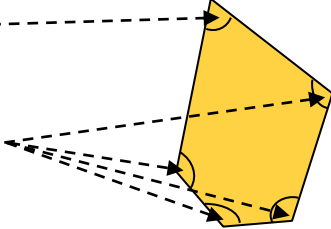# YEAR 7 – PAPER TWO
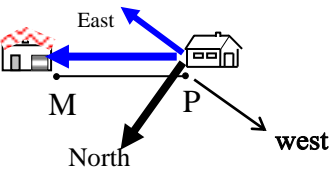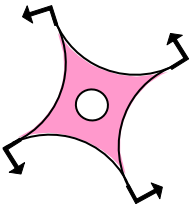# ANSWERS AND LEARNING STATEMENT
NON CALCULATOR

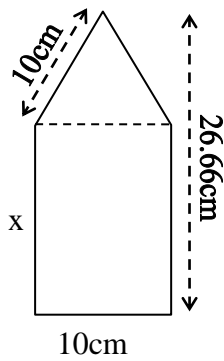|	ANSWER	WORKED SOLUTION	LEARNING STATEMENT A student can
1	Gain $20	On the first sale, Jason made $120 − $100 = $20. On the second sale, he made $180 − $150 = $30. So, in total he made $20+$30 = $50.Now, he had to repay $30 to Jack, so his total gain was $50 − $30 = $20.	solve problems involving purchases and the calculation of change to the nearest five cents with and without digital technologies (ACMNA080)
2	54 minutes	From 3:52 until 4 pm there is 8 minutes. From 4 pm until 4:46 pm there is 46 minutes. So, James won the match in 46 + 8 = 54 minutes.	use am and pm notation and solve simple time problems (ACMMG086)
3	24	The octagonal face at the front has 8 edges, so does the face at the back. There are another 8 edges joining the front face to the back face. This is a total of $3 \times 8 = 24$ edges	construct simple prisms and pyramids (ACMMG140)
4	$20 - \boxed{!} = 12$	$\boxed{!} + \boxed{!} = 22$ this means $\boxed{!} = 11$. $\boxed{!} \times \boxed{!} = 100$ this means $\boxed{!} = 10$ $20 - \boxed{!} = 12$ this means $\boxed{!} = 8$ $\boxed{!} \times 7 = 77$ this means $\boxed{!} = 11$ As $\boxed{!}$ is less than 10 then $20 - \boxed{!} = 12$ is the only correct number sentence.	select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)
5	4:30 pm	The show finished 15 minutes before 7:05 pm. This means the show finished at 6:50 pm. As 2 hours 20 minutes before 6:50 pm is 4:30 pm the show must have started at 4:30 pm.	use am and pm notation and solve simple time problems (ACMMG086)
6	40 minutes	To cut one log into 3 pieces it requires 2 cuts. So, to cut one log into 3 pieces it takes $2 \times 4 = 8$ minutes. Hence, to cut 5 logs into 3 pieces each it takes $5 \times 8 = 40$ minutes.	solve problems involving multiplication of large numbers by one- or two-digit numbers using efficient mental, written strategies and appropriate digital technologies (ACMNA100)

7	31.94	$\begin{array}{r} 3\overset{317}{\cancel{4}.\cancel{8}0} - \\ 2.86 \\ \hline 31.94 \end{array}$	add and subtract decimals, with and without digital technologies, and use estimation and <u>rounding</u> to check the reasonableness of answers (ACMNA128)
8		acute angle - - - - - - - - -> obtuse angles	classify triangles according to their side and <u>angle</u> properties and describe quadrilaterals (ACMMG165)
9	2:35	When 9:25 is reflected it looks like this, which is 2:35.	describe translations, reflections in an axis, and rotations of multiples of 90° on the Cartesian plane using coordinates. Identify line and rotational symmetries (ACMMG181)
10	North East	Peter is to walk from P to M which means he is to walk in the North East direction.	use a grid reference system to describe locations. Describe routes using landmarks and directional language (ACMMG113)
11		The first and third shapes each have 1 axis of symmetry . The second has 2 axes of symmetry. Only the fourth shape has rotational symmetry.	describe translations, reflections in an axis, and rotations of multiples of 90° on the Cartesian plane using coordinates. Identify line and rotational symmetries (ACMMG181)
12	185 m	In the remaining 4 days he swam 840 – 100 = 740m. As he swam an equal distances in each of these 4 days then he swam 740 ÷ 4 = 185 m each day.	select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)

