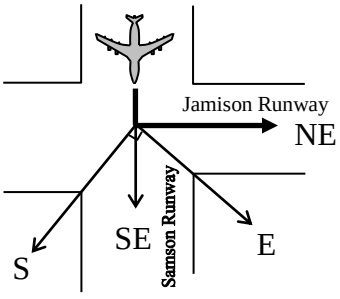
YEAR 9 – PAPER FOUR
ANSWERS AND LEARNING STATEMENT

NON CALCULATOR

QUESTION	ANSWER	WORKED SOLUTION	LEARNING STATEMENT A student can	NSW SYLLABUS
1	49	The seventh square number is 7^2, which is 49.	identify special groups of numbers, including figurate numbers.	NS 4.1
2	50 mL	Melissa takes 20 mL twice a day, which is $20 \times 2 = 40$ mL each day, so in 5 days would use $5 \times 40 = 200$ mL. Hence, the medicine remaining in the bottle is $250 - 200 = 50$ mL .	select and apply appropriate strategies for addition, subtraction and multiplication.	NS 3.2 NS 3.3
3	E2	The aisle seats are D4, E3 and E2. Of these three seats, E2 is furthest from the screen.	use coordinates on simple maps to describe a position.	SGS 2.3
4	$\frac{2}{3}$	There are six numbers on these cards. From these numbers only 7, 17, 37 and 47 are prime numbers. Therefore, the probability of selecting a prime number is $\frac{4}{6} = \frac{2}{3}$	determine relative frequencies and theoretical probabilities.	NS 5.1.3
5	\$30 + \$10 + \$30 + \$20	In each of the four options each amount is a rounded to a multiple of 10. So, the estimates to \$34, \$12, \$28 and \$19 are \$30, \$10, \$30 and \$20 respectively. Hence, the best estimate is \$30 + \$10 + \$30 + \$20.	use estimation to check whether an answer is reasonable.	NS 3.4 Unit 2
6	2.2L	Each division of the scale on the larger jug is $1 \div 5 = 0.2$L. So, the large jug contains 1.2L. As the smaller jug contains 1L then the new amount in the large jug is $1.2 + 1 = 2.2$ L.	estimate the volume of a substance in a partially filled container.	MS 2.3

7	18	Let x be the number then $7x - 14 = 112$ $7x = 112 + 14 = 126$ $x = \frac{126}{7}$ $\therefore x = 18$ Hence, the number is 18.	solve linear equations using strategies such as backtracking.	PAS 4.4
8	1cm represents 3m	4 cm represents 12 m, by dividing each measurement by 4 the result is 1 cm represents 3m	solve real life problems involving ratios.	NS 4.3
9	$\frac{5}{8}$	$\frac{1}{8}+\frac{1}{4}=\frac{3}{8}$ then the fraction that is blue is $1-\frac{3}{8}=\frac{5}{8}$	solve a variety of real life problems involving fractions.	NS 4.3
10	half the area of ABCD	First Method: The area of a kite is one half of the product of its diagonals. The diagonals of this kite are the length and width of the rectangle, hence the area of the kite is equal to half the area of the rectangle. Second Method: Area of the rectangle is NL × MK Area of kite = $\frac{1}{2} \times$ NL × MK Hence, the area of kite is $\frac{1}{2}$ the area of the rectangle.	use formulae to calculate the area of a kite.	MS 5.1.1
11	2	As PQ = PR, then $4x + 1 = x + 7$ $3x + 1 = 7$ $3x = 6$ $x = 2$	determine the properties of triangles and use algebraic techniques to solve equations.	SGS 4.3 PAS 4.4
12	north-east	 The plane is heading SE, then turns left. Its new direction would be NE.	use a variety of mapping skills.	SGS 3.3

