YEAR 9 – PAPER FIVE
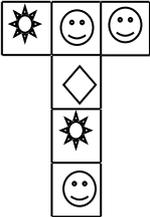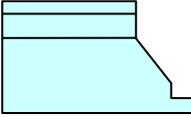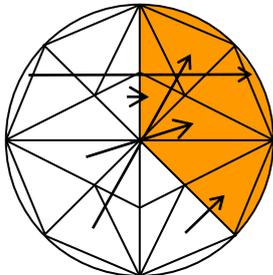## ANSWERS AND LEARNING STATEMENT

NON CALCULATOR
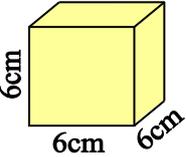
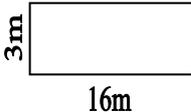| QUESTION	ANSWER	WORKED SOLUTION	LEARNING STATEMENT A student can	NSW SYLLABUS
1	7.35m	There are 10 intervals between 7m and 7.5m. Therefore, each interval represents: $0.5 \div 10 = 0.05$m. So, 7 intervals represent 0.35m. Hence, the measurement is $7 + 0.35 = 7.35$m	identify a value on a simple scale.	MS 3.1
2	210m	Each vertical interval represents 30m. The highest point at Hillview is 120m above sea level and the lowest point in Blue Gulf is 90m below sea level, so the difference is $120 - (-90) = 210$m.	interpret a scale on a diagram and subtract integers.	NS 4.3
3	$\dfrac{30}{7}$	$4\dfrac{2}{7} = \dfrac{28}{7} + \dfrac{2}{7} = \dfrac{30}{7}$	write a mixed numeral as an improper fraction.	NS 4.3
4	0.09	$4 \overline{)0.36}^{\,0.09}$	add, subtract, multiply and divide decimals (limit operators to 2 digits for division).	NS 4.3
5	3	Range = largest score – smallest score So, the largest score = Range + smallest score Therefore, the largest score is $57 + 26 = 83$. Hence, $\square$ represents 3.	interpret data displayed in a stem and leaf plot and analyse data.	DS 4.1 DS 4.2
6	108	The cost of 10 boxes is $108.50, which is more than $100. The cost of 9 boxes is $9 \times \$10.85 = \$97.65$, which is less than $100. Therefore, the largest number of cans that can be bought is $9 \times 12 = 108$ cans.	solve a variety of real life problems involving rates.	NS 4.3
7	71.5m	6cm represents 66m, so 1cm represents 11m. By measuring the diagram, the length of the plane is 6.5cm. This would represent 6.5×11m $= 71.5$m	identify and use the scale in a scale drawing to calculate a length.	SGS 4.4
8	$\dfrac{1}{3}$	Two of the six equal sectors of the spinner show a 4. Hence, the probability of a 4 is $\dfrac{2}{6}$ which simplifies to $\dfrac{1}{3}$.	determine the probability of a simple event.	NS 3.5