13	20%	Jasmine did not get heads 5 times in 25 tosses. Hence, her percentage of scoring no heads is $5 \div 25 \times 100 = 20\%$.	find percentages of quantities and express one quantity as a <u>percentage</u> of another, with and without digital technologies. <u>(ACMNA158)</u>
14	32m	On the scale diagram the shorter building is 25 mm, which represents 20 m. Hence the scale is 5mm represents 4m. On the scale diagram, the taller building is 40mm. As 5mm represents 4m, then 40mm represents 32m.	recognise and solve problems involving simple ratios <u>(ACMNA173)</u>
15	45	The pattern is add 7 to the number of hexagons in shape 1 to get the number of hexagons in Shape 2. Then add 9 to the number of hexagons in shape 2 to get the number of hexagons in Shape 3. Then add 11 to the number of hexagons in shape 3 to get the number of hexagons in Shape 4. So to get the number of hexagons in Shape 5 we add 13 to the number of hexagons in shape 4. Hence, shape 5 has 32 + 13 = 45 hexagons.	continue and create sequences involving whole numbers, fractions and decimals. Describe the rule used to create the sequence <u>(ACMNA133)</u>
16	$112	As Harry saves $12 each week then to save $168 he need $168 ÷ $12 = 14 weeks. Now Alex saves $8 each week so in 14 weeks he saves $14 \times $8 = 112.	select and apply efficient mental and written strategies to solve problems involving all four operations with whole numbers <u>(ACMNA123)</u>
17	G49	The first 5 terms can be expressed as : A1², B2², C3²,D 4² and E5². So, the next 2 terms are F6² and G7² . Therefore, the pattern is A1, B4, C9, D16, E25, F36, G49, ... Hence the only alternative which is a term in this pattern is G49.	continue and create sequences involving whole numbers, fractions and decimals. Describe the rule used to create the sequence <u>(ACMNA133)</u>
18	$15	The cost of hiring 1 horse for 2 hours is $25, so the cost of hiring 2 horses for 2 hours is $50. The cost of 1 horse for 4 hours is $35. Hence, they would save $50 − $35 = $15 if they had hired 1 horse for 4 hours.	interpret secondary <u>data</u> presented in digital media and elsewhere <u>(ACMSP148)</u>

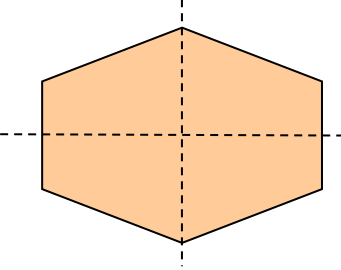| 19	$\dfrac{1}{4}$	If 1 green egg was removed then there would be 3 green eggs and 9 yellow eggs left. So the probability of selecting a green egg now would be $\dfrac{3}{12} = \dfrac{1}{4}$.	assign probabilities to the outcomes of events and determine probabilities for events (ACMSP168)
20	7:30 pm	4:24pm plus 6 minutes is 4:30pm. 4:30 pm plus 5 hours is 9:30 pm. So, the plane lands in Perth at 9:30 pm Sydney time. This would be equivalent to 7:30 pm Perth time.	use am and pm notation and solve simple time problems (ACMMG086)
21	$\dfrac{2}{7}$	There are less red than any other colour. Let there be x red marbles, then there will be $2x$ blue marbles and hence $4x$ green marbles. The total number of marbles is $x + 2x + 4x = 7x$. The probability of selecting a blue marble is $\dfrac{2x}{7x} = \dfrac{2}{7}$.	assign probabilities to the outcomes of events and determine probabilities for events (ACMSP168)
22	Its diagonals must meet at right angles.	As Tania's quadrilateral has all 4 sides equal, but the diagonals are different lengths, it must be a RHOMBUS. The only statement that is true for a rhombus is "Its diagonals must meet at right angles".	classify triangles according to their side and angle properties and describe quadrilaterals (ACMMG165)
23	400	Two fifths were tulips, so three fifths would be roses. So the number of roses sold was $\dfrac{3}{5} \times 800 = 480$ Hence, the number of red roses sold was $\dfrac{5}{6} \times 480 = 400$.	multiply and divide fractions and decimals using efficient written strategies and digital technologies (ACMNA154)
24	20	The number of red fish in the tank is $\dfrac{3}{7} \times 35 = 15$. Hence, the number of fish that are not red is $35 - 15 = 20$.	assign probabilities to the outcomes of events and determine probabilities for events (ACMSP168)
25	8	Let Melanie's age be M, so Cheryl's age is 3M and Tania's age will be M + 10. The sum of their ages is 50, so $M + 3M + M + 10 = 50$ $5M + 10 = 50$ $5M = 40$ $M = 8$ So, Melanie is 8 years old.	introduce the concept of variables as a way of representing numbers using letters (ACMNA175)