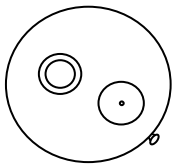
13	rectangle	Of the four options the rhombus, rectangle and parallelogram have diagonals which bisect each other. However, the rectangle is the correct option as it is the only quadrilateral that has also its diagonals equal in length.	classify and determine the properties of a quadrilateral.	SGS 4.3
14	5 800 000	It can be seen that the population triples every 10 years, so in 2020 it will be $3 \times 648000 = 1944000$ and in 2030 it will be $3 \times 1944000 = 5832000$, which is closest to 5 800 000.	create, record, analyse and generalise number patterns.	PAS 4.2
15	24L	There are 5 divisions between 0L and 20 L, so each division is worth 4L. In the first hour the fuel drops 2 divisions before the tank is refilled. It then drops another 4 divisions over the next 2 hours. Hence, the total of 6 divisions is equivalent to $6 \times 4 = 24$L.	interpret scales on maps and diagrams.	MS 3.1
16	2m (3m + 1)	The largest common factor for both $6m^2$ and 2m is 2m. Hence, by factorising we get: $6m^2 + 2m = 2m(3m + 1)$	use algebraic techniques to simplify, expand and factorise algebraic expressions.	PAS 4.4
17	3:30pm Monday	In the first option the car can be parked only from 12:00pm till 4:00pm In the second option if the car was parked at 3:30pm, then it can stay more than 4 hours as after 6:00pm there are no restrictions. In the third and fourth options the car can stay only 4 hours, as the time restriction ends at 2:00pm.	interpret a variety of charts and tables related to time.	MS 4.3
18	7	$6x - 2 = 3x + 19$ $3x - 2 = 19$ $3x = 21$ $x = 7$	use algebraic techniques to solve equations.	PAS 4.4
19	65m	$226 = 2 \times \text{length} + 48 \times 2$ $226 = 2 \times \text{length} + 96$ $130 = 2 \times \text{length}$ Hence, the length is 65m.	use formulae to calculate the perimeter of a rectangle.	MS 4.1

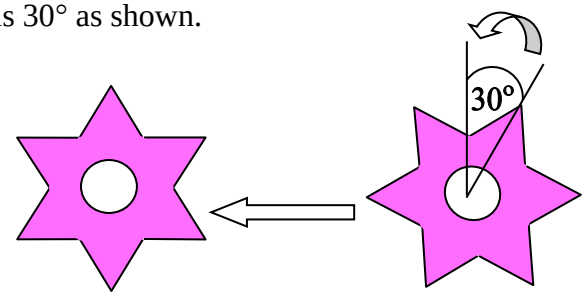
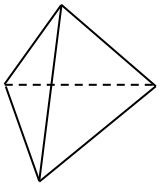
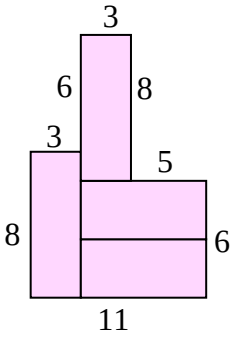
20	24%	Money Earned on Saturday is: \$2500 – \$640 – \$660 – \$600 = \$600 Hence the percentage earned on Saturday is: $\frac{600}{2500} \times 100 = 24\%$	express one quantity as a percentage of another.	NS 4.3
21	75	The stem and leaf plot shows the number of patients admitted per day for 30 days. As the data is arranged in ascending order the median will be the average of the 15^{th} and 16^{th} scores. Median = $\frac{74+76}{2} = 75$.	analyse data displayed in a stem and leaf plot.	DS 4.2
22	(8, 3)	From the diagram, PQ = 8 and PR = 10. By Pythagoras' Theorem, $QR^2 + 8^2 = 10^2$ $QR^2 = 36$ $QR = 6$ Hence R is 6 units below Q so the coordinates of R are (8, 3).	use Pythagoras' Theorem to calculate the length of a side. read name and plot points on the number plane.	MS 4.1 PAS 4.5
23	4.1 ha	The smallest possible area would be $200 \times 200 = 40000m^2 = 4ha$ (1ha=10000m²) The largest possible area would be $210 \times 210 = 44100m^2 = 4.41$ ha. The only possible answer from the alternatives provided is 4.1ha.	recognise that one hectare is equal to 10000 m².	MS 3.2
24	22° North, 5° West	The latitude of the plane is 38° – 16° = 22°N The longitude of the plane is 9° – 4° = 5°W The position of the plane is 22°North, 5°West	use a variety of mapping skills.	SGS 3.3
25	\$ 11	Let the cost of a bag of streamers be x, hence the cost of a birthday sign would be 2x. The cost for these items could be expressed in the equation x+ x+ x+ 2x+ 2x = 38.50 7x = 38.50 x = \$5.50 Hence the cost of the sign = 2 × \$5.50 = \$11	translate a word problem into an equation and solve the equation.	PAS 4.4