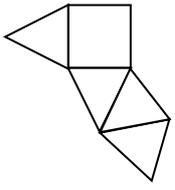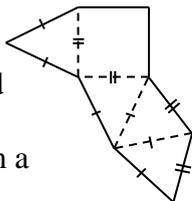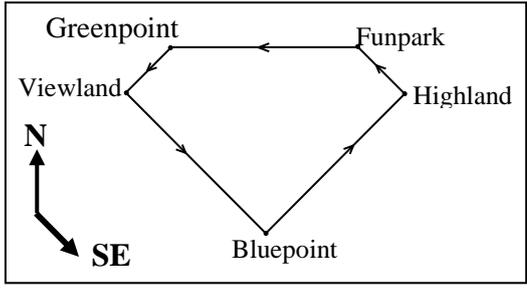|				
9	48	If 20% are red, then 80% are white. Hence, the number of white roses is $\frac{80}{100} \times 60 = 48$.	solve a simple word problem involving percentages.	NS 4.3
10	14 years	Since John's dad is 4 years less than 3 times John's age, then 3 times John's age is $38 + 4 = 42$. Hence, John's age must be $42 \div 3 = 14$.	identify the solution of a multi-step word problem involving proportional reasoning.	NS 4.2
11	27	Peter is three times his daughter's mass, so he is $3 \times 36kg = 108$ kg. Since Peter's mass is 4 times his son's mass then his son's mass is $108 \div 4 = 27$ kg.	identify the solution of a multi-step word problem involving proportional reasoning.	NS 4.2
12	10 cm	The area of rectangle I is $6 \times 15 = 90$cm². Hence, in rectangle II , $9 \times x = 90$, then $x = 10$ cm.	find the length of a rectangle given the area and one side.	MS 3.2
13	$30 \times \$10 + 20 \times \$20$	27 boxes of mangoes at \$13 each is close to $30 \times \$10$ and 19 boxes of tomatoes at \$19 each is close to $20 \times \$20$.	identify an arithmetic expression giving the best estimate of a calculation.	NS 3.1
14	$\sqrt{150}$	$12 = \sqrt{144}$ and $13 = \sqrt{169}$. Hence, out of the four options only $\sqrt{150}$ is between 12 and 13.	identify a range of values between which a 3 digit surd lies.	NS 4.1
15	12	The number of red apples in the tray is: $\frac{2}{5} \times 20 = 8$. Therefore, there are $20 - 8 = 12$ green apples in the tray.	determine the probability of a simple event.	NS 3.5
16	(–3, 0)	By substituting the coordinates of each point into the equation y = 2x+6, we get: $-3 \neq 2 \times 0 + 6$ $-2 \neq 2 \times -2 + 6$ $0 = 2 \times -3 + 6$ $-8 \neq 2 \times -2 + 6$ From the above, it can be seen that only the point (–3, 0) satisfies the equation. Hence, only this point lies on the line.	determine whether a point lies on a line.	PAS 4.5
17	25°	The triangle is equilateral, this indicates that each angle is 60°. Therefore, $2x + 10° = 60°$ that is $x = 25°$.	identify properties of an equilateral triangle. Solve a linear equation.	SGS 4.3 PAS 4.4
18	$2^4 \times 3^6$	Using the index laws: $(2 \times 2 \times 3 \times 3 \times 3)^2 = (2^2 \times 3^3)^2 = 2^4 \times 3^6$	apply index laws to simplify an expression.	NS 5.1.1

19	$\dfrac{500}{p}$	Let N be the number of tomato cans in the pile. Therefore, the mass of the pile is $N \times p$. As the mass of the pile is also 500 kg, hence $N \times p = 500$ and so $N = \dfrac{500}{p}$.	create an algebraic expression to represent a situation.	PAS 4.1
20	72	The number of students wearing hats is: $\dfrac{90}{100} \times 800 = 720$ students . Hence, the number of students wearing hats and carrying banners is: $\dfrac{1}{10} \times 720 = 72$	identify the solution of a multi step word problem involving percentages.	NS 4.3
21		Since $\dfrac{25}{150} = \dfrac{1}{6}$, $\dfrac{75}{150} = \dfrac{3}{6}$ and $\dfrac{50}{150} = \dfrac{2}{6}$ then the net John is to use has one ◇, three ☺ and two ☀	estimate the probability of an event from tabulated data.	NS 5.1.3
22		From the side view, the left side should be vertical and the right side should be vertical, sloping, vertical, horizontal then vertical. Only the first option shows this view.	identify a view of a solid shape.	SGS 3.1
23	$\dfrac{3}{7}$	The total number of students in the four columns is $5 + 7 + 12 + 4 = 28$ students. Of these students, 12 are less than 167 cm tall. Hence, the probability of randomly selecting a student less than 167 cm tall is $\dfrac{12}{28} = \dfrac{3}{7}$.	solve probability problems involving simple events.	NS 4.4
24	54	When a = 3 and b = –3 $2ab^2 = 2 \times 3 \times (-3)^2$ $= 2 \times 3 \times 9$ $= 54$	substitute into an algebraic expression.	PAS 4.3
25	49.6cm²	The area of a kite is half the product of the lengths of its diagonals. These diagonals are the length and width of this rectangle, so its area is twice that of the kite. Hence, the area of the rectangle is $2 \times 24.8 = 49.6$ cm².	recognise relationships between the area of different quadrilaterals.	MS 5.1.1

