CONTENTS

UNIT 4: MULTIPLICATION

4.1. Looking back

Date		Classwork		Homework	

Practising a multiplication table makes it far quicker for you to work out mental calculations. It will help you to use your knowledge to quickly solve any multiplication question.

1. Complete the following as fast as possible.

×	1	2	3	4	5	6	7	8	9	10
1	1									
2		4								
3										
4			12							
5								40		
6										
7										
8										
9										
10										

×		1	2	3	4	5	6	7	8	9	10
1		1									
2			4								
3											
4				12							
5									40		
6											
7											
8											
9											
10											

Signature:		Date:	

4.2. Multiplication as repeated addition

Date		Classwork		Homework	

Busi's necklace has six beads repeated four times.

This is the same as $6 + 6 + 6 + 6 = 24$

which is the same as: $4 \times 6 = 24$

2. Complete the following table:

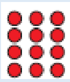
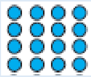
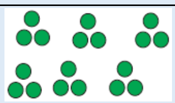
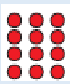
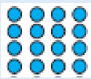
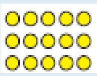
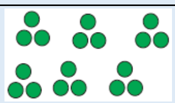
Diagram	In words	Addition	Multiplication
		$3 + 3 + 3 + 3 = 12$	
	two groups of six		
			
			$3 \times 5 = 15$
			

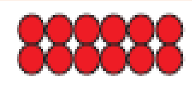
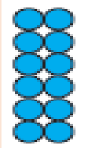
Diagram	In words	Addition	Multiplication
		$3 + 3 + 3 + 3 = 12$	
	two groups of six		
			
			$3 \times 5 = 15$
			

Signature:		Date:	

4.3. Properties of numbers

Date		Classwork		Homework	

Study the following. Draw your own diagram to show this.

Example:	2×6		6×2
		=	

a)	$2 \times 7 = 7 \times 2$	$2 \times 7 = 7 \times 2$
b)	$3 \times 3 = 3 \times 3$	$3 \times 3 = 3 \times 3$
c)	$3 \times 4 = 4 \times 3$	$3 \times 4 = 4 \times 3$
d)	$4 \times 5 = 4 \times 5$	$4 \times 5 = 4 \times 5$

Signature:		Date:	

4.4. Properties of numbers, continued

Date		Classwork		Homework	

1. Complete the following:

a)	$2 \times (2 \times 3) = (2 \times 2) \times 3$ $2 \times 6 = 4 \times$ ______ $12 = 12$	$2 \times (2 \times 3) = (2 \times 2) \times 3$ $2 \times 6 = 4 \times$ ______ $12 = 12$
b)	$2 \times (3 \times 1) = (2 \times 3) \times 1$ $2 \times 3 =$ _____ $\times 1$ ______ = ______	$2 \times (3 \times 1) = (2 \times 3) \times 1$ $2 \times 3 =$ _____ $\times 1$ ______ = ______
c)	$4 \times (3 \times 2) = (4 \times 3) \times$ _____ _____ $\times 6 = 12 \times 2$ $24 = 24$	$4 \times (3 \times 2) = (4 \times 3) \times$ _____ _____ $\times 6 = 12 \times 2$ $24 = 24$
d)	$8 \times (1 \times 5) = (8 \times 1) \times 5$ ______ $\times 5 =$ ______ $\times 5$ _______ $= 40$	$8 \times (1 \times 5) = (8 \times 1) \times 5$ ______ $\times 5 =$ ______ $\times 5$ _______ $= 40$

2. Complete the following

a)	$4 \times (2 + 3) = (4 \times 2) + ($____ $\times 3) = 20$	$4 \times (2 + 3) = (4 \times 2) + ($____ $\times 3) = 20$
b)	$6 \times (5 + 2) = (6 \times 5) + (6 \times$ ____$) = 42$	$6 \times (5 + 2) = (6 \times 5) + (6 \times$ _____$) = 42$
c)	$7 \times (3 + 5) = (7 \times$ ____$) + (7 \times 5) = 56$	$7 \times (3 + 5) = (7 \times$ ____$) + (7 \times 5) = 56$
d)	$8 \times (5 - 3) = (8 \times$ ____$) - (8 \times 3) = 16$	$8 \times (5 - 3) = (8 \times$ ____$) - (8 \times 3) = 16$
e)	$9 \times ($____ $- 5) = (9 \times 7) - (9 \times 5) = 18$	$9 \times ($____ $- 5) = (9 \times 7) - (9 \times 5) = 18$

Signature:		Date:	

4.5. Multiplication and division as inverse operations

Date		Classwork		Homework	

1. Complete the following:

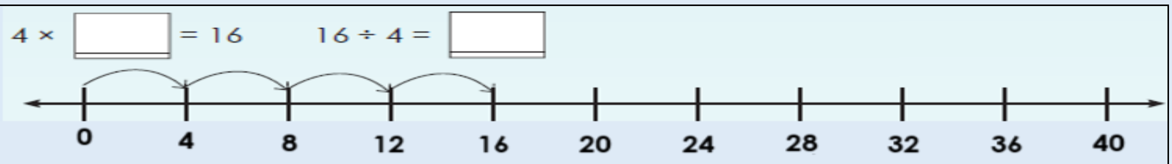
Example

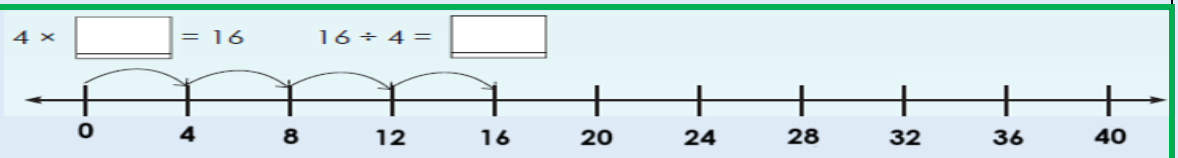
5 × 4	=	20	**Therefore** 20 ÷	4	=	5	**Or** 20 ÷	5	= 4
72 ÷ 12	=	6	**Therefore** 12 ×	6	=	72	**Or** 6 ×	12	= 72

a)	3 × 4	=		**Therefore** 12 ÷		=	3	**Or** 12 ÷		= 4
	3 × 4	=		**Therefore** 12 ÷		=	3	**Or** 12 ÷		= 4
b)	18 × 2	=		**Therefore** 36 ÷		=	18	**Or** 36 ÷		= 2
	18 × 2	=		**Therefore** 36 ÷		=	18	**Or** 36 ÷		= 2
c)	50 ÷ 5	=		**Therefore** 5 ×		=	50	**Or** 10 ×		= 50
	50 ÷ 5	=		**Therefore** 5 ×		=	50	**Or** 10 ×		= 50
d)	60 ÷ 12	=		**Therefore** 5 ×		=	60	**Or** 12 ×		= 60
	60 ÷ 12	=		**Therefore** 5 ×		=	60	**Or** 12 ×		= 60

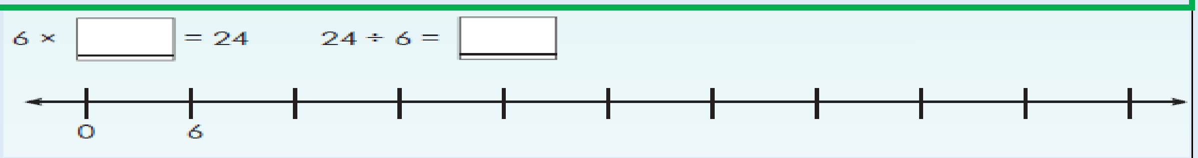
2. Complete the following and show the multiplication on the number line.

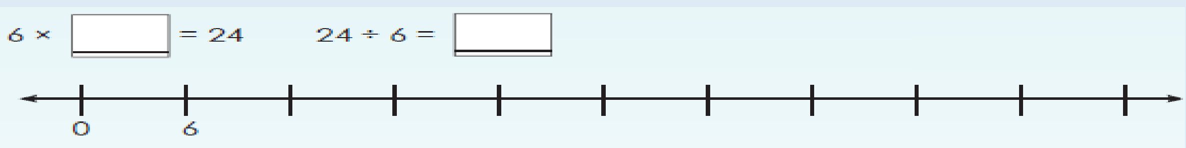
a)





b)





Signature:		Date:	

4.6. Multiplication and division as inverse operations, continued.

Date		Classwork		Homework	

1. Fill in the ×, ÷, + , − and = in the right places.

a)	6		3		18	6		3		18
b)	18		3		6	18		3		6
c)	18		6		3	18		6		3
d)	6		6		36	6		6		36
e)	36		6		6	36		6		6
f)	12		2		24	12		2		24
g)	24		2		12	24		2		12
h)	24		12		2	24		12		2
i)	81		9		9	81		9		9
j)	9		9		81	9		9		81
k)	28		7		4	28		7		4
l)	28		4		7	28		4		7
m)	7		4		28	7		4		28
n)	30		3		60	30		3		60
o)	60		3		20	60		3		20
p)	60		30		2	60		30		2
q)	7		6		42	7		6		42
r)	42		6		7	42		6		7
s)	42		7		6	42		7		6
t)	33		11		3	33		11		3
u)	3		11		33	3		11		33

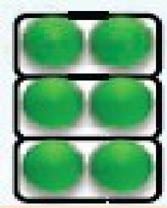
Signature:		Date:	

4.7. Repeated addition and multiplication

Date		Classwork		Homework	

1. Write down the following as repeated addition, and then multiplication:

Example:



i. **3** groups of **2**

ii. **Three 2s**

iii. Repeated addition: $2 + 2 + 2 = 6$

iv. Multiplication: $3 \times 2 = 6$

a)

i. ______ rows of ______ OR______ groups of ______

ii. ____

iii. Repeated addition: ______________________

iv. Multiplication: _________________________

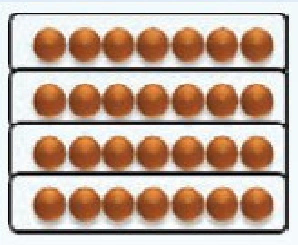
i. ______ rows of ______ OR______ groups of ______

ii. ____

iii. Repeated addition: ______________________

iv. Multiplication: _________________________

b)



i. ______ rows of ______ OR______ groups of ______

ii. ____

iii. Repeated addition: ______________________

iv. Multiplication: _________________________

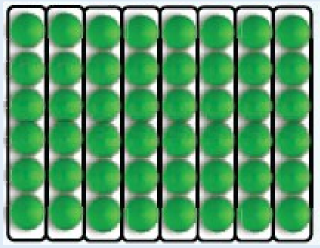
i. ______ rows of ______ OR______ groups of ______

ii. ____

iii. Repeated addition: ______________________

iv. Multiplication: _________________________

c)



i. ______ rows of ______ OR______ groups of ______

ii. ____

iii. Repeated addition: ________________________

iv. Multiplication: ___________________________

i. ______ rows of ______ OR______ groups of ______

ii. ____

iii. Repeated addition: ________________________

iv. Multiplication: ___________________________

2. Fill in the missing number.

4 × ☐ = 8	4 × ☐ = 80	2 × ☐ = 800
9 × ☐ = 27	9 × ☐ = 270	9 × ☐ = 2 700

4 × ☐ = 8	4 × ☐ = 80	2 × ☐ = 800
9 × ☐ = 27	9 × ☐ = 270	9 × ☐ = 2 700

3. Determine the product.

a)	2 × 3 = __________	2 × 3 = __________
b)	3 × 2 × 3 = __________	3 × 2 × 3 = __________
c)	5 × 4 × 2 = __________	5 × 4 × 2 = __________
d)	5 × 2 × 9 = __________	5 × 2 × 9 = __________
e)	2 × 2 × 2 × 5 = __________	2 × 2 × 2 × 5 = __________

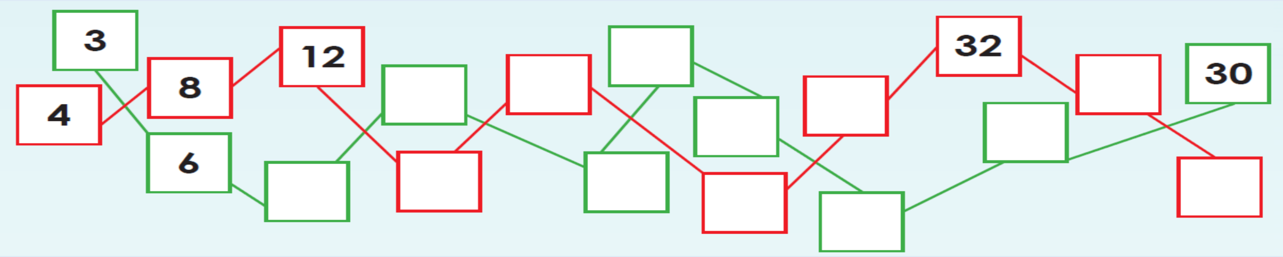
Signature:		Date:	

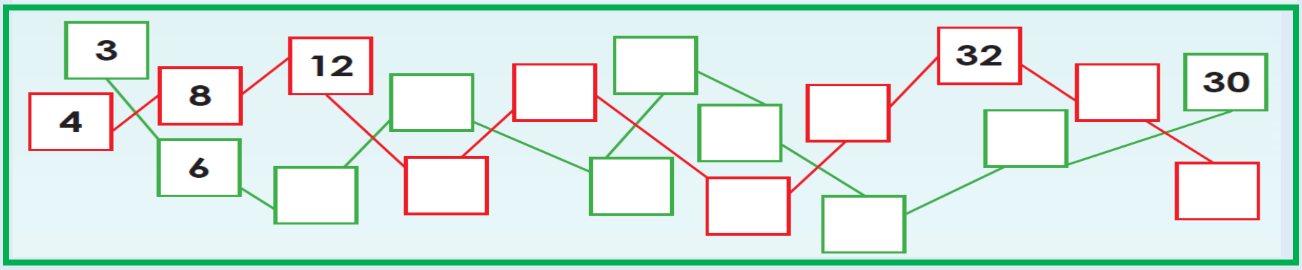
4.8. Multiples

Date		Classwork		Homework	

Multiples of a number can be made by multiplying the number by any whole number. The first three multiples of 2 other than 0 are 2, 4, and 6. You get them by doing 2 × 1, 2 × 2, 2 × 3.