26	B and D	Gradient of the line $y = 4 – 2x$ is -2 The line parallel to this line should have the same gradient. The first option is incorrect as line AB is vertical so it is not be parallel to the line $y = 4 – 2x$. The second option is incorrect as the gradient of AC = $\frac{4+2}{4-8} = -\frac{3}{2}$ The third option is incorrect as the gradient of BC = $\frac{5+2}{4-8} = -\frac{7}{4}$ The fourth option is the correct answer as the gradient of BD = $\frac{5+3}{4-8} = -2$ which is the same gradient of the line $y = 4 – 2x$.	determine the gradient of an interval joining two points on the number plane.	PAS 5.1.2
27	$\frac{1}{9}$	There are 36 possible outcomes from rolling a die twice. Those that result in a sum of 9 are 3 then 6, 6 then 3, 4 then 5, 5 then 4 Hence, the probability is $\frac{4}{36} = \frac{1}{9}$.	determine relative frequencies and theoretical probabilities.	NS 5.1.3
28	14	When $b = –2$, $3b^2 – b = 3 \times (–2)^2 – (–2)$ $= 3 \times 4 + 2$ $= 12 + 2$ $= 14$	substitute into algebraic expressions.	PAS 4.3
29	26000	There are 26 different ways of selecting the letter for the first position. As a digit may be repeated, there are 10 ways of filling the 2nd position, 10 ways of filling the 3rd position and 10 ways of filling the 4th position. Hence, there will be $26 \times 10 \times 10 \times 10 = 26000$ different passwords possible.	finding probabilities of compound events using organised lists, tables or diagrams	NS 5.3.2
30	220 km	12% of the distance is 30 km then 1 % is $30 \div 12 = 2.5$ km The distance to be travelled is 100 % which is $2.5 \times 100 = 250$ km. Hence, John still has to travel $250 – 30 = 220$ km	apply the unitary method to problems involving rates and ratios.	NS 4.3

31	36	As $\frac{3}{8}$ cannot be simplified, so the number of marbles that Kevin could have must be a multiple of 8. Since the largest multiple of 8 which is less than 100 is 96 then the largest number of blue marbles that Kevin could have is $\frac{3}{8} \times 96 = 36$	develop a strategy for finding equivalent fractions.	NS 3.4
32	10cm	As the dimensions are whole numbers and the area of the base is 91cm², the dimensions of the base must be 13cm by 7 cm. Let its height be *h*.The surface area can be expressed in the equation $2(13h + 7h + 91) = 582$ $13h + 7h + 91 = 291$ $13h + 7h = 200$ $20h = 200$ $h = 10$cm	calculate the surface area of a rectangular prism.	MS 4.2

YEAR 9 – PAPER FOUR – CALCULATOR ALLOWED

QUESTION	ANSWER	WORKED SOLUTION	LEARNING STATEMENT A student can	NSW SYLLABUS
1	8p+ 4	5p + 4 + 3p = 8p + 4	add and subtract like terms to simplify an algebraic expression.	PAS 4.3
2	48	2 × 6 = 12 hence ? ÷4 = 12 So ? = 12 × 4 ? = 48	select and apply appropriate strategies for multiplication and division.	NS 3.3
3	26	The number of squares is equal to four times the number of triangles plus 2. In the 6th shape there are 6 triangles so the number of squares is 4 × 6 + 2 = 26 squares.	determine a rule for a geometric pattern and use the rule to calculate further terms.	PAS 4.2
4	4 : 7	The ratio of trees to cars is 48 : 84, which can be simplified to 4 : 7	simplify a ratio.	NS 4.3
5		The glass and container on top of the cabinet would look like circles when viewed from above, so the correct view would be either the first or the third options. The first option is the correct option as it also shows the small knob on the drawer of the cabinet.	visualise and sketch three dimensional objects from different views.	SGS 3.1
6	63	Kevin bought a total of 8 bags. 5 of these bags have 9 balloons each, and the remaining 3 bags each have 6 balloons. Hence, the total number of balloons is 5 × 9 + 3 × 6 = 63	select and apply appropriate strategies for addition, subtraction and multiplication.	NS 3.3
7	$320	Each table seats 6 people, so to seat 36 guests, 6 tables are needed .This means the cost of the tables is 6 × $8 = $48. The cost of 36 chairs at $2 each is 36 × $2 = $72. Hence, the total cost including the sound system is $48 + $72 + $200 = $320	select and apply appropriate strategies for addition, subtraction and multiplication.	NS 3.3