26	$\dfrac{xy}{2}$	If $5x^2y \div \boxed{} = 10x$, then $5x^2y \div 10x = \boxed{}$ Hence, $\boxed{} = \dfrac{xy}{2}$.	simplify algebraic expressions that involve division.	PAS 4.3
27	$18 \times 0.4 \times 170 - \$18 \times 0.05 \times 30$	The profit on 170 calculators was $18 \times 0.4 \times 170$ and the loss on the remaining 30 calculators was $18 \times 0.05 \times 30$. This means that the total profit was $18 \times 0.4 \times 170 - \$18 \times 0.05 \times 30$.	solve a multi step percentage problem.	PAS 5.1.2
28	$20	The first time James sold the chain he made a profit of $170 - \$150 = \$20$, and the second time he also made a profit of $210 - \$190 = \$20$ but he has to give back the $20 he borrowed so his total profit was $40 - \$20 = \$20$.	solve a multi step word problem involving profit.	NS 5.1.2
29	85°	As ABCD is a square, $\angle BAC = 45°$ (the diagonals of a square bisect the right angles) As the angle sum of a triangle is 180°, then $x + 50° + 45° = 180°$ $\therefore x = 180° - 95° = 85°$	apply knowledge of triangles and squares and their angle properties to solve problems.	SGS 4.3
30	$\dfrac{3}{8}$	If the shapes are moved as indicated by the arrows, it can be seen from the diagram that the fraction of the circle shaded is $\dfrac{3}{8}$.	calculate what fraction of a dissected circle is shaded.	MS 4.1
31	200	Jessica buys 5 roses for $12 which means she pays $2.40 for each rose. She sells 4 roses for $12 which means she sells each rose for $3. Hence, her profit is $3 - \$2.40 = 60$ cents per rose. Hence, to make a profit of $120 she would have to sell $120 \div \$0.60 = 200$ roses.	solve a multi step word problem involving profit.	NS 5.1.2

YEAR 9 – PAPER FIVE – CALCULATOR ALLOWED

QUESTION	ANSWER	WORKED SOLUTION	LEARNING STATEMENT A student can	NSW SYLLABUS
1	1 hour 55 minutes	There are 40 minutes between 11:20 am and noon, and 1 hour and 15 minutes between noon and 1:15pm. Therefore, the time between 11:20 am and 1:15pm is 40 minutes plus 1hour 15 minutes. Hence, the time taken by the train is 1 hour and 55 minutes.	calculate elapsed time in hours and minutes between two given digital times in am/pm notation.	MS 3.5
2	-2	The number halfway between -12 and 8 is their average which is $\frac{-12+8}{2} = -2$. Hence, -2 is the number halfway between -12 and 8.	find the value of a number halfway between two integers.	NS 4.2
3	290 km	Greenwood and Hilltown are in opposite directions. Hence, the total distance between them is $167 + 123 = 290$ km.	solve a simple word problem involving the addition of whole numbers.	NS 3.2
4	75	$\frac{5}{8}$ of the lollies are green. Hence the number of green lollies is $\frac{5}{8} \times 120 = 75$.	solve a problem involving ratios.	NS 4.3
5	60	January has 31 days, so the average number of fish per day is $1860 \div 31 = 60$ fish.	use data to calculate the mean.	DS 5.1.1
6	105	As the angle is more than 90° it cannot be 75°, the angle on the outer scale. By reading the inner scale, the angle indicated is 105°.	read a protractor scale to accurately measure a given obtuse angle.	SGS3.2b
7	6cm 6cm 6cm	The volume of each of the four prisms is as shown: $5 \times 8 \times 5 = 200$cm³, $6 \times 6 \times 6 = 216$ cm³. $4 \times 12 \times 4 = 192$ cm³, $10 \times 4 \times 5 = 200$cm³. Hence, the cube with edges 6cm has the largest volume.	calculate the volume of rectangular prisms.	MS 4.2
8	67108864	To calculate the 4th term, the rule must be applied on the 3rd term which is 16 384. Hence, the 4th term in David's pattern is $16384\,^{2} \div 4 = 67108864$	Apply a rule to find a term in a sequence.	PAS 4.2