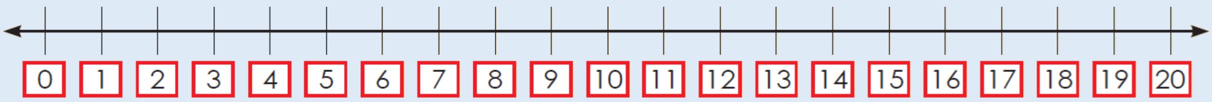
1. Complete these patterns of multiples.



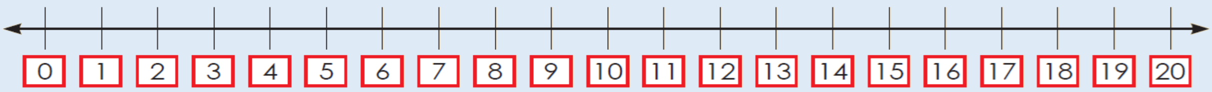


2. Show the multiples on the following number lines.

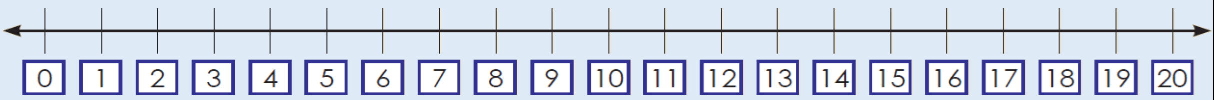
a) Multiples of 5



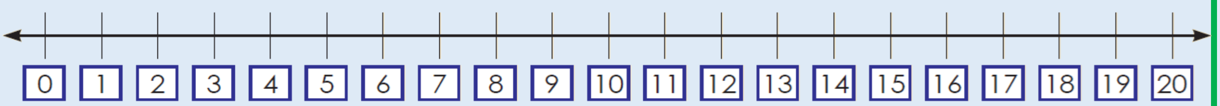
Multiples of 5

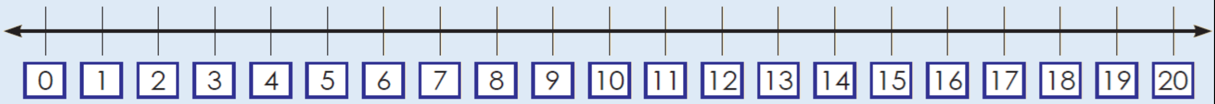
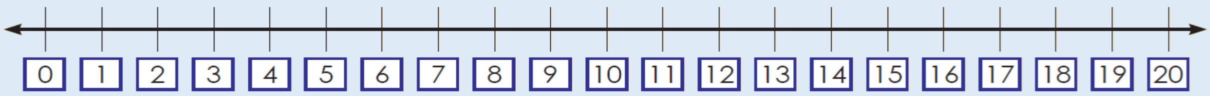


b) Multiples of 3

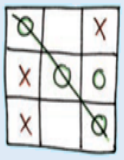


Multiples of 3



c)	Multiples of 6 
	Multiples of 6 

3. Complete the following as shown in the example in (a).

a)	4 	How many wheels will 5 cars have?	**Let us count:** 4, 8, 12, 16, 20 There are 20 wheels	
b)	10 	How many toes will seven people have?		
c)	6 	How many eggs will 7 half dozen boxes hold?		
d)	5 	How many fingers will 10 hands have?		
e)	8 	How many legs will 9 spiders have?		
f)	9 	How many small squares will be on 5 "Noughts and crosses boards"?		

Signature:		**Date:**	

4.9. Multiples continued

Date		Classwork		Homework	

1. These numbers are multiples of:

a)	10; 20; 30; 40; 50; 60; …		
b)	6; 12; 18; 24; 30; . . .		
c)	8; 16; 24; 32; 40; 48; …		
d)	7; 14; 21; 28; 35; . . .		
e)	9; 18; 27; 36; 45; …		

2. Complete the following:

a)	20 is a multiple of 5, because	**4**	×	**5**	=	**20**	**4**	×	**5**	=	**20**
b)	20 is a multiple of 5, because		×		=	**20**		×		=	**20**
c)	42 is a multiple of 6, because		×		=	**42**		×		=	**42**
d)	42 is a multiple of 6, because		×		=	**42**		×		=	**42**
e)	56 is a multiple of 7, because		×		=	**56**		×		=	**56**
f)	56 is a multiple of 7, because		×		=	**56**		×		=	**56**
g)	64 is a multiple of 8, because		×		=	**64**		×		=	**64**

3. Complete the following:

×	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
3	3	6	9	12	15					
	3 × 1	3 × 2	3 × 3	3 × 4	3 × 5	3 × 6	3 × 7	3 × 8	3 × 9	3 × 10

×	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
3	3	6	9	12	15					
	3 × 1	3 × 2	3 × 3	3 × 4	3 × 5	3 × 6	3 × 7	3 × 8	3 × 9	3 × 10

Signature:		Date:	

4.10. Factors

Date		Classwork		Homework	

• 1 and 8 are pair factors of 8 because $1 \times 8 = 8$ • 2 and 4 are pair factors of 8 because $2 \times 4 = 8$ Therefore: 1, 2, 4 and 8 are factors of 8	• 1 and 12 are pair factors of 12 because $1 \times 12 = 12$ • 2 and 6 are pair factors of 12 because $2 \times 6 = 12$ • 3 and 4 are pair factors of 12 because $3 \times 4 = 12$ Therefore: 1, 2, 3, 4, 6 and 12 are factors of 12

1. Write all the factors of the following numbers:

a)	5		
b)	9		
c)	10		
d)	14		
e)	21		
f)	45		
g)	99		

2. Match column A and B to find the factors of the given numbers:

	Column A	Column B	Column A	Column B
a)	Factor of 18	7	Factor of 18	7
b)	Factor of 16	9	Factor of 16	9
c)	Factor of 21	19	Factor of 21	19
d)	Factor of 39	8	Factor of 39	8
e)	Factor of 57	13	Factor of 57	13

3. Which of the following is **not** a factor of 75? Use a cross to show.

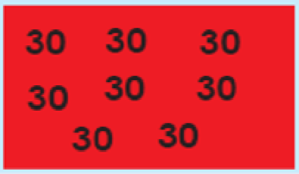
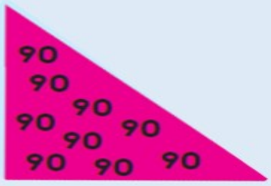
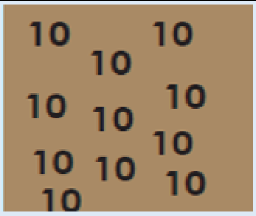
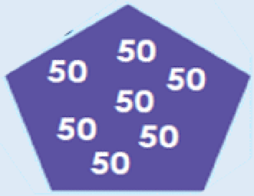
1	3	6	15	25	75		1	3	6	15	25	75

Signature:		Date:	

4.11. Multiplication of at least 2-digit by 1-digit numbers.

Date		Classwork		Homework	

1. Use multiplication to find the total in each shape.

2. Complete the table below.

Number	× 10	× 20	× 30	× 40	× 50		× 10	× 20	× 30	× 40	× 50
4											
5											
6											
7											
8											
9											

3. Calculate by using the breaking down method.

Example:

4×16
$= 4 \times (10 + 6)$
$= (4 \times 10) + (4 \times 6)$
$= 40 + 24$
$= 64$

6×25
$= 6 \times (20 + 5)$
$= (6 \times 20) + (6 \times 5)$
$= 120 + 30$
$= 150$

a)	8×16	8×16

b)	4×35	4×35

c)	9×68	9×68

d)	7×14	7×14

e)	3×57	3×57

f)	5×19	5×19

Signature:		**Date:**	

4.12. Multiplication of at least 2-digit by 2-digit numbers

Date		Classwork		Homework	

1. Calculate the total of the numbers in each shape. Use multiplication.

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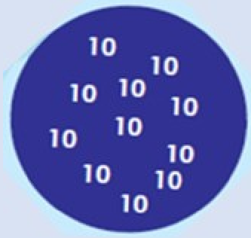
<td>
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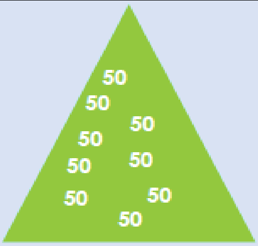
<td>
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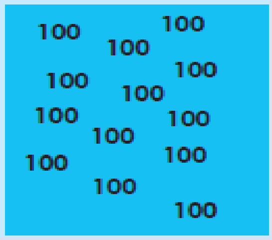
<td>
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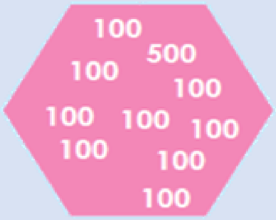
<td>
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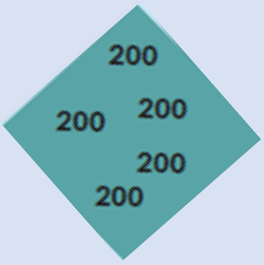
<td>
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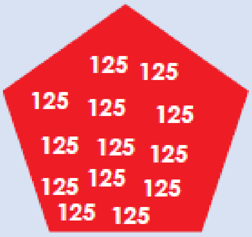
<td>
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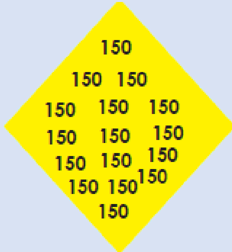
<td>
</td>
</tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

2. Complete the table below.

Number	× 10	× 20	× 30	× 40	× 50		× 10	× 20	× 30	× 40	× 50
10											
20											
30											
40											
50											
60											
70											
80											
90											

Signature:		Date:	

4.13. Multiplication of at least 2-digit by 2-digit numbers using breaking down method

Date		Classwork		Homework	

1. Use the method below to calculate.

Example:	
11 × 12 = (10 + 1) × (10 + 2) = (10 × 10) + (1 × 10) + (10 × 2) + (1 × 2) = 100 + 10 + 20 + 2 = 100 + 30 + 2 = 132	48 × 36 = (40 + 8) × (30 + 6) = (40 × 30) + (8 × 30) + (40 × 6) + (8 × 6) = 1 200 + 240 + 240 + 48 = 1 000 + 200 + 200 + 200 + 40 + 40 + 40 + 8 = 1 000 + 600 + 120 + 8 = 1 000 + 600 + 100 + 20 + 8 = 1 728

a)	28 × 71
	28 × 71

b)	29×63
	29×63

Signature:		Date:	

4.14. Using factors to multiply

Date		Classwork		Homework	

Example:	Calculate 92×12
Calculate 47×6 $= 47 \times 2 \times 3$ $= 94 \times 3$ $= (90 + 4) \times 3$ $=90 \times 3 + 4 \times 3$ $= 270 + 12$ $= 282$	$= 92 \times 2 \times 2 \times 3$ $= 184 \times 2 \times 3$ $= 368 \times 3$ $= (300 + 60 + 8) \times 3$ $=300 \times 3 + 60 \times 3 + 8 \times 3$ $= 900 + 180 + 24$ $= 1\,000 + 104$ $= 1\,104$

Calculate:

a)	23×12	23×12

b)	45×24	45×24

Signature:		Date:	

4.15. Using approximation in multiplication

Date		Classwork		Homework	

Approximation involves rounding numbers off to the nearest multiple of tens, hundreds, thousands, etc.