26	$9	Using Option A, $30 would buy 10 games. Using Option B, 10 games would cost $21. John would have saved $9 if he chose Option B.	interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)
27	24	Using 1 full scoop each time the box contains enough powder for 30 washes, so it must contain 30 scoops. If she uses $1\frac{1}{4}$ scoops for each wash then the box can do $30 \div 1\frac{1}{4} = 30 \div \frac{5}{4} = 30 \times \frac{4}{5} = 24$ washes.	recognise and solve problems involving simple ratios (ACMNA173)
28	$ 70	John, Tom and Ronald have a total of $230 and John and Tom together have $145. So Ronald must have $230 − $145 = $85. Now, as Tom and Ronald together have $155, then Tom must have $155 − $85 = $70.	Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)
29	2.4 tonnes	As a pallet contains 300 bricks then the number of pallets Ray bought is $1800 \div 300 = 6$ Now the mass of the 6 pallets is $6 \times 400 = 2400$kg. $= 2.4$ tonnes.	Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)
30	18	$\frac{1}{3}$ of the hairclips of 1 bag are pink this means in the remaining $2\frac{2}{3}$ bags all the hairclips are not pink. Now, as there are 48 hairclips in $2\frac{2}{3}$ bags then in each bag there are $48 \div 2\frac{2}{3} = 48 \div \frac{8}{3}$ $= 48 \times \frac{3}{8} = 18$ hairclips.	Solve problems involving addition and subtraction of fractions with the same or related denominators ACMNA126)

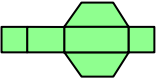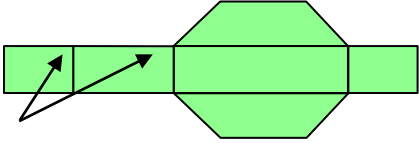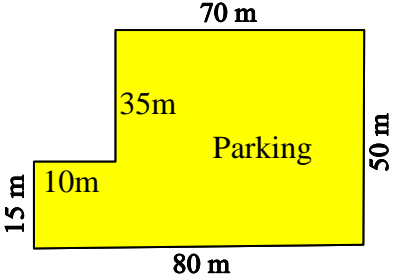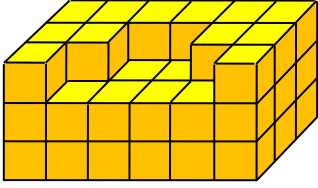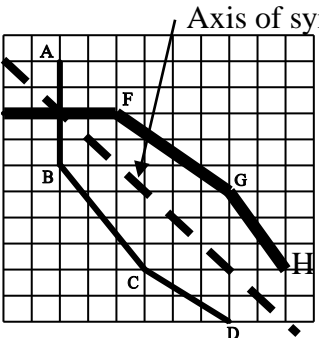| 31 | 43.3 cm² | The base of the rectangle is 10 cm, the same as the base of the equilateral triangle.
Let the height of the rectangle be x. The perimeter of the pentagon is 66cm.
$10 + 10 + x + 10 + x = 66$
$2x + 30 = 66$
$2x = 36$
$x = 18$
Hence the height of the triangle is $26.66 - 18 = 8.66$cm
The area of the triangle is
$A = \frac{1}{2} \times 10 \times 8.66$
$= \frac{1}{2} \times 86.6$
$= 43.3$ cm²