9	$\dfrac{1}{3}$	As each person ate $\dfrac{2}{3}$ of a pizza, then the four of them ate altogether $4 \times \dfrac{2}{3} = 2\dfrac{2}{3}$ pizzas. Therefore, the amount of pizza remaining is $3 - 2\dfrac{2}{3} = \dfrac{1}{3}$ pizza.	perform operations with fractions.	NS 4.3
10	4	If $3k = 36$, then $k = 12$. Hence, $\dfrac{k}{3} = \dfrac{12}{3} = 4$.	solve a linear equation.	PAS 4.4
11	$220	Veronica received 20% discount then she paid 80% of the original price. Let x be the original price, then $0.8 \times x = \$176$ Therefore $x = \$176 \div 0.8 = \$220$ Hence, the original price of Veronica's coat is $220.	calculate pre-sale price of an item.	NS 4.3
12	3m / 16m (rectangle)	The perimeter P and the area A for each rectangle are as shown: Shape 1: P = 2(2 + 22) = 48m — Incorrect; A = 2 × 22 = 44m² — Incorrect Shape 2: P = 2(3 + 16) = 38m — Correct; A = 3 × 16 = 48m² — Correct Shape 3: P = 2(4 + 12) = 32m — Incorrect; A = 4 × 12 = 48m² — Correct Shape 4: P = 2(6 + 8) = 28m — Incorrect; A = 6 × 8 = 48m² — Correct Only the 2nd shape has both the perimeter and area as required.	calculate the perimeter and area of a rectangle.	MS 4.1
13	$9	Let the cost of the drink be D dollars, then the cost of one movie ticket will be 2D dollars. As two movie tickets and one drink cost $22.50 then $2D + 2D + D = \$22.50$ $5D = \$22.50$ Therefore, D = $4.50 Hence, the drink costs $4.50 and the movie ticket costs 2 × $4.50 = $9.	operate with decimals to solve a word problem.	NS 4.3
14	10 × number of parallelograms + 2	The first 5 terms are placed in this table <table><tr><td>Number of parallelograms</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Number of matchsticks</td><td>12</td><td>22</td><td>32</td><td>42</td><td>52</td></tr></table> By calculation, or by testing each of the possible rules provided, the correct pattern is 10 × number of parallelograms + 2.	identify a rule to match a physical pattern.	PAS 4.2

15	$\dfrac{2}{3}$	If $42 \div \triangle = 63$ then $42 \div 63 = \triangle$ So $\triangle = \dfrac{42}{63} = \dfrac{2}{3}$	identify and use an operation to solve a problem involving fractions.	NS 4.2
16	$90°$	The angle sum of a hexagon is $(6 - 2) \times 180° = 720°$ $\therefore x + 130° + 130° + 150° + 150° + 70° = 720°$ (angle sum of a hexagon) $x + 630° = 720°$ $\therefore x = 90°$	apply the knowledge of the angle sum of a hexagon to calculate the size of a missing angle.	SGS 5.2.1
17		As can be seen in the diagram, the equal sets of sides allow the edges marked with 2 dashes to fit together along the square base to form a square pyramid.	identify the net of a 3 dimensional object.	SGS 3.1
18	$m = 2$	Substitute the given values of m into the equations $n = 2m - 7$ and $n = 3m - 9$. When m= 2, we get $n = -3$ in both equations. When m= –2, we get $n = -11$ in the first equation and n= –15 in the second. When m= 4, we get $n = 1$ in the first equation and n= 3 in the second. When m= – 4, we get $n = - 15$ in the first equation and n= – 21 in the second. Hence, both equations produce the same value of n only when m = 2.	substitute given values into an algebraic expression.	PAS 4.3
19	Viewland	 The part of the journey from Viewland to Bluepoint is the only part which is in a south easterly direction. Hence, when James left Viewland he was riding in a south easterly direction.	identify a compass bearing given the orientation of objects on a map.	SGS 2.3
20	$- 27$	Substituting the value $a = -3$ into the expression $3a - 2a^2$ produces $3 \times (-3) - 2 \times (-3)^2 = -9 - 2 \times 9$ $= -9 - 18$ $= -27$	substitute into an algebraic expression.	PAS 4.3