Example:

46×58	46×58
$\approx 46 \times 60$ (by approximating the 2nd number)	$\approx 50 \times 58$ (by approximating the 1st number)
$\approx (40 + 6) \times 60$	$\approx 50 \times (50 + 8)$
$\approx (40 \times 60) + (6 \times 60)$	$\approx (50 \times 50) + (50 \times 8)$
$\approx 2\ 400 + 360$	$\approx 2\ 500 + 400$
$\approx 2\ 760$	$\approx 2\ 900$

NOTE: The closer the approximate number is to the multiple of ten, the better the estimate. $46 \times 58 = 2\ 668$. The 1st approximate (2 760) is better than the 2nd approximate (2 900) because 58 is closer to a multiple of ten than 46.

1. Calculate the following by approximation.

c)	23×39	23×39

d)	48×63	48×63

e)	26 × 46	26 × 46

f)	38 × 65	38 × 65

g)	54 × 41	54 × 41

h)	55 × 98	55 × 98

Signature:		**Date:**	

4.16. Multiplication using doubling and halving

Date		Classwork		Homework	

To use doubling and halving in multiplication, you simply double one of the numbers and half the other one.

Example:

16×25	80×55
$= 8 \times 50$	$= 40 \times 110$
$= 4 \times 100$	$= 20 \times 220$
$= 400$	$= 10 \times 440$
	$= 4\ 400$

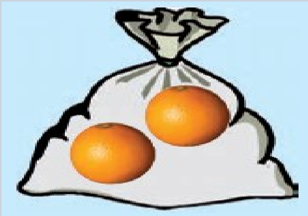
1. Calculate using the example shown above.

a)	40×8	40×8
b)	16×35	16×35
c)	75×24	75×24

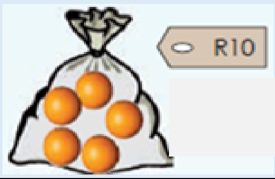
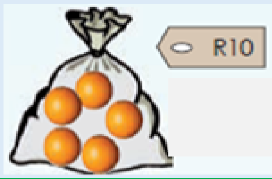
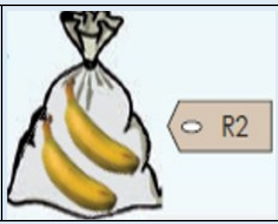
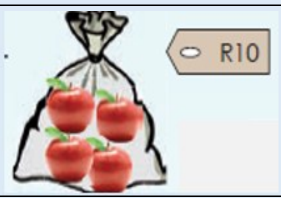
Signature:		Date:	

4.17. Problems involving rate

Date		Classwork		Homework	

Example The bag of oranges costs R4. If the oranges are of the same size, how much does each orange cost? 	R4 ÷ 2 = R2 Therefore, the cost is R2 per orange. We use the word "per" for rate. **Example: R2 per orange.**

1. Complete the following:

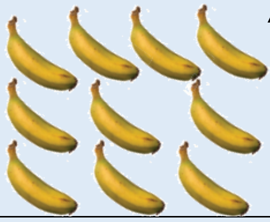
a)	 The cost is R_____ per orange	 The cost is R_____ per orange
b)	 The cost is R_____ per orange	 The cost is R_____ per orange
c)	 The cost is R_____ per apple	 The cost is R_____ per apple
d)	 The cost is R_____ per banana	 The cost is R_____ per banana
e)	 The cost is R_____ per apple	 The cost is R_____ per apple

Signature:		Date:	

4.18. Problems in context involving rate

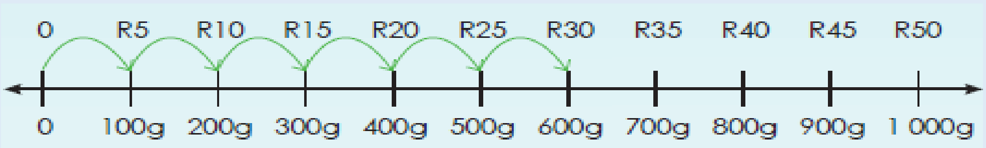
Date		Classwork		Homework	

1. Answer the following.

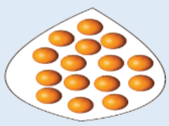
a)	All apples are of the same size. How much do these apples cost if one apple costs R2? 		
b)	 All bananas are of the same size. How much do these bananas cost if one banana costs R1.50?		
c)	The chicken is special for R25/kg. How much will 2 kg cost? 		
d)	 The milk costs R10/litre. How much do 4 ℓ of milk cost? Note: 1 box = 1ℓ		

2. Solve the following by looking at the number line.

a) How much will 600 g of cheese cost?



3. The bag of oranges cost R15. How much does one orange cost, if they are of the same size?

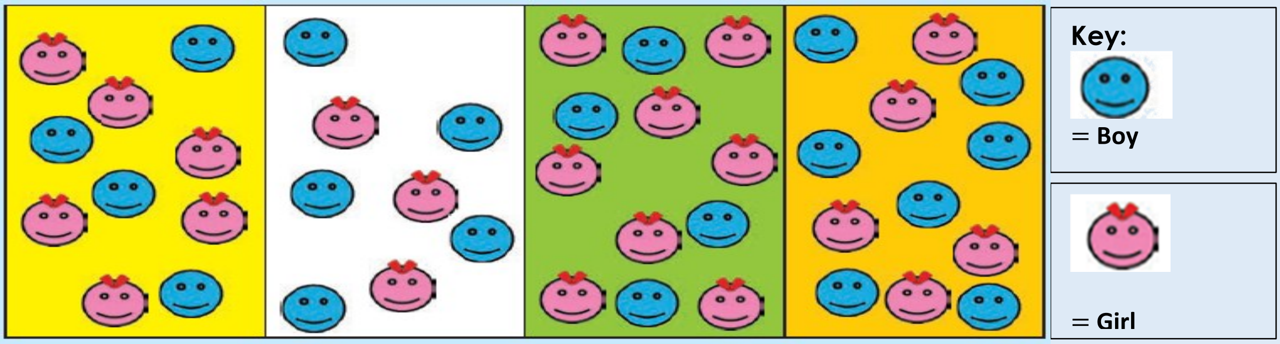


Signature:		Date:	

4.19. Problems involving ratio

Date		Classwork		Homework	

1. How many girls and boys are there in each box?



Class	Girls	Boys	Girls	Boys
Yellow	6	4		
White				
Green				
Orange				

2. A cup contains 120 beans. Of all the beans 80 are white beans and the rest are red beans. How many red beans are there?

3. Zwi collected 65 bottles for recycling. Her friend collected twelve times as many bottles as Zwi. How many bottles did the friend collect?

Signature:		Date:	

4.20. Solving Problems

Date		Classwork		Homework	

Example

A parent gives nine bags of soccer balls to a school. Each bag contains 6 soccer balls. How many soccer balls does the parent give away?

- *What is the question?* How many soccer balls does a parent give away?
- *What are the numbers?* 9 (bags) and 6 (balls per bag)
- *What operation must be used?* Multiplication (×).
- *Draw a picture.*

- *Write down a number sentence.* $9 \times 6 = \Delta$
- *Show the calculation.* $9 \times 6 = 54$

Answer: A parent gives away 54 soccer balls.

1. Solve the following problems:

a) A farmer plants 8 rows of apple trees. There are 7 apple trees in each row. How many apples trees are there in total?

b) Ann's mother buys 5 pizzas. Each pizza is cut into four slices. How many slices are there altogether?

Signature:		Date:	

4.21. Solving Problems, continued

Date		Classwork		Homework	

1. Mandla has three friends. Each of them has twenty sweets. How many sweets do they all have together?

2. There are 38 children in our class. Each child needs to pay R45 for their stationery. How much money must the teacher collect?

3. My mother gave Zola and Puleng 18 sweets. Puleng got 6 sweets. How many more sweets did Zola get more than Puleng?

4. The shopkeeper sells 98 litres of milk in one week. How many litres will he have sold in 12 weeks?

Signature:		Date:	

4.22. Solving Problems, continued

Date		Classwork		Homework	

1. The price of 3 apples at a shop is R3.00. The price of 5 of the same apples is R4.50. Which is a better buy?

2. In a party 10 soft drinks are required for every 12 guests. How many soft drinks are required if there are 60 guests?

3. The computer game cost R199. My father bought two. How much did he pay?

4. There are chickens and dogs at Lunga's home. The total number of heads for chickens and dogs is 10. The total number of legs for chickens and dogs is 26. How many chickens are there?

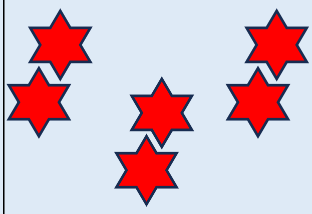
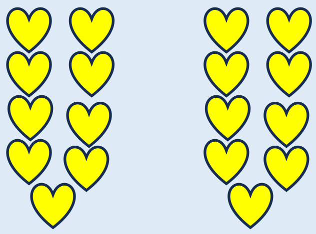
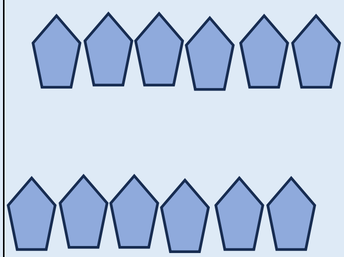
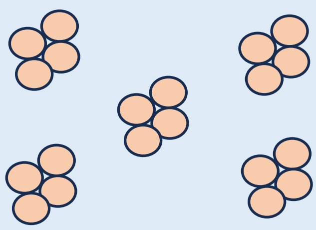
Signature:		Date:	

UNIT 5: DIVISION

5.1. Multiplication and division as inverse operations

Date		Classwork		Homework	

1. Complete the following as shown in the example:

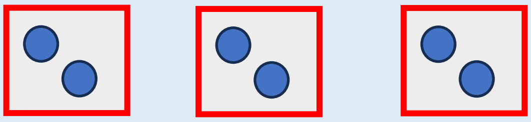
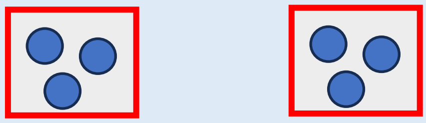
a)		**Multiplication**	
		3 groups of 2	
		3 × 2 = 6	
		Division	
		6 shared between 3 groups	
		6 ÷ 3 = 2	
b)		**Multiplication**	**Multiplication**
		Division	**Division**
c)		**Multiplication**	**Multiplication**
		Division	**Division**
d)		**Multiplication**	**Multiplication**
		Division	**Division**

Signature:		Date:	

5.2. Grouping and sharing

Date		Classwork		Homework	

1. The diagrams below show sharing between two and grouping in 2s

	
A	**B**

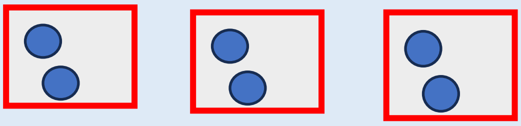
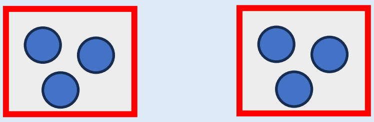
a) Which one represents grouping in 2's?

b) Which one represents sharing between two?

c) Which statement shows sharing between two and which one shows grouping in 2s? Write A or B in the box that corresponds with the correct statement.

6 sweets are shared equally between two learners		
There are 6 sweets. How many learners can each have 2 sweets?		

2. Write the number sentence for each statement?

A			
B			

3. Design a problem that shows $4 \times 3 = 12$

Signature:		**Date:**	

5.3. Grouping and sharing, continued

Date		Classwork		Homework	

1. Say whether each of the following is an example of grouping or sharing.

a) There are 18 apples. How many children can have 3 each?		
b) Three oranges are packed in a basket. How many baskets can you fill up with 18 oranges, if you put equal number of oranges in each?		
c) A lead pencil costs R7. How many lead pencils of the same type can I buy with R28?		
d) I need 3 matchsticks to make one triangular shape. How many triangular shapes can I make with 84 match sticks		
e) 6 chocolates fit in one box. If I have 72 chocolates, how many boxes will I need?		
f) I need 80 chairs for a party. I arrange them in 10s per table. How many tables do I need?		