8	30°	In order to fit the star in its box the smallest angle of rotation needed to change it from its original orientation to the orientation needed is 30° as shown.  Orientation needed Original orientation	determine the order of the rotational symmetry of a shape.	SGS 3.2a
9	54	36 slices can be divided into 18 pairs of slices. Each pair makes 3 small sandwiches, so the total number of small sandwiches she can make is 18 × 3 = 54.	select and apply appropriate strategies for addition, subtraction and multiplication.	NS 3.3
10	30	162-182 fish were caught in 12 of the weeks, 183-203 fish were caught in 10 of the weeks and 204-224 fish were caught in 8 of the weeks. Hence, the fisherman caught more than 161 fish in 12 + 10 + 8 = 30 of the weeks.	draw and interpret frequency histograms and polygons.	DS 4.1
11	6	 The triangular pyramid formed will have 3 edges around the base and another 3 edges connecting the base to the apex. Hence, it will have 6 edges.	describe solids in terms of their geometric properties.	SGS 4.1
12	2050g	1 kg = 1000g so 41 kg = 41000g As 41000g is to be divided into 20 small bags, then each bag will contain 41000 ÷ 20 = 2050g.	convert between kilograms and grams.	MS 3.4
13	50 cm	 The perimeter is: 8 + 5 + 6 + 11 + 8 + 3 + 6 + 3 = 50 cm	calculate the perimeter of a simple composite figure.	MS 4.1

14	SUPER PRAWNS	Calculating the price for 1 kg in each packet. Fresh Prawns: $ 21.60 ÷ 1.8 = $ 12 SUPER PRAWNS : $25.40 ÷ 1.5 ≈ $ 16.93 Blue Ocean Prawns : $26.40 ÷ 1.6 = $ 16.50 *Prawns Specialist* : $15.20 ÷ 1.2 ≈ $ 12.67 The most expensive price per kilogram is $16.93 for the SUPER PRAWNS	calculate a 'best buy'.	NS 5.1.2
15	120°	∠ ABC = 90° (angle in rectangle ABCD) ∠ ABD = 90° – 55° (complementary angles) = 35° x + 35° + 25° = 180° (angle sum of a triangle) x = 120°	use angle relationships to find unknown angles in diagrams.	SGS 4.2
16	Multiply the Celsius temperature by 1.8 and then add 32	The first option is incorrect as $20 \times 3 + 14 \neq 68$. The second option is incorrect as $15 \times 3 + 8 \neq 59$. The third option is incorrect as $20 \times 2 + 29 \neq 68$. The fourth option is correct as it verifies 15, 20, 30 and 40.	determine a rule in words to describe the pattern from a table.	PAS 4.2
17	$\frac{2}{7}$	Let there be n pieces of milk chocolate, then there will be 2n pieces of dark chocolate and hence 4n pieces of white chocolate. The probability of picking a piece of dark chocolate will be $\frac{2n}{n+2n+4n}=\frac{2n}{7n}=\frac{2}{7}$	determine relative frequencies and theoretical probabilities.	NS 5.1.3
18	2520 L	While jogging, Jenny will breathe 70 – 7 = 63L more air per minute than when sitting. Hence, in 40 minutes she will breathe 63 × 40 = 2520 L more air while jogging rather than sitting.	calculate rates from given information.	NS 4.3
19	$ 2500	Salvia sells 200 roses each fortnight, which is equivalent to selling100 roses per week. So, in 10 weeks she sells 10 × 100 = 1000 roses. Hence , in 10 weeks Salvia earns $2.50 × 1000 = $2500.	calculate rates from given information.	NS 4.3