21	1275	The distance from Sally's house to the Beach is 5cm on the scale drawing, so 5cm represents 850m. Hence, 1 cm represents 170m on this scale drawing, The distance from Sally's house to the beach, via the shop, is 4 + 3.5 = 7.5cm. This means the actual distance that Sally will walk is 7.5 × 170 = 1275 m.	identify the scale of a map and use it to calculate other distances in the diagram.	SGS 3.3
22	60°	$x + 55° + 65° = 180°$ (co-interior angles, AB∥CD) $x = 180° - 65° - 55°$ $x = 60°$	apply knowledge of transversals and angles on parallel lines to find the size of an angle.	SGS 4.2
23	452.4cm³	By substituting r = 6 into the given formula, $V = \dfrac{2}{3} \times \pi \times 6^3$ $V = 452.4cm³$	substitute into a given formula to calculate a volume.	SGS 5.2.2
24	74	By substituting C = 6790 into the given formula, we get: $6790 = 85N + 500$ $6290 = 85N$ $N = 74$ Hence, 74 people attended the function.	identify the value of the variable, given the value of the subject, in a stated formula.	PAS 4.4
25	45°	$\angle EBF = 85°$ (opposite angles of parallelogram ABCD are equal) $x = 180° - 85° - 50°$ (angle sum of ΔEFB) $\therefore\ x = 45°$	use the properties of a parallelogram and triangle to calculate the size of a missing angle.	PAS 4.3
26	3927cm²	By considering that the area of a circle is given by $A = \pi r²$, then the area of a semicircle must be given by: $A = \dfrac{1}{2} \times \pi \times r^2$ $\therefore A = \dfrac{1}{2} \times \pi \times 50^2$ Hence, A = 3926.990817cm² which is closest to 3927cm².	calculate the area of a semicircle.	MS 4.1
27	Rhombus	Only one of the diagonals of a kite bisects the angles it passes through. Neither of the diagonals of a trapezium nor parallelogram bisect the angles they pass through. Both of the diagonals of a rhombus bisect the angles they pass through.	apply the knowledge of the properties of the different quadrilaterals to identify a particular quadrilateral.	SGS 4.4

28	$30 - x^2$	Area of the larger triangle is: $\frac{1}{2} \times 10 \times 6 = 30\text{cm}^2$ Area of the smaller triangle is: $\frac{1}{2} \times 2x \times x = x^2 \text{ cm}^2$ The shaded area is $(30 - x^2)$ cm²	calculate the area of a composite shape.	MS 5.1.1
29	13	Since p is a prime number then ' p ' could be 2, 3, 5, 7, 11, 13, 17...... By trial and error, we realise that: for p = 11 ,the number is $7^3 \times 11^4 = 5\,021\,863$, which is less than 9 million, for p = 13, the number is $7^3 \times 13^4 = 9\,796\,423$, which is between 9 million and 10 million. for p = 17, the number is $7^3 \times 17^4 = 28\,647\,703$, which is over 10 million. Hence, the value p must be 13.	understand mathematical terms and develop a strategy to solve a problem involving powers and roots.	NS 4.1
30	24	If the company charges \$4 per km, then the distance travelled for \$56 would be $56 \div 4 = 14\text{km}$. The driver took 35 minutes which the same as $\frac{35}{60} = \frac{7}{12}$ hours to drive this distance. Hence, his average speed for this delivery was: $14 \div \frac{7}{12} = 24$ km/h	interpret and solve a two-step problem, in a practical context, involving rates.	NS 4.3
31	179	The average height of 3 children is 158 cm, that is their combined height is $3 \times 158 = 474\text{cm}$. The average height of 3 children and their two parents is 164 cm, that is the combined height of the 5 people of this family is $5 \times 164 = 820\text{cm}$. So, the combined height of the two parents is $820 - 474 = 346\text{cm}$. Let their father's height be x cm, then their mother's height will be $(x - 12)$ cm Therefore, $x + x - 12 = 346$ $2x = 358$ then $x = 179\text{cm}$ Hence, the father is 179cm tall.	analyse statistical data and calculate a mean to solve a two step problem.	DA 4.2