	33 m^2	 Area AEFH = $9m^2$∴ AE = AH = 3m = BG Area KGCL = $25m^2$ ∴ GC = LC = 5m = HD Area rectangle HKLD = $45m^2$. Since HD = 5m then DL = 45 ÷ 5 = 9m Length of DC = 9+ 5 = 14m ∴ EB = 14 – 3 = 11m Area shaded rectangle = 11 × 3 = 33 m^2.	calculate the area of composite shapes. MG216
29	22.5°	Interior angle sum of an octagon is (8 – 2) × 180°= 1080° As the octagon is regular all angles are equal. So each angle is 1080°÷8= 135° As AB = AC (equal sides of a regular octagon) then triangle ABC is isosceles.  Hence, ∠ABC = ∠ACB = m° 2m + 135° = 180°(angle sum of∆ABC) 2m = 45° m = 22.5°	demonstrate that the angle sum of a triangle is 180° and use this to find the angle sum of a polygon. MG166

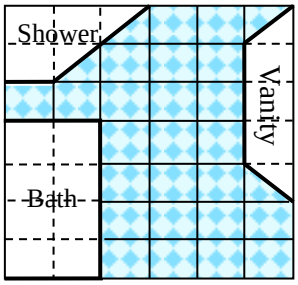
30	2 ½ hours	20L per min takes 4 hours to fill 1L per min will take 4 × 20 = 80 hours 16L per min will take 80 ÷ 16 = 5 hours It will take 2 ½ hours to fill half the trough.	solve a range of problems involving rates and ratios. NA188
31	80km/h	Time taken = 2h 45min + 2h 29min + 2h 16min = 6h 90min = 6h + 1 ½ h = 7 ½ h Average speed = 600 ÷ 7 ½ = 600 ÷ $\frac{15}{2}$ = 600 × $\frac{2}{15}$ = 40 × 2 = 80km/h	solve a range of problems involving rates and ratios. NA188
32	18	Stage 1 is in this direction ↑ Stage 5 is in this direction ↓ From Stage 1 to stage 5 is effectively a rotation of 180°. ∴ x + 2x + 3x + 4x = 180 10x = 180 x = 180 ÷ 10 = 18	investigate different ways to produce the same transformation such as using multi successive rotations. MG181

YEAR 9 – PAPER THREE – CALCULATOR ALLOWED

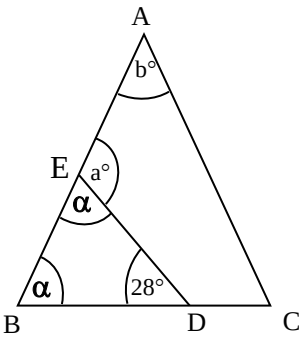
	ANSWER	WORKED SOLUTION	LEARNING STATEMENT A student can
1		 Checked pattern completes the tessellation.	describe patterns and investigate different ways to produce the same transformation. MG181
2	2950g	Mass = 3kg –50g = 3000g – 50g = 2950g	choose appropriate units of measurement volume and convert from one unit to another. MG195
3	¼	Total votes = 60 + 20 = 80 Fraction navy = $\frac{20}{80} = \frac{2}{8} = \frac{1}{4}$	express one quantity as a fraction of another. NA155
4	0.8	4.2 ÷ □ = 5.25 ∴ 4.2 = 5.25 × □ □ = 4.2 ÷ 5.25 = 0.8	carry out operations with rational numbers using efficient mental and written strategies. NA183
5	Second shape		investigate different ways to produce the same transformation such as using successive rotations. MG181
6	7th shape	From shape 3 (25 matches) to 57 matches = 57 – 25 = 32 For each successive shape add 8 matches. 32 ÷ 8 = 4 Four more shapes i.e. the 7th shape.	find the rule for a linear relationship. NA193
7	D = ck ÷ 100 + s	Product of cents per km and number of kilometres = ck Converting to this to dollars = ck ÷ 100 Adding the standard daily rate gives ck ÷ 100 + s	find the rule for a linear relationship. NA193

8		   P over S Q over S R over S	investigate different ways to produce the same transformation such as using successive reflections. MG181
9	150 000	147 142 ten thousands The digit indicated is the ten thousands column. The number is closer to 150 000 than 140 000.	using rounding to estimate the results of calculations with whole numbers. NA156
10	C = 15L + 50	Cost of L lessons at $15 per lesson = 15 × L = 15L Add on the registration fee of $50 C = 15L + 50	find the rule for a linear relationship. NA193
11	20cm	Let the height of the box be h cm. ∴ 40 + h + 40 + h = 120 80 + 2h = 120 ∴2h = 40 h = 20	solve simple linear equations. NA179
12		From Elisa's view: Left is 10 cm high i.e. 1 cube. Middle is 30 cm high i.e. 3 cubes Right is 20cm high at the back i.e. 2 cubes	draw different views of prisms and solids. MG161
13	144cm	Width of each drawer = 3.6m ÷ 5 = 360cm ÷ 5 = 72cm Shelf is 2 drawers wide = 2 × 72cm = 144cm	carry out operations with rational numbers using efficient mental and written strategies. NA183
14	15m	Scale = 1 : 150 so the real length is 150 times the model length. Real length = 150 × 10cm = 1500cm = 1500 ÷ 100 = 15m	solve a range of problems involving rates and ratios. NA188