10cm (slanted side of triangle)
26.66cm (total height)
x
10cm (base) | Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving (ACMMG159) |
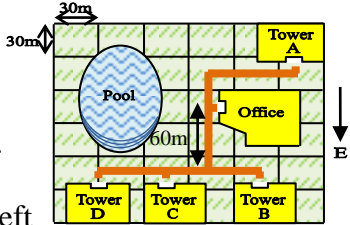
YEAR 7 – PAPER TWO – CALCULATOR ALLOWED

	ANSWER	WORKED SOLUTION	LEARNING STATEMENT A student can
1	$ 102.35	The cost of 1 calculator is $ 818.80 ÷ 8 = $102.35	multiply decimals by whole numbers and perform divisions by non-zero whole numbers where the results are terminating decimals, with and without digital technologies (ACMNA129)
2	1575	The total number of apples packed by the farmer is $785 \times 7 = 5495$. He still has to pack $7070 - 5495 = 1575$ apples.	select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)
3	23rd of July	From 3rd to the 31st of July there are $31 - 3 = 28$ days. As 8 lessons are to be made then there are 7 equal interval of time between lessons. So the interval of time is $28 ÷ 7 = 4$ days. Therefore, her lessons were on 3rd, 7th, 11th, 15th, 19th, 23rd, 27th, and 31st. Hence, her 6th lesson was on the 23rd of July.	select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)
4	$\dfrac{5}{8}$	If each square was divided into 2 triangles there would be a total of 16 triangles. 10 of these triangles are shaded, therefore the fraction shaded is $\dfrac{10}{16} = \dfrac{5}{8}$	solve problems involving addition and subtraction of fractions with the same or related denominators ACMNA126)
5	40.5m	The area of this backyard is Area = Length $\times$ Width $1235.25 = $ Length $\times 30.5$ So the length is $1235.25 ÷ 30.5 = 40.5$m.	calculate the perimeter and area of rectangles using familiar metric units (ACMMG109)

6	27	The number of papers = mass of all papers ÷ mass of one paper Therefore, the number of papers is $553.5 \div 20.5 = 27$ As there are 27 exam papers this indicates that 27 students sat for this exam.	multiply decimals by whole numbers and perform divisions by non-zero whole numbers where the results are terminating decimals, with and without digital technologies (ACMNA129)
7	3, 8, 23, 68, 203	$3 \times 3 - 1 = 8$ $3 \times 8 - 1 = 23$ $3 \times 23 - 1 = 68$ $3 \times 68 - 1 = 203$ Hence, Joseph's pattern is 3, 8, 23, 68, 203	continue and create sequences involving whole numbers, fractions and decimals. Describe the rule used to create the sequence (ACMNA133)
8	2	 This hexagon has the 2 axes of symmetry as shown.	describe translations, reflections in an axis, and rotations of multiples of 90° on the Cartesian plane using coordinates. Identify line and rotational symmetries (ACMMG181)
9	4	As there are 10 small intervals between 0 and 40 so each interval represents 4 pets. There are 40 cats and the total number of animals is 40 + 56 + 24 + 40 = 160. So the total number of pets is 4 times the number of cats.	interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)
10	39 kg	The average mass of the three girls is 35kg then the total mass of the three girls is $3 \times 35 = 105$kg. Louisa and Mary have a combined mass of 66kg, so Tina's mass is 105 – 66 = 39kg.	calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (ACMSP171)
11	12	The 14 soccer balls sold on Wednesday are represented by 3.5 balls. So, each picture of a soccer ball represents $14 \div 3.5 = 4$ soccer balls. Hence, on Thursday, Sport World sold $3 \times 4 = 12$ soccer balls.	interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)