20	1000 + (50 × number of guests)	Each of the expressions is correct for the cost being \$1000 when the number of guests is 0. Only the first expression is correct for the cost being \$6000 when the number of guests is 100.	determine a rule in words to describe the pattern from a table or graph.	PAS 4.2
21	$\frac{1}{2}$	Ben ate $\frac{1}{4}$ of the pizza so $1-\frac{1}{4}=\frac{3}{4}$ remains. John ate $\frac{1}{3}$ of the remainder which is $\frac{1}{3}\times\frac{3}{4}=\frac{1}{4}$ of the pizza. As Ben and John ate $\frac{1}{4}$ of the pizza each then $\frac{1}{2}$ of the pizza is left.	perform the four operations on fractions.	NS 4.3
22	\$82.20	If the price before sales tax is p, then 1.12 × p = \$767.20 p = \$767.20 ÷ 1.12 = \$685 Kevin's refund is \$767.20 - \$685 = \$82.20	solve a variety of real life problems involving percentages.	NS 4.3
23	30	110km/h = 110000m/60min = 30.5533… m/s As Peter's speed should be just under 30.553m/s, then his speed is 30m/s.	solve a variety of real life problems involving rates and ratios.	NS 4.3
24	\$84	The height of the stack is 8.4 cm = 84 mm. Since the thickness of a coin is 2mm, then the number of coins in the stack is 84 ÷ 2 = 42. Hence, the value of the coins is 42 × \$2 = \$84.	convert between centimetres and millimetres.	MS 2.1
25	\$400	*First Method:* The profit made on the first 3 days was \$450 + \$500 +\$650 = \$1600 As the profit on Sunday was $\frac{1}{5}$ of the total profit, then \$1600 was $\frac{4}{5}$ of the total profit. Hence, $\frac{1}{5}$ of the total profit was \$400. Hence, the profit made on Sunday was \$400. *Second Method:* Let the profit on Sunday be x dollars then the total profit made was \$450 + \$500 +\$650+ x = \$1600 + x As the profit on Sunday was $\frac{1}{5}$ of the total profit then $\frac{x}{1600+x}=\frac{1}{5}$ ∴ 5x = 1600 + x ∴ x = 400 Hence, the profit made on Sunday was \$400.	solve a variety of real life problems involving rates and ratios.	NS 4.3

26	Ben used 80 large boxes and 120 small boxes.	Let x be the number of large boxes that Ben used then the number of small boxes he used was $200 - x$. Since the total number of mangoes in all boxes is 1360 then $8x + 6(200 - x) = 1360$ $8x + 1200 - 6x = 1360$ $2x = 1360 - 1200$ $x = 160 \div 2$ $x = 80$ Hence, Ben used 80 large boxes and 120 small boxes.	translate a word problem into an equation and solve the equation.	PAS 4.4
27	165°	$\angle$ DBC = 45° (diagonal in square ABCD bisects the angle it cuts through) $\angle$ CBE = 135°(angles on straight line DE add to 180°) $\angle$ EFC = 135°(opposite angles of a parallelogram BEFC are equal) $\angle$ EFG = 60°(angle in equilateral triangle EFG) $x + 135° + 60° = 360°$(angles of revolution at the point F) $\therefore x = 165°$	use angle relationships to find unknown angles in diagrams.	SGS 4.2
28	30cm²	Area of the larger triangle is: $\frac{1}{2} \times 12 \times 9 = 54\text{cm}^2$ Area of the smaller triangle is: $\frac{1}{2} \times 8 \times 6 = 24\ \text{cm}^2$ The shaded area is: $54 - 24 = 30\ \text{cm}^2$.	use a formula to calculate the area of a triangle.	MS 4.1
29	$302	The charge per hour is: ($470 – $50) ÷ 15 = $28 Hence, the cost of hiring the machine for 9 hours is: $50 + 9× $28 = $302	solve a variety of real life problems involving rates and ratios.	NS 4.3
30	35cm	As the average height of the five candles is 23cm, then their total heights is $23 \times 5 = 115$ cm. As the average height of the six candles is 25cm, then their total heights is $25 \times 6 = 150$ cm. Hence, the height of the sixth candle is $150 - 115 = 35$cm.	find measures of location (mean, mode and median) for small sets of data.	DS 4.2

31	6283cm	Length of arc AB is : $\frac{60°}{360°} \times 2 \times \pi \times 50 = \frac{50\pi}{3}\text{cm}$ In 5 seconds the ball will move from A to B then back to A covering a distance of $\frac{50\pi}{3} \times 2 = \frac{100\pi}{3}\text{cm}$ As in 1 minute the ball can make $60 \div 5 = 12$ return trips, then in one minute it will cover a distance of $\frac{100\pi}{3} \times 12 = 400\pi\,\text{cm}$ Hence, in 5minutes the ball will cover a distance of $400\pi \times 5 = 2000\pi\,\text{cm}$ $\approx 6283\text{cm}$	calculate the perimeter of a sector.	MS 5.2.1
32	15	Let the number of questions in the second part of the test be x then the test has 25 + x questions in total. She had answered 24 + 0.8x of these questions correctly. As her overall score in the test was 90%, then, $24 + 0.8x = 0.9\,(25 + x)$ $24 + 0.8x = 22.5 + 0.9x$ $0.8x - 0.9x = 22.5 - 24$ $-0.1x = -1.5$ $x = 15$ Hence, the second part of the test had 15 questions.	translate a word problem into an equation and solve the equation.	PAS 4.4