15	6.875	$m = 10 - 2\ n^2 = 10 - 2 \times n^2$ When $n = 1.25$, $m = 10 - 2 \times 1.25^2 = 6.875$	evaluate algebraic expression by substituting a given value for a variable. NA176
16	1.28kg	8 times the recommended dietary intake of Niacin = 8 × 12mg = 96 mg Packet contains 7.5mg of Niacin per 100g. 96 ÷ 7.5 = 12.8 There are 12.8 lots of 100g = 12.8 × 100 = 1280g = 1280 ÷ 1000 = 1.28kg	solve a range of problems involving rates and ratios. NA188
17	12g	Yeast : Flour = 3 : 247 Total parts = 3 + 247 = 250. 1 kg = 1000g Each part = 1000g ÷ 250 = 4g 3 parts yeast = 3 × 4g = 12g	solve a range of problems involving rates and ratios. NA188
18	214%	Using the calculator $2\frac{1}{7} \times 100\% = 214\frac{2}{7}\%$ 214% is closest	connect fractions and percentages and carry out simple conversions. NA157
19	30p + 20	Since the distance increases by 30m for each minute then distance d = 30 × number of minutes + constant = 30 p + constant where p = number of minutes When p = 1, d = 50 50 = 30 × 1 + constant constant = 20 Expression for distance is30p + 20	find the rule for a linear relationship. NA193
20	250g	Weight of 20 tins + carton = 7.75kg Weight of 26 tins + carton = 10kg ∴ Weight of 6 tins = 10kg – 7.75kg = 2.25kg Weight of 1 tin = 2.25kg ÷ 6 = 0.375kg Weight of 20 tins = 0.375kg × 20 = 7.5kg Weight of carton = 7.75kg – 7.5kg = 0.25kg = 0.25 × 1000 = 250g	carry out operations with rational numbers using efficient mental and written strategies. NA183

21	76.23 cm^3	For the cube: height = width = depth = 2.2cm For the rectangular prism: Height = 5.5 cm + 2.2 cm = 7.7 cm Width = 4.5 cm Depth = 2.2 cm Volume = 7.7 × 4.5 × 2.2 = 76.23 cm^3	use formulas to solve problems involving volume. MG198
22	$\frac{13}{21}$	The room is 7 tiles long by 6 tiles wide = 42 tiles.  Shower covers the equivalent of 4 tiles. Bath covers the equivalent of 8 tiles. Vanity covers the equivalent of 4 tiles. Number of tiles required = 42 – (4 + 8 + 4) = 42 – 16 = 26 Fractioncovered = $\frac{26}{42} = \frac{13}{21}$	calculate the area of composite shapes. MG216
23	8	If average age for 3 children is 10 then the total of their ages = 3 × 10 = 30 Third child's age = 30 – (10 + 12) = 30 – 22 = 8	calculate the mean for a set of data. MG171
24	Squirrel	Speed = distance ÷ time Mouse = 133 ÷ 60 = 2.21666 m/s Pig = 148 ÷ 30 = 4.9333 m/s Squirrel = 54 ÷ 10 = 5.4 m/s Chicken = 160 ÷ 40 = 4.0 m/s Squirrel is the fastest.	solve a range of problems involving rates and ratios. NA188
25	70m	Peter's distance = 120m Anthony's distance = ½ circumference of circle = ½ (πd) = ½ × π × 120 = 188.5m Difference in distance 188.5m – 120m = 68.5m Approximately 70m.	investigate the relationship between features of circles such as circumference, area, radius and diameter. MG197

26	16	Product of the two numbers – 5 = 59 ∴ product of the two numbers = 59 + 5 = 64 Factors in pairs are 1, 64 or 2, 32 or 4, 16 or 8,8 The minimum value for the sum of the two numbers is 8 + 8 = 16	apply knowledge of factors to strategies for expressing whole numbers as products. NA149
27	718.5 mm	750 – 748.25 = 1.75 = 748.25 – 746.5 etc. For every 10^0 decrease in temperature the length decrease by 1.75mm. From 200^0 to 20^0 is a decrease of 180^0. $180^0 \div 10^0 = 18$ Amount of decrease = 18 × 1.75mm = 31.5 mm Length 750 – 31.5 mm = 718.5 mm	solve a range of problems involving rates and ratios. NA188
28	$2 040	Total number of locks to be fitted = 6 × 8 = 48 $ 90 for every 4 locks and 48 ÷ 4 = 12 Cost of locks = 12 × $90 = $1080 $20 profit for each lock = 48 × $20 = $960 which will be added on. He needs to charge $ 1080 + $960 = $2040	solve problems involving profit. NA189
29	1624	Number of divisions on the sector graph is 20. Drama has 7 divisions out of the 20. Drama DVDs = $\frac{7}{20} \times 4640 = 1624$	explore the relationship between graphs and simple rates problem. NA208
30	10 minutes	Tap A fills one tank in 30 minutes. Tap B will fill two tanks in 30 minutes. So together taps A and B will fill 3 tanks in 30 minutes i.e. one tank in 10 minutes.	solve a range of problems involving rates and ratios. NA188

31	a = 104° b = 28°	 Let $\angle EBD = \alpha . \therefore \angle BED = \alpha$ (base angles of isosceles ΔEBD are equal) α + α + 28° = 180° (angle sum of ΔEBD) 2α = 180º − 28º 2α = 152º α = 76º a = 180º − 76º (angle of a straight line AB) ∴a = 108º ∠ BCA = 76º (base angles of isosceles ΔABC are equal) b + 76 + 76 = 180º (angle sum of ΔABC) b = 180º − 152º b = 28º	finding angles using angle sum of a triangle and base angles of isosceles triangle. MG166
32	5 cm	1 m^3 = 100cm × 100cm × 100cm = 1 000 000cm^3 Volume of the smaller cubes = 1 000 000 ÷ 8 000 = 125cm^3 Volume of cube = s^3 = 125 Length of side, s = $\sqrt[3]{125} = 5$ cm	recognise that the conversion factors for volume units arethe cubes of those for the corresponding linear units. MG195