12	−12°C	From 5pm until 9pm is 4 hours. Each hour the temperature decreased by 2.5°, so in 4 hours the temperature fell by 10°C. Hence at 9 pm the temperature was $−2 − 10 = −12°C$.	investigate everyday situations that use integers. Locate and represent these numbers on a number line (ACMNA124)
13	54L	The fuel gauge moved from 6 to 2, a drop of 4. These 4 units represent 24 litres, so each unit represents $24 ÷ 4 = 6$ litres. Hence, when the tank is full it will hold $9 × 6 = 54$ litres.	recognise and solve problems involving simple ratios (ACMNA173)
14	fourth	Only the second, third and fourth houses have the required large backyard. The second is made of fibro, so not suitable. The price of the third is \$605 000 which is over \$0.51million which means it is not suitable. Only the fourth satisfies all of the requirements.	describe and interpret different data sets in context(ACMSP120)
15	B	The probability that the die will show a number more than 2 is $\frac{4}{6} = \frac{2}{3}$ The distance from 0 to 1 is 63mm. $\frac{2}{3}$ of 63mm = 42mm. B is 42mm from zero.	describe probabilities using fractions, decimals and percentages (ACMSP144)
16	18 days	The length should become $2.5 × 80 = 200$mm. So the length of the toy needs to increase by is $200 − 80 = 120$mm. The length of the toy increases by 20mm every 3 days. Hence, it requires $120 ÷ 20 = 6$ lots of 3 days which is 18 days.	select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)

17		This net will not form the trapezoidal prism. These 2 sections should be in the reverse order to be a correct net.	connect three-dimensional objects with their nets and other two-dimensional representations (ACMMG111)
18	25	The pump can move 97500 litres in 65 hours. This is the same as $97500 \div 65 = 1500$ L /hour To change from hours to minutes, divide by 60. $1500 \div 60 = 25$ L / minute.	convert between units of time (ACMMG085)
19	32.8 km	Each time Tom drives from his home to the farm and then returns home he makes the trip 2 times. So in a week he makes the trip 4 times. In a year he would make the trip $52 \times 4 = 208$ times. Hence, the distance from his home to the farm is $6822.4 \div 208 = 32.8$ km.	multiply decimals by whole numbers and perform divisions by non-zero whole numbers where the results are terminating decimals, with and without digital technologies (ACMNA129)
20	260 m	The perimeter of this shape can be found by adding together the length of each side. P= 70 + 50 + 80 + 15 +10 + 35 = 260 m	calculate the perimeter and area of rectangles using familiar metric units (ACMMG109)
21	4	Jennifer could choose a : 2 from group A and a 7 from group B or a 4 from group A and a 5 from group B or a 6 from group A and a 3 from group B or an 8 from group A and a 1 from group B. Hence, she can win in 4 ways.	construct sample spaces for single-step experiments with equally likely outcomes (ACMSP167)

22	2016m	Two and a half stops is equivalent to 840m. This means that the distance between 2 consecutive stops is $840 \div 2.5 = 336$m. The length of Beach Rd is $6 \times 336 = 2016$m	recognise and solve problems involving simple ratios (ACMNA173)
23	pentagonal pyramid	A triangular prism has 9 edges. A hexagonal pyramid has 12 edges. A pentagonal prism has 15 edges. Only a pentagonal pyramid has 10 edges.	connect three-dimensional objects with their nets and other two-dimensional representations (ACMMG111)
24	764 999	751999 to the nearest 10000 is 750000. 769860 to the nearest 10000 is 770000. 769990 to the nearest 10000 is 770000. 764999 to the nearest 10000 is 760000.	round decimals to a specified number of decimal places (ACMNA156)
25	16.5 hours	From 4:30 until 5:00 there are 30 minutes and from 5:00 until 7:15 there are 2 hours and 15 minutes. On Saturday from 10:45 until 11:00 there are 15 minutes and from 11:00 until 1:30pm there is 2 hours and 30 minutes. This means he plays 2 hours and 45 minutes each day. Over 6 days this gives 12 hours and 270 minutes which is 16 hours and 30 minutes.	compare 12- and 24-hour time systems and convert between them (ACMMG110)
26	4	As $3 + 4 + 5 + 6 + 7 = 25$ and $182 \div 25 = 7.28$ then when the pattern is repeated 7 times the sum of the numbers is $7 \times 25 = 175$. Now to reach the sum of 182 we need to add 7 more and as $3+4 = 7$ so the last number must be 4.	solve problems involving division by a one digit number, including those that result in a remainder (ACMNA101)
27	6.2	$35.64 - 4.95 = 30.69$ $30.69 \div 4.95 = 6.2$	Multiply and divide decimals using efficient written strategies and digital technologies (ACMNA154)
28	Tower D	The length of each side of the squares in the grid is 30 metres. James leaves the office and turns left and walks 60 m East towards towers B, C and D. In total he walks 135m, so he has $135 - 60 = 75$m left to walk. 75 m is equivalent to 2.5 squares, so he will end his walk at Tower D.	recognise and solve problems involving simple ratios . (ACMNA173)