2. Write the number sentence to solve each statement in (1) above and write an inverse operation for each

	Number sentence		Inverse operation	
a)				
b)				
c)				
d)				
e)				
f)				

Signature:		Date:	

5.4. Division and patterns

Date		Classwork		Homework	

1. Complete the following:

30 ÷ 3 =	300 ÷ 3 =	30 ÷ 3 =	300 ÷ 3 =
27 ÷ 3 =	270 ÷ 3 =	27 ÷ 3 =	270 ÷ 3 =
24 ÷ 3 =	240 ÷ 3 =	24 ÷ 3 =	240 ÷ 3 =
21 ÷ 3 =	210 ÷ 3 =	21 ÷ 3 =	210 ÷ 3 =
18 ÷ 3 =	180 ÷ 3 =	18 ÷ 3 =	180 ÷ 3 =
15 ÷ 3 =	150 ÷ 3 =	15 ÷ 3 =	150 ÷ 3 =
12 ÷ 3 =	120 ÷ 3 =	12 ÷ 3 =	120 ÷ 3 =
9 ÷ 3 =	90 ÷ 3 =	9 ÷ 3 =	90 ÷ 3 =

50 ÷ 5 =	500 ÷ 5 =	50 ÷ 5 =	500 ÷ 5 =
45 ÷ 5 =	450 ÷ 5 =	45 ÷ 5 =	450 ÷ 5 =
40 ÷ 5 =	400 ÷ 5 =	40 ÷ 5 =	400 ÷ 5 =
35 ÷ 5 =	350 ÷ 5 =	35 ÷ 5 =	350 ÷ 5 =
30 ÷ 5 =	300 ÷ 5 =	30 ÷ 5 =	300 ÷ 5 =
25 ÷ 5 =	250 ÷ 5 =	25 ÷ 5 =	250 ÷ 5 =
20 ÷ 5 =	200 ÷ 5 =	20 ÷ 5 =	200 ÷ 5 =
15 ÷ 5 =	150 ÷ 5 =	15 ÷ 5 =	150 ÷ 5 =
10 ÷ 5 =	100 ÷ 5 =	10 ÷ 5 =	100 ÷ 5 =

Signature:		Date:	

5.5. Division and patterns, continued

Date		Classwork		Homework	

1. Quick calculations. Look for links

30 ÷ 3 = ____	15 ÷ 3 = ____	60 ÷ 3 = ____	600 ÷ 3 = ____
150 ÷ 3 = ____	24 ÷ 4 = ____	24 ÷ 8 = ____	240 ÷ 4 = ____
120 ÷ 4 = ____	12 ÷ 4 = ____	40 ÷ 10 = ____	40 ÷ 5 = ____
400 ÷ 10 = ____	400 ÷ 5 = ____	200 ÷ 5 = ____	18 ÷ 2 = ____
36 ÷ 2 = ____	72 ÷ 2 = ____	72 ÷ 4 = ____	72 ÷ 8 = ____

30 ÷ 3 = ____	15 ÷ 3 = ____	60 ÷ 3 = ____	600 ÷ 3 = ____
150 ÷ 3 = ____	24 ÷ 4 = ____	24 ÷ 8 = ____	240 ÷ 4 = ____
120 ÷ 4 = ____	12 ÷ 4 = ____	40 ÷ 10 = ____	40 ÷ 5 = ____
400 ÷ 10 = ____	400 ÷ 5 = ____	200 ÷ 5 = ____	18 ÷ 2 = ____
36 ÷ 2 = ____	72 ÷ 2 = ____	72 ÷ 4 = ____	72 ÷ 8 = ____

2. In (1), colour the calculations that you linked with the same colour and give reasons why you linked them.

Colour	Reasons	Reasons

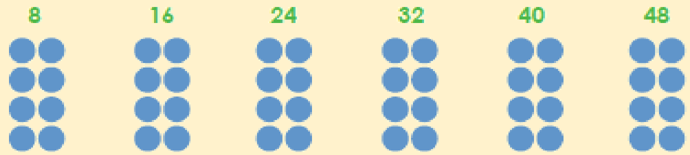
Signature:		Date:	

5.6. Division of 2-digit numbers by 1-digit numbers

Date		Classwork		Homework	

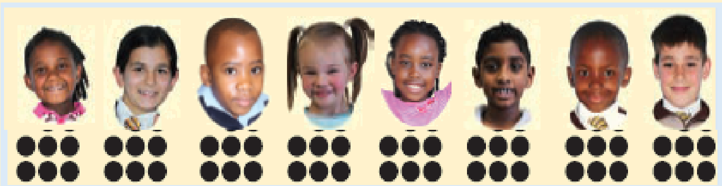
Study the following example: Calculate 48 ÷ 8 =

Example 1: We can ask ourselves how many groups of 8 will we get from 48? Let us count.



There are 6 groups of 8 in 48. ∴ **48 ÷ 8 = 6**

Example 2: If we share 48 items between 8 people, how much will each get? Let us share



If we share 48 items between 8 people, we get 6.

∴ **48 ÷ 8 = 6**

We can also use a table

1 × 8 = 8
2 × 8 = 16
3 × 8 = 24
4 × 8 = 32
5 × 8 = 40
6 × 8 = 48
7 × 8 = 56
8 × 8 = 64
9 × 8 = 72

1. Use any of the two examples to calculate the following.

a) 30 ÷ 5

b) 42 ÷ 7

c) 54 ÷ 9

Signature:		Date:	

5.7. Division of 3-digit numbers by 1-digit numbers

Date		Classwork		Homework	

Study the following example: Calculate $485 \div 8 =$

Example 1	
Example 1: We can ask ourselves how many groups of 8 will we get from 485? Let us count. 10 groups of 8 is 80 20 groups of 8 is 160 30 groups of 8 is 240 40 groups of 8 is 320 50 groups of 8 is 400 **60 groups of 8 is 480** 70 groups of 8 is 560 60 groups of 8 will give us 480 Sixty groups of 8 will give us 480 with 5 left. $\therefore$ **485 ÷ 8 = 60 rem 5**	We can also use a table $10 \times 8 = 80$ $20 \times 8 = 160$ $30 \times 8 = 240$ $40 \times 8 = 320$ $50 \times 8 = 400$ $\mathbf{60 \times 8 = 480}$ $70 \times 8 = 560$

1. Use any of the two examples to calculate the following.

a) $650 \div 9$

b) $400 \div 9$

c) $301 \div 5$

Signature:		Date:	

5.8. Division of numbers using breaking down method

Date		Classwork		Homework	

To divide numbers, you can also break down the number to be dived into multiples of the divisor (the number that you are dividing with). Then divide each multiple by the divisor

Consider the following examples

49 ÷ 3		432 ÷ 6
(30 + 18 + 1) ÷ 3 30 ÷ 3 = 10 18 ÷ 3 = 6 48 ÷ 3 = 16 ∴ 49 ÷ 3 = 16 rem 1	(30 + 15 + 3 + 1) ÷ 3 30 ÷ 3 = 10 15 ÷ 3 = 5 3 ÷ 3 = 1 48 ÷ 3 = 16 ∴ 49 ÷ 3 = 16 rem 1	(300 + 120 + 12) ÷ 6 300 ÷ 6 = 50 120 ÷ 6 = 20 12 ÷ 6 = 2 432 ÷ 6 = 72 ∴ 432 ÷ 6 = 72

1. Calculate:

a)	358 ÷ 3	
b)	732 ÷ 8	

Signature:		Date:	

5.9. Using long division

Date		Classwork		Homework	

Consider the following examples:

49 ÷ 3

$$\begin{array}{rrrl}
3 & \overline{)\,4} & 9 & \\
- & 3 & 0 & (3 \times 10) \\
\hline
 & 1 & 9 & \\
- & 1 & 5 & (3 \times 5) \\
\hline
 & & 4 & \\
- & & 3 & (3 \times 1) \\
\hline
 & & 1 &
\end{array}$$

Clue board

3 × 1 = 3
3 × 2 = 6
3 × 10 = 30
3 × 5 = 15

∴ 49 ÷ 3 = 16 rem 1

432 ÷ 6

$$\begin{array}{rrrrl}
6 & \overline{)\,4} & 3 & 2 & \\
- & 3 & 0 & 0 & (6 \times 50) \\
\hline
 & 1 & 3 & 2 & \\
- & & 6 & 0 & (6 \times 10) \\
\hline
 & & 7 & 2 & \\
- & & 6 & 0 & (6 \times 10) \\
\hline
 & & 1 & 2 & \\
- & & 1 & 2 & (6 \times 2) \\
\hline
 & & & 0 &
\end{array}$$

Clue board

6 × 1 = 6
6 × 2 = 12
6 × 10 = 60
6 × 5 = 30
6 × 100 = 600
6 × 50 = 300
6 × 25 = 150

∴ 432 ÷ 6 = 72

1. Use long division to calculate the following.

a) 91 ÷ 7

91 ÷ 7	91 ÷ 7
Clue board ________ ________ ________ ________ ________	**Clue board** ________ ________ ________ ________ ________
∴ 91 ÷ 7 =	∴ 91 ÷ 7 =

b) $74 \div 6$

$74 \div 6$

Clue board

$\therefore 74 \div 6 =$

$74 \div 6$

Clue board

$\therefore 74 \div 6 =$

c) $159 \div 4$

$159 \div 8$

Clue board

$\therefore 159 \div 4 =$

$159 \div 8$

Clue board

$\therefore 159 \div 4 =$

d) $237 \div 5$

$237 \div 5$

Clue board

$\therefore 237 \div 5 =$

$237 \div 5$

Clue board

$\therefore 237 \div 5 =$

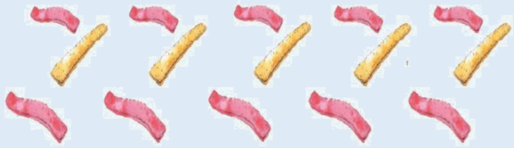
Signature:		Date:	

5.10. Solving problems

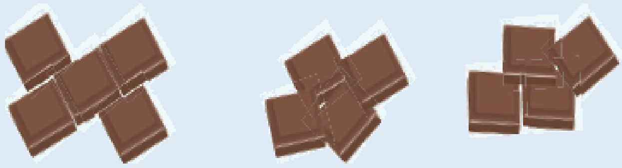
Date		Classwork		Homework	

Solve these word problems using any method.

1. At a party 15 sugar strips are shared among 4 children. Share equally.
Use drawings to help you.



2. Jabu and Lebo want to share 13 chocolate pieces equally. How many pieces do they each get?

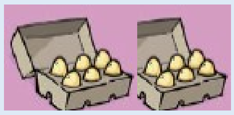


3. 68 apples must be shared equally among 7 people.
How many apples will each one get and how many apples will remain?

Signature:		Date:	

Date		Classwork		Homework	

1. 137 eggs must be packed in cartons that can take 6 eggs each.



a) How many cartons are needed?

b) How many cartons can be filled?

c) How many eggs will be in the carton that is not filled?

Signature:		Date:	

5.12. Solving problems in financial context

Date		Classwork		Homework	

Solve the following problems:

1. The bookshop sold 8 books for R500. How much did one book of the same kind cost?

2. A shoe shop sells each pair of shoes for R82. My mother and sister bought 9 pairs altogether. How much did they pay?

3. My teacher bought 7 story books for R69 each. How much did she pay for all the story books?

Signature:		Date:	

5.13. Solving problems in financial context continued

Date		Classwork		Homework	

Solve the following problems:

1. My mother bought computer gadgets for R98 each. She bought 5 gadgets. How much did she pay altogether?

2. I spent R600 on 6 computer games which are the same. How much did I pay for each game?

3. My mother went on a training course for 7 days. The lunch costs R75 per day. How much did she pay for her lunches?

Signature:		Date:	

5.14. Solving problems in context involving ratio and rate

Date		Classwork		Homework	

Solve the following problems:

1. Joey bought 240 metres of wire to fence his farm. This is 15 times more than what Peter bought. How much wire did Peter buy?

2. It takes Tebogo 1 hour to run 6 km. How much time will it take him to run 3 km, if running at the same pace?

3. A store charges R90 for a box of 15 avocado pears. A garage charges R63 for a bag of 9 avocado pears. Which is the best deal?