29	18	The bottom layer of this solid has 6×3=18cubes, part of 8 of these can be seen from this view, so 10 remain hidden. The middle layer of this solid has also 6×3 = 18cubes, part of 10 of these can be seen from this view, so 8 remain hidden. All of the cubes in the top layer can be seen. Hence, a total of 18cube are hidden.	draw different views of prisms and solids formed from combinations of prisms (ACMMG161)
30	22	From A to B is 4 units long. Hence, each unit is 17.6 km ÷ 4 = 4.4 km. From C to H is 5 units long, 5 × 4.4km = 22km.	investigate combinations of translations, reflections and rotations, with and without the use of digital technologies (ACMMG142)
31 a	8	To use the smallest number of jars they must use the maximum number of large jars. As 180 ÷ 35 = 5.14.... so the maximum number of large jars used could be 5. If they use 5 large jars they could fit 5 × 35 = 175 cookies .The remaining cookies would be 180 – 175 = 5 but these cookies could not fill a small jar so they cannot use 5 large jars. If they use 4 large jars they could fit 4 × 35 = 140 cookies. The remaining cookies would be 180 – 140 = 40 cookies but these could fill 2 small jars and 10 cookies will be left over. So they cannot use 4 large jars. If they use 3 large jars we they could fit 3 × 35 = 105 cookies. The remaining cookies would be 180 – 105 = 75 cookies. These cookies could be filled in exactly 5 small jars. Hence, the shop needs 3 large and 5 small jars which is a total of 8 jars to fit 180 cookies.	Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)

31 b	230	We can use "trial and error" to find a combination with a mass of 3kg. As $3 \div 0.45 = 6.66$ then the maximum number of large jars used was 6. If they sold 6 large jars their mass would be $6 \times 0.45 = 2.7$kg. The remaining mass would be $3 - 2.7 = 0.3$kg. As when this mass is divided by 0.2 it does not give a whole number of small jars so they did not sell 6 large jars. If they sold 5 large jars their mass would be $5 \times 0.45 = 2.25$kg. The remaining mass would be $3 - 2.25 = 0.75$kg. As when this mass is divided by 0.2 it does not give a whole number of small jars so they did not sell 5 large jars. If they sold 4 large jars their mass would be $4 \times 0.45 = 1.8$kg. The remaining mass would be $3 - 1.8 = 1.2$kg. As when this mass is divided by 0.2 it gives 6 which is a whole number then the shop sold 4 large jars and 6 small jars this morning. Hence, the number of cookies sold was $4 \times 35 + 6 \times 15 = 230$.	Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)
32	2403	As $\quad 1 \times 3 + 3 = 6$ $\qquad 3 \times 3 + 3 = 12$ $\qquad 5 \times 3 + 3 = 18$ This indicates that we need to multiply the number of dark circles by 3 then add 3 to get the number of white circles. So, to find the number of dark circles from the number of white circles we reverse the process that is we subtract 3 then divide by 3 as shown. $7212 - 3 = 7209$, $7209 \div 3 = 2403$. Hence, the shape will have 2403 dark circles.	Continue and create sequences involving whole numbers, fractions and decimals. Describe the rule used to create the sequence (ACMNA133)