4. A printing machine works at the same pace all the time. It takes 8 hours to print 720 booklets on the machine. How many booklets are printed each hour?

Signature:		Date:	

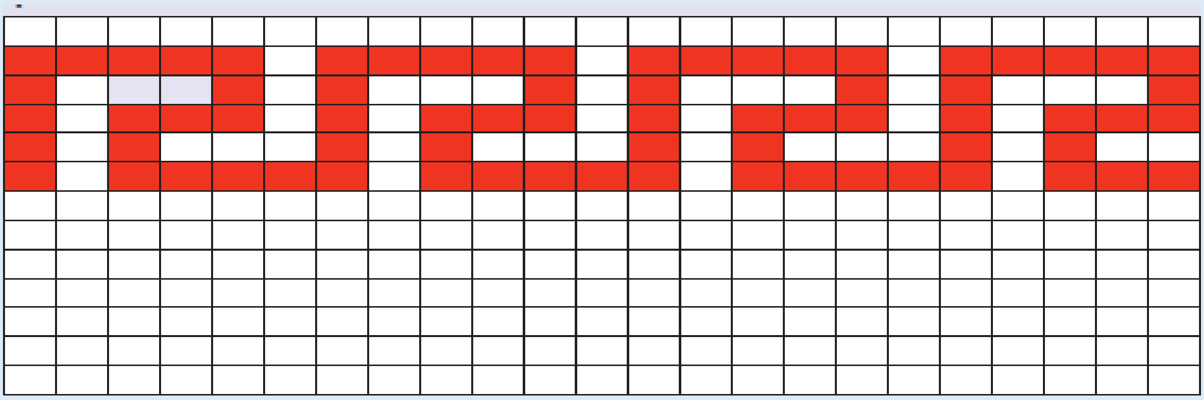
UNIT 6: GEOMETRIC PATTERNS

6.1. Having fun with patterns

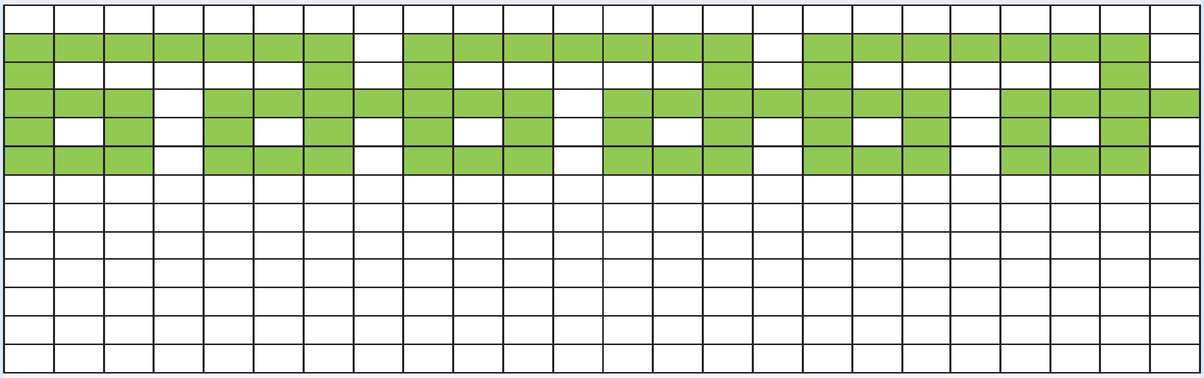
Date		Classwork		Homework	

1. Copy each pattern on the grid below it.

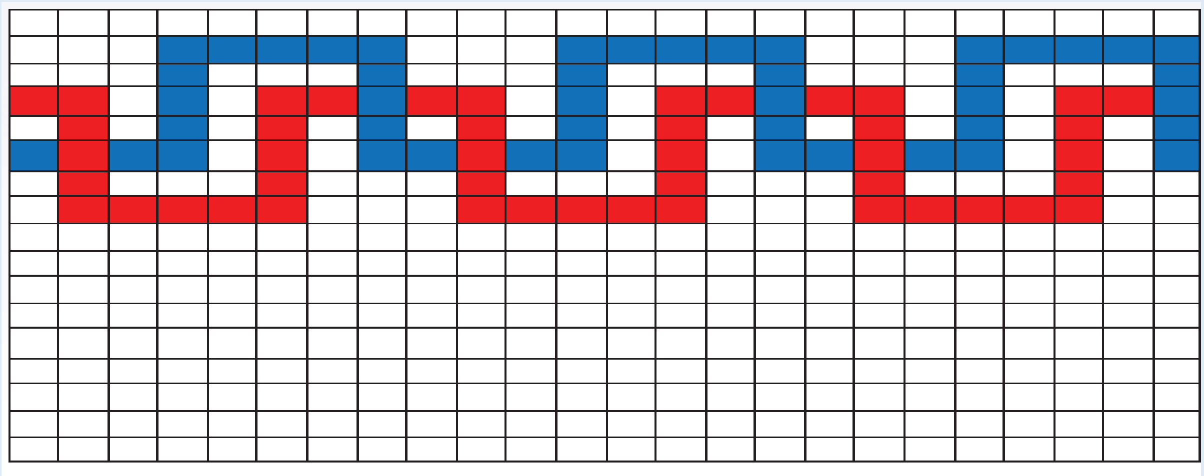
a)



b)



c)

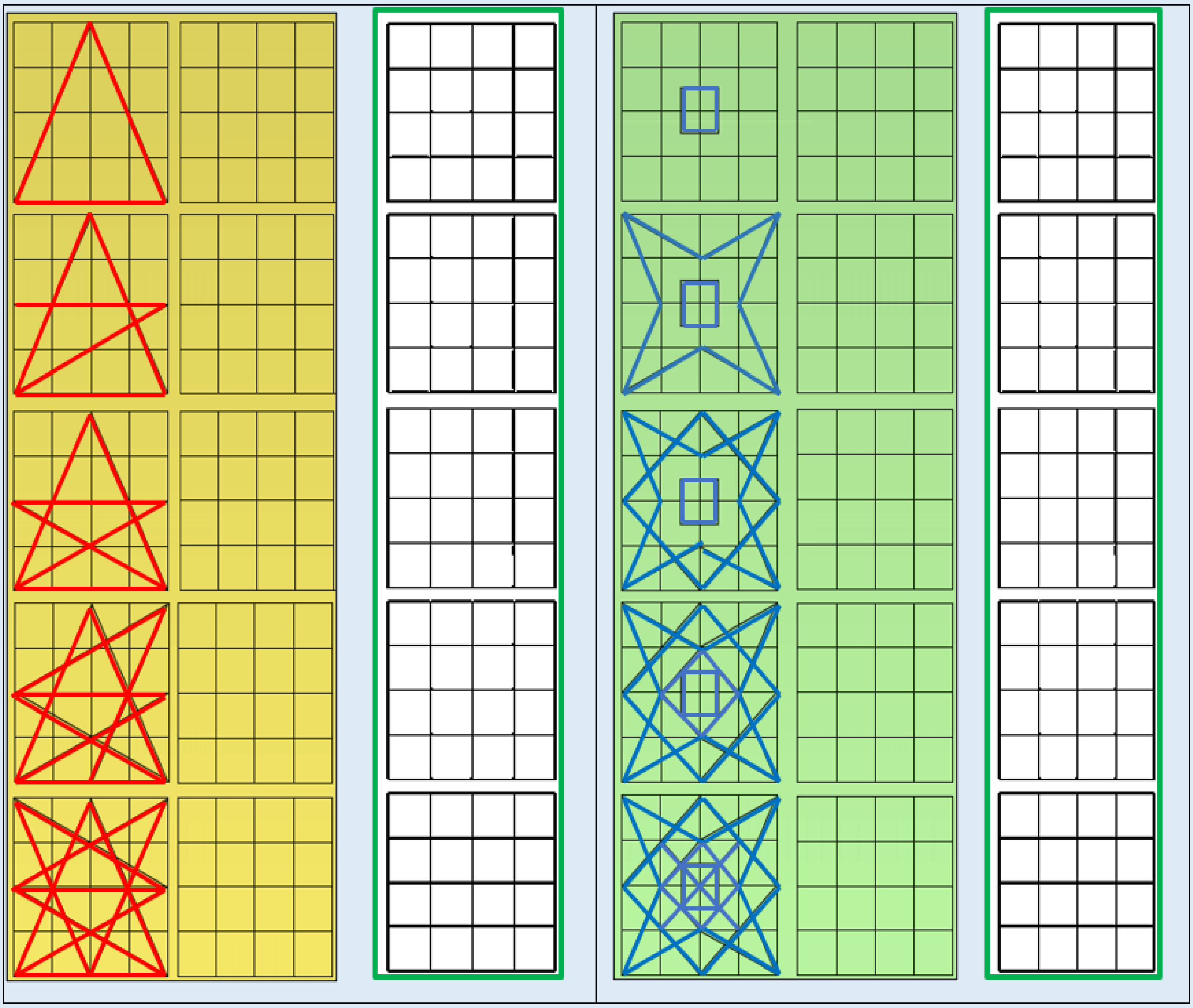


Signature:		Date:	

6.2. Having fun with patterns. continued

Date		Classwork		Homework	

1. Draw each design such that it matches the one on the left?



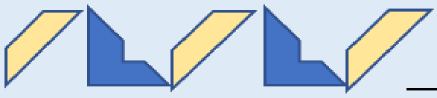
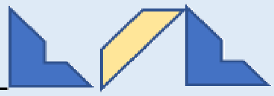
Signature:		Date:	

6.3. Seeing geometric patterns

Date		Classwork		Homework	

The more **patterns** you can see in mathematics, the better you are at mathematics! How good are you at seeing patterns? A pattern can grow or can repeat.

1. Study and complete the pattern.

a)	 ____ ____ 	____ ____
b)	A B C A ____ ____ A B C A	____ ____
c)	○ □ ○ △ ○ □ ○ △ ○ □ ___ ___ ○	____ ____
d)	→ ↓ ← ↑ → ↓ ← ↑ → ___ ___ ___	____ ____ ____
e)	___ ♥ ☆ ◎ ♥ ☆ ◎ ♥ ☆ ◎ ___ ☆	____ ____

f) What type of patterns are shown in (a) to (e)? [repeating or growing]

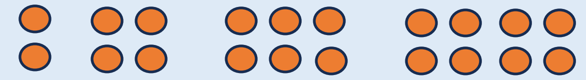
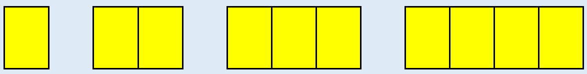
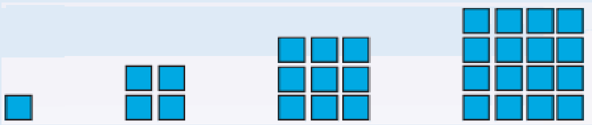
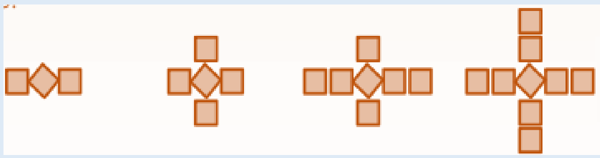
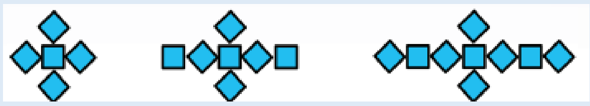
2. Design your own repeating pattern using shapes.

Signature:		Date:	

6.4. Seeing geometric patterns, continued.

Date		Classwork		Homework	

1. Study and draw the next diagram in the following patterns.

a)				
b)				
c)				
d)				
e)				

f) What type of patterns are shown in (a) to (e)? [repeating or growing]

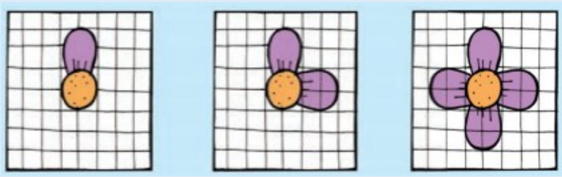
2. Design your own growing pattern using shapes.

Signature:		Date:	

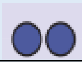
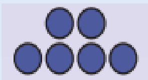
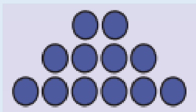
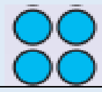
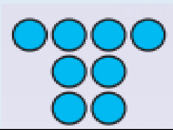
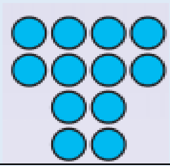
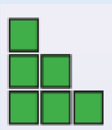
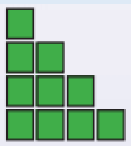
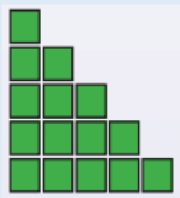
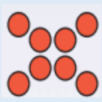
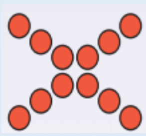
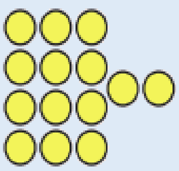
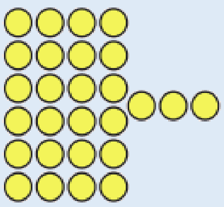
6.5. Investigating and extending geometric patterns

Date		Classwork		Homework	

1. What happens to the petals? Complete:

2. Study the patterns and extend them.

a)					
b)					
c)					
d)					
e)					

Signature:		Date:	

6.6. Investigating and extending geometric patterns, continued

Date		Classwork		Homework	

A **geometric pattern** is the arrangement of objects, shapes, drawings, diagrams in the same manner without changing the structure. However, the structure may be enlarged or reduced.

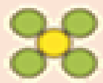
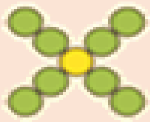
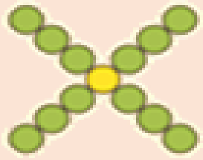
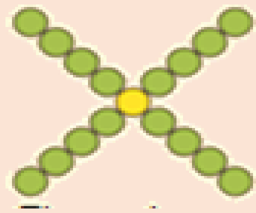
			

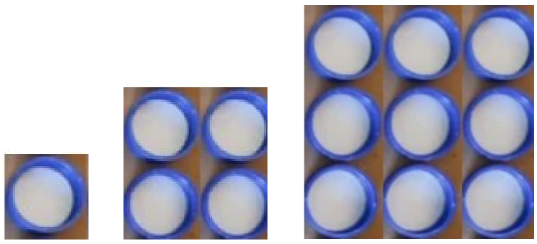
Figure 1	Figure 2	Figure 3	Figure 4

One can **describe the pattern** above by saying:

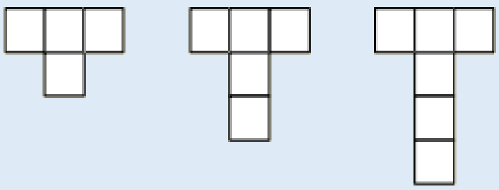
- Two dots are added diagonally on the either side of the yellow circle for each stage.
- Add one dot at the end of each stage such that it forms an X-shape

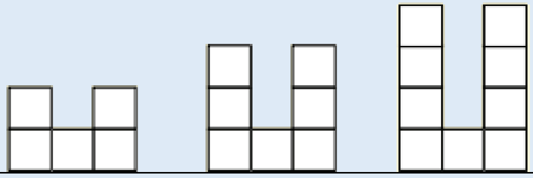
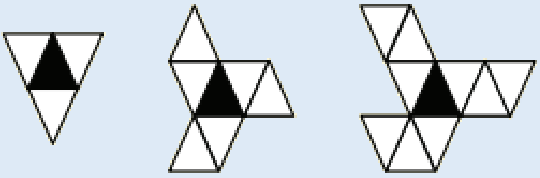
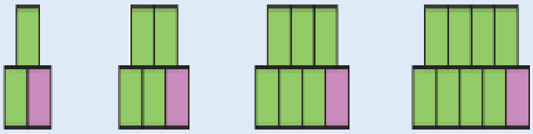
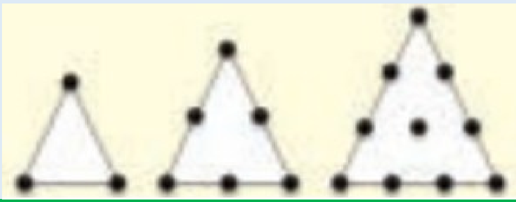
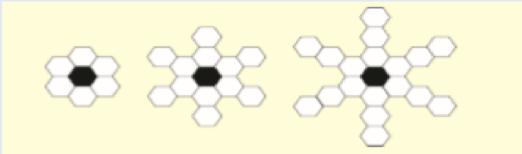
This type of description shows the **relationship** between the consecutive stages of a pattern, i.e. what happens to the previous stage to get the next stage.

1. Describe how each pattern grows, verbally.

Build the following using cool drink cans. 	Build the following using bottle tops. 

2. Extend and describe how each pattern grows.

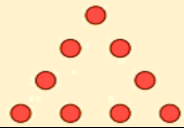
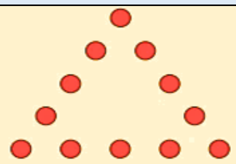
a)			
Description:			
Description:			

b)			
Description:			
Description:			
c)			
Description:			
Description:			
d)			
Description:			
Description:			
e)			
Description:			
Description:			
f)			
Description:			
Description:			

Signature:		**Date:**	

6.7. Investigating and extending geometric patterns

Date		Classwork		Homework	

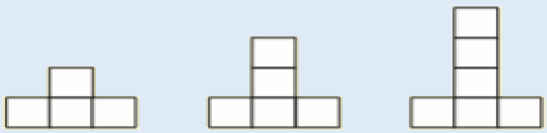
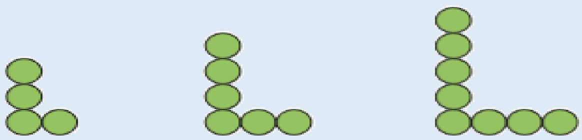
			
Figure 1	Figure 2	Figure 3	Figure 4

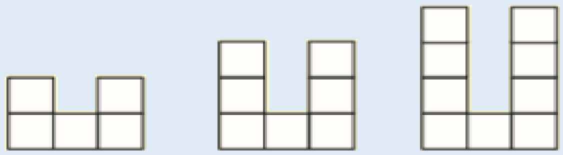
The pattern above can be described in different ways:

- The arrangement of the circles forms a triangular shape with two circles per side, and then increases by one circle per side.
- The arrangement of the circles forms a triangular shape that differs by three dots from the one next to it.
- The arrangement of the circles forms a triangular shape, and the next triangle is formed by adding one dot on each side.

This type of description shows how the pattern is **formed.**

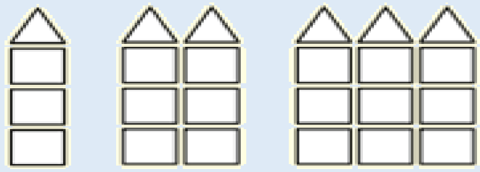
1. Extend and describe how each pattern is formed.

a)			
Description:			
Description:			
b)			
Description:			
Description:			

c) 

Description:

Description:

d) 

Description:

Description:

2. Design your own pattern and describe how the pattern is formed.

Description:

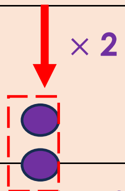
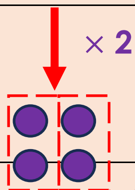
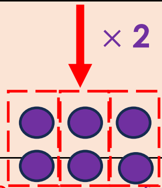
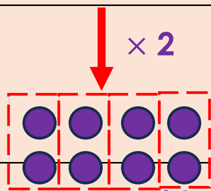
Description:

Signature:		Date:	

6.8. General rule

Date		Classwork		Homework	

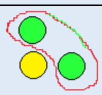
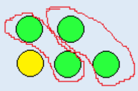
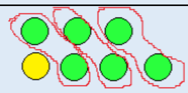
The description of a pattern can also show the relationship between the stage number or figure number and the diagram itself. This type of relationship is called a **general rule** for the pattern. A **general rule** helps you to easily determine the term of the pattern or the number of shapes in any stage of the pattern.

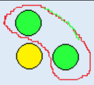
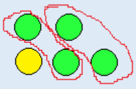
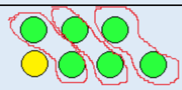
Stage	Figure **1**	Figure **2**	Figure **3**	Figure **4**
Pattern				
Words	1 group of 2	2 groups of 2	3 groups of 2	4 groups of 2
Number sentence	1 × 2	2 × 2	3 × 2	4 × 2
General rule	$\square$ × 2	$\square$ × 2	$\square$ × 2	$\square$ × 2

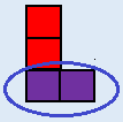
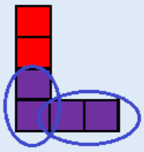
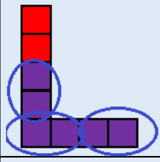
To determine the general rule of the pattern, look for what changes and what is the same.

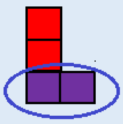
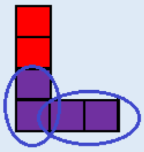
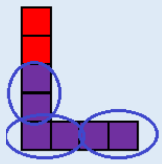
This therefore means in stage 22, there will be 22 × 2 circles = 44 circles

1. In each complete the table by:
   - Drawing the fourth stage
   - Identifying what is the same in each, which is highlighted
   - Identifying what changes by representing it as groups
   - Writing a number sentence
   - General rule by replacing what changes by a place holder or the word "stage number"

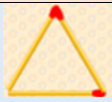
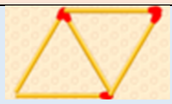
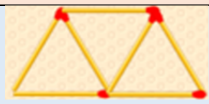
a) Stage	1	2	3	4
Pattern				
What is the same?	1			
What changes?	1 group of 2			
Combine the two rows	1 + 1 group of 2			
Number sentence	1 +1 × 2			
General rule	1 + $\square$ × 2			

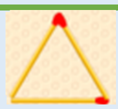
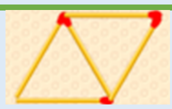
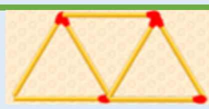
Pattern				
What is the same?	1			
What changes?	1 group of 2			
Combine the two rows	1 + 1 group of 2			
Number sentence	$1 + 1 \times 2$			
General rule	$1 + \square \times 2$			

b) Stage	1	2	3	4
Pattern				
What is the same?	2			
What changes?	1 group of 2			
Combine the two rows	2+ 1 group of 2			
Number sentence	$2 + 1 \times 2$			
General rule	$2 + \square \times 2$			

Pattern				
What is the same?	2			
What changes?	1 group of 2			
Combine the two rows	2+ 1 group of 2			
Number sentence	$2 + 1 \times 2$			
General rule	$2 + \square \times 2$			

2. Follow the steps in No. 1, to write the general rule for the pattern.

Stage	**1**	**2**	**3**	**4**
What is the same?				
What changes?				
Combine the two rows				
Number sentence				
General rule				

What is the same?				
What changes?				
Combine the two rows				
Number sentence				
General rule				

3. Determine the number of shapes in stage 35 for (a), (b) and (c)

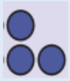
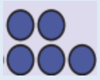
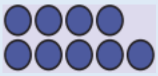
No.	**Rule**	**Number of shapes in stage 35**	
a)			
b)			
c)			

Signature:		**Date:**	

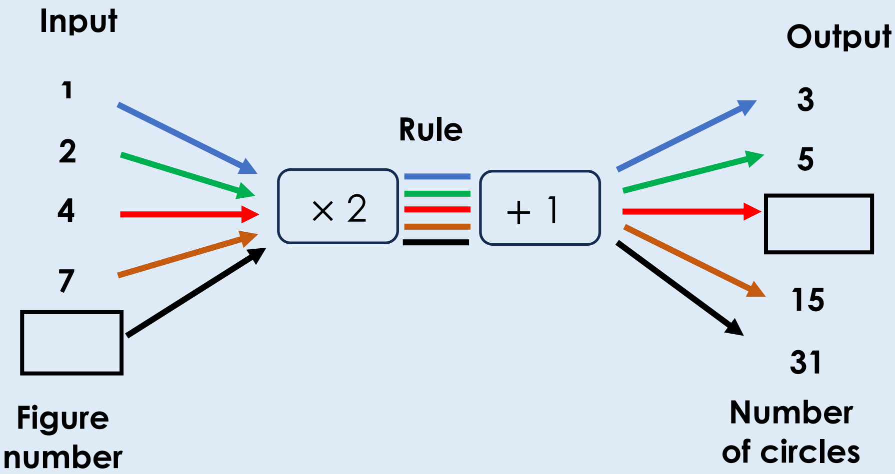
6.9. Input, output and rules in flow diagrams

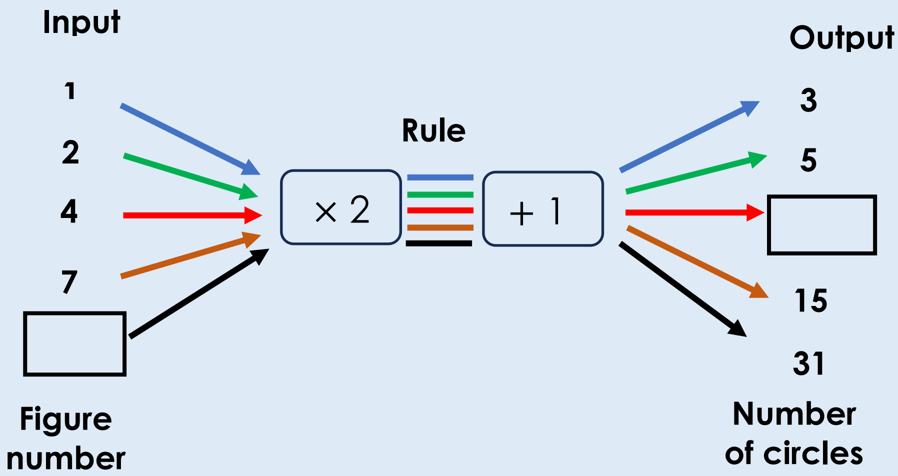
Date		Classwork		Homework	

1. Look at the pattern formed by circles and complete the flow diagram.

Figure 1	Figure 2	Figure 3	Figure 4		Figure 31
					

a) Complete the flow diagram if given the rule



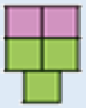
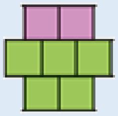
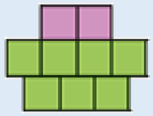
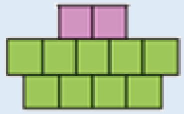


Signature:		Date:	

6.10. Input, output and rules in flow diagrams, continued.

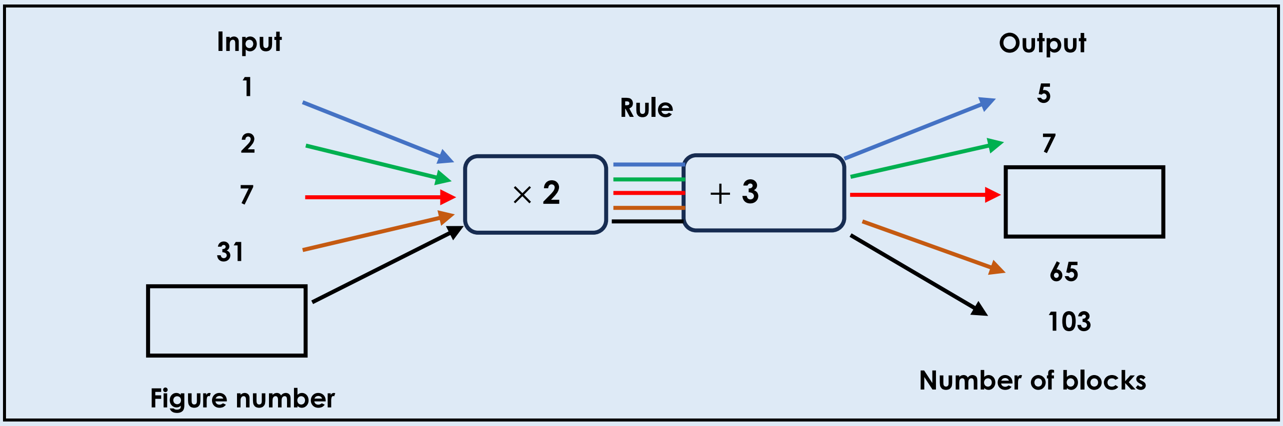
Date		Classwork		Homework	

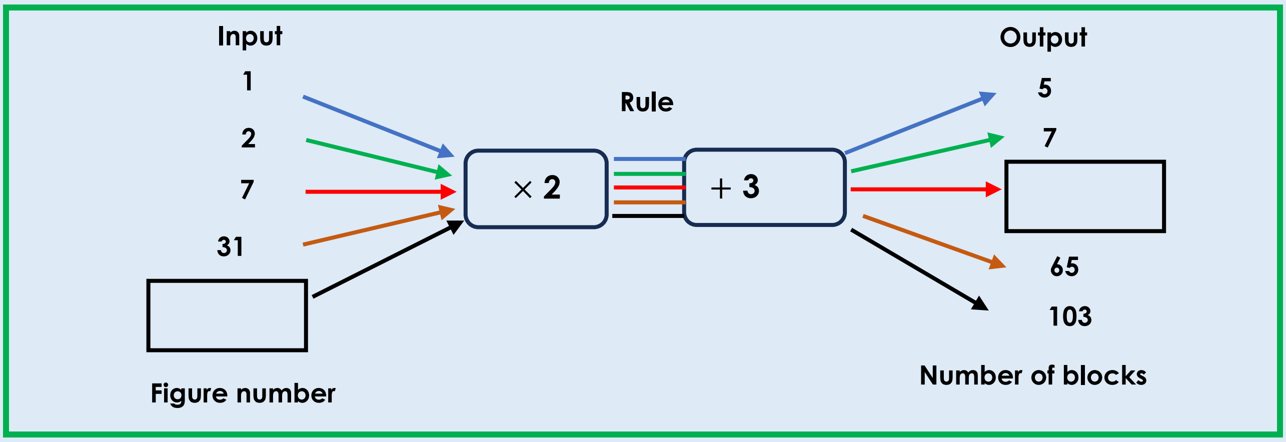
Look at the pattern formed by blocks.

Figure 1	Figure 2	Figure 3	Figure 4		Figure 31
					

1. Describe how the pattern is formed.

2. Complete the flow diagram.



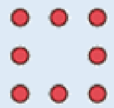
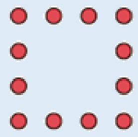
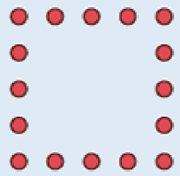


Signature:		Date:	

6.11. Input, output and rules in flow diagrams, continued

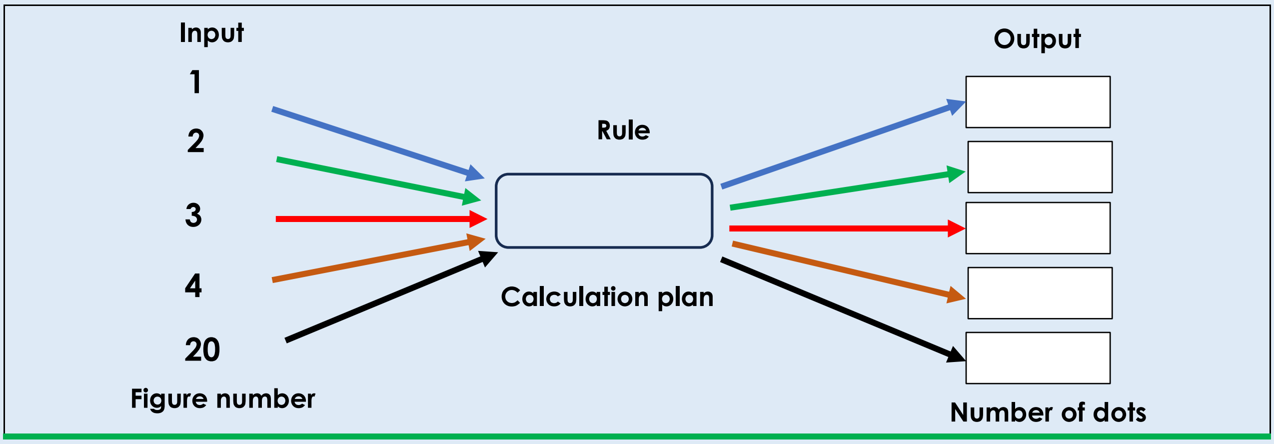
Date		Classwork		Homework	

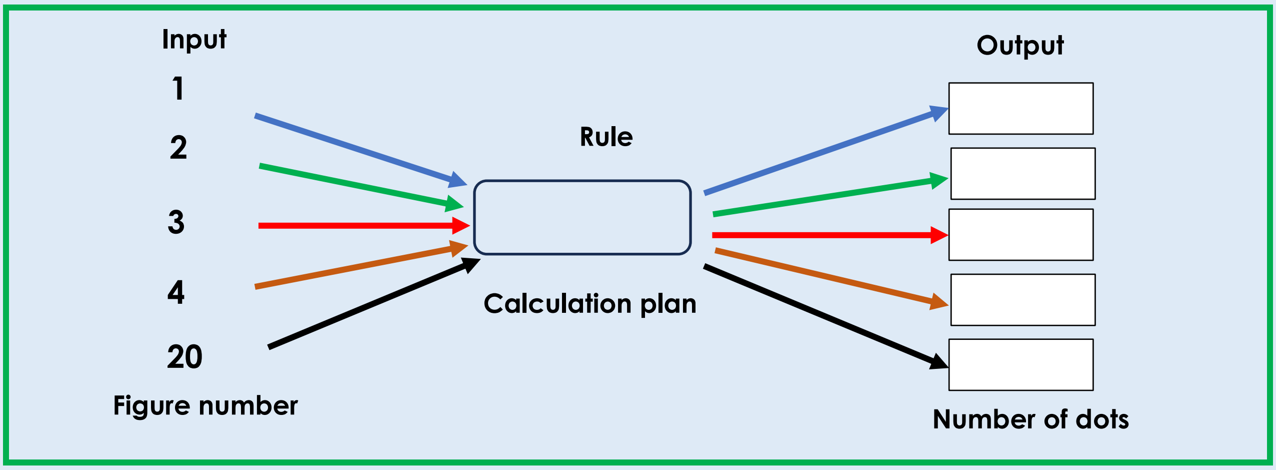
Look at the pattern formed.

Figure 1	Figure 2	Figure 3	Figure 4		Figure 20
					

1. Describe how the pattern is formed.

2. Complete the flow diagram.



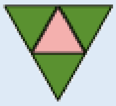
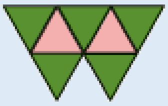
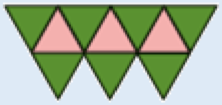
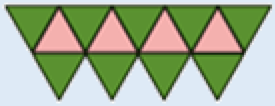


Signature:		Date:	

6.12. Input, output and rules in flow diagrams, continued

Date		Classwork		Homework	

Triangles are arranged to form a pattern

Figure 1	Figure 2	Figure 3	Figure 4
			

1. Describe how the pattern for the green triangles grows.

2. Describe how the pattern for the pink triangles is formed.

3. Determine the general rule for the pattern formed by green triangles.

4. How many green triangles will be there in stage 50?

Signature:		Date:	

6.13. Equivalent forms

Date		Classwork		Homework	

Patterns can be represented and described in different forms as shown below.

Diagrammatic representations

1. Study and extend the following pattern.

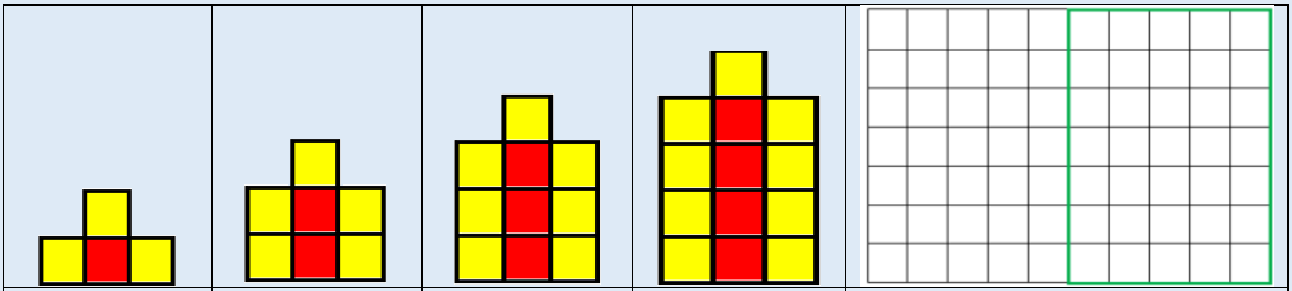


Diagram 1 | Diagram 2 | Diagram 3 | Diagram 4 | Diagram 5

The same pattern can be described **verbally** or using own words

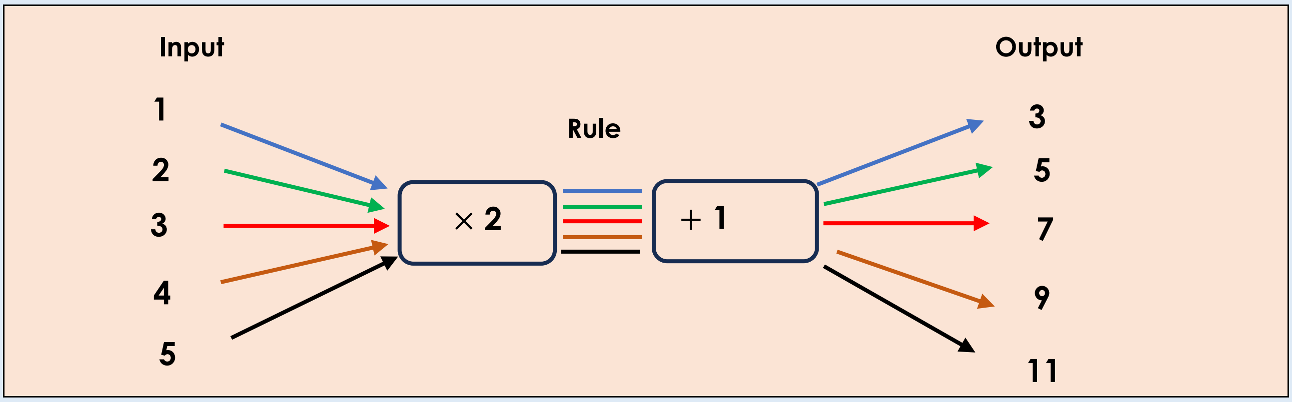
Verbal description

- To get the next diagram, add a row with a red square and two yellow squares at the bottom of each stage such that the red square is between two yellow squares.
- The number of rows with a red square and two yellow squares is the same as the diagram number

Table form

Diagram number	1	2	3	4	5	6	
Red Squares	1	2	3	4	5		
Yellow Squares	3	5	7	9	11		
Total squares	4	7	10	13	16		

Flow diagram.



Number sentence

Open number sentence	Closed number sentence
2 × ___ + 1 = 7	2 × 3 + 1 = 7

2. Study the pattern formed by red squares.

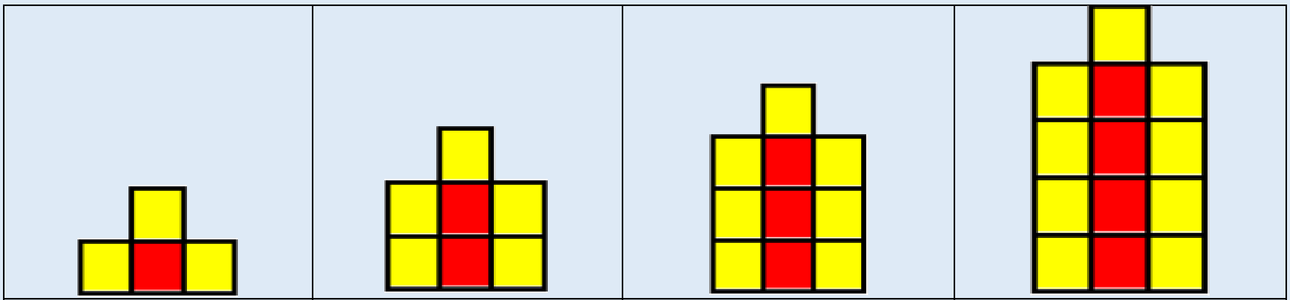
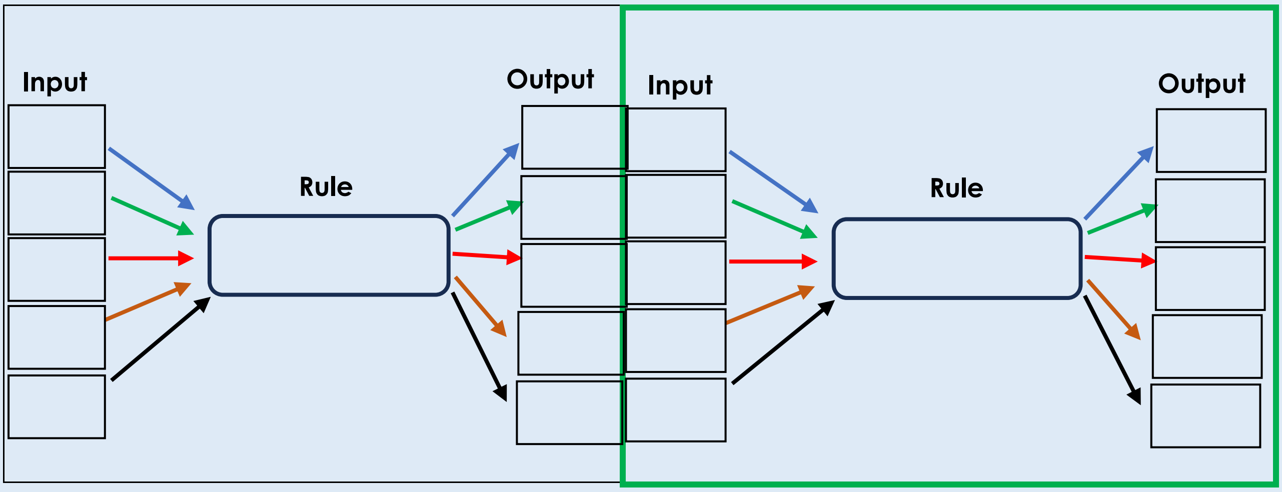


Diagram 1	Diagram 2	Diagram 3	Diagram 4

a) Complete the flow diagram for the red squares.



b) Determine the general rule for the red squares.

c) Write the number sentence for the red squares.

Open number sentence	**Closed number sentence**

Signature:		**Date:**	

6.14. Equivalent forms

Date		Classwork		Homework	

1. Study the given pattern and answer the questions that follow:

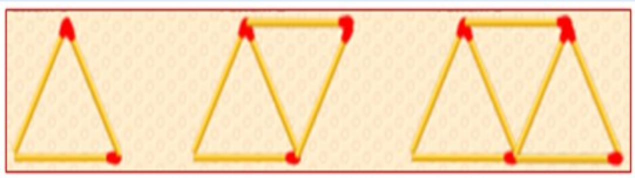


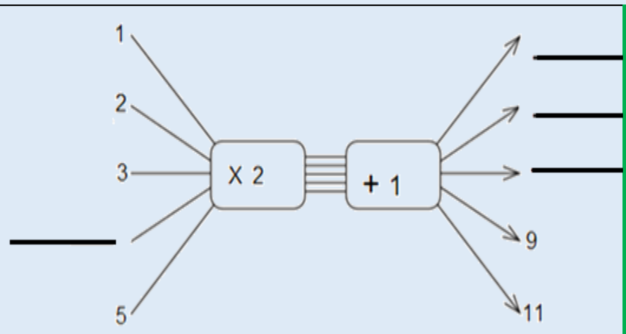
Diagram 1 Diagram 2 Diagram 3	Diagram 4	Diagram 4

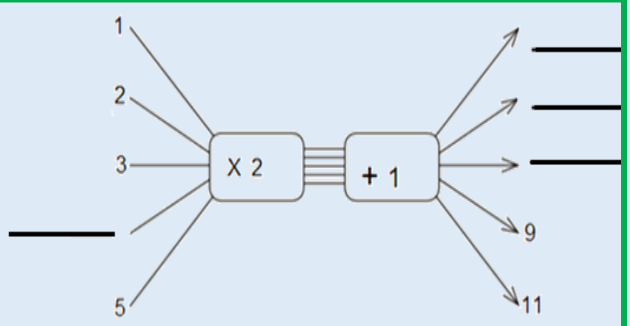
a) Draw diagram 4.

b) Describe how you would get the next diagram or stage.

c) Write the rule in own words using matchsticks and/or triangles

d) Complete the flow diagram using the information on the given pattern.





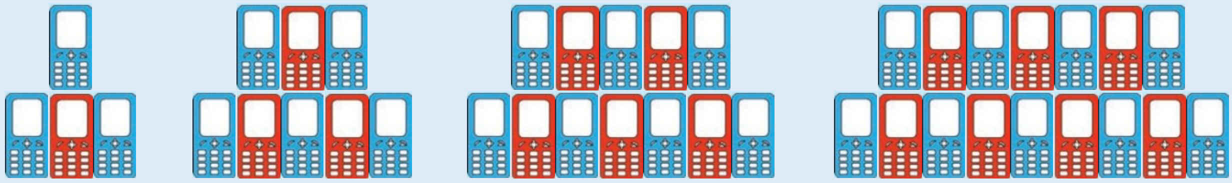
e) Write any two number sentences (one open and one closed)

Signature:		Date:	

6.15. More equivalent forms

Date		Classwork		Homework	

1. Elspeth is making this growing pattern with blue and red cell phones.



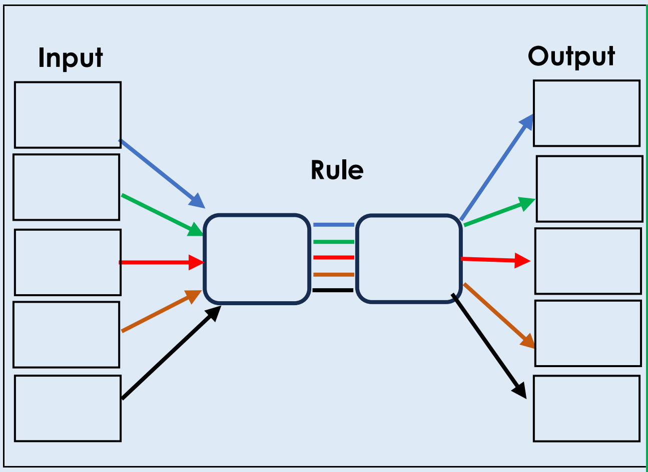
Arrangement 1 | Arrangement 2 | Arrangement 3 | Arrangement 4

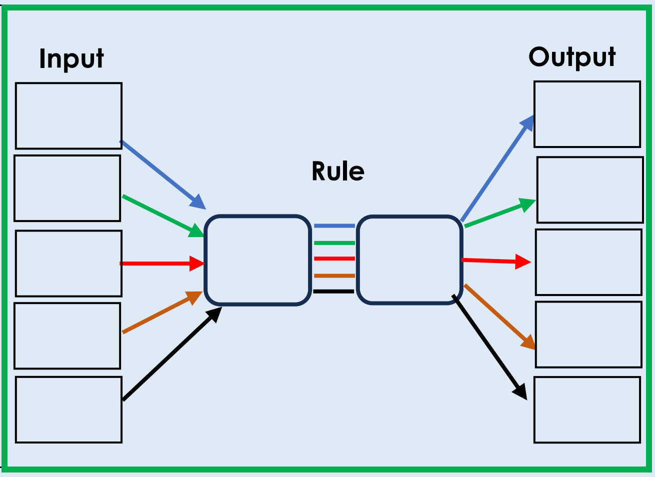
a) Complete the table.

Arrangement number	1	2	3	4	5		20		3	4	5		20
No, of red phones	1	3											
No of blue phones	3	5											
Total number of phones	4	8											

b) Describe the patterns of red phones is formed.

c) Make a flow diagram to show how the number of red phones can be calculated.





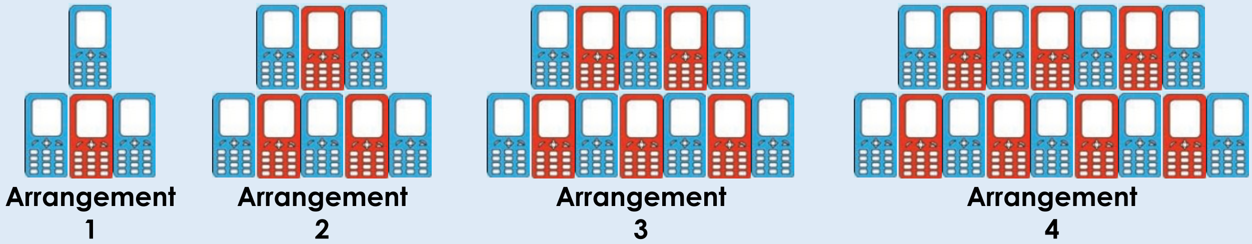
d) Write a number sentence to show how you can calculate the number of red cell phones.

Signature:		Date:	

6.16. More equivalent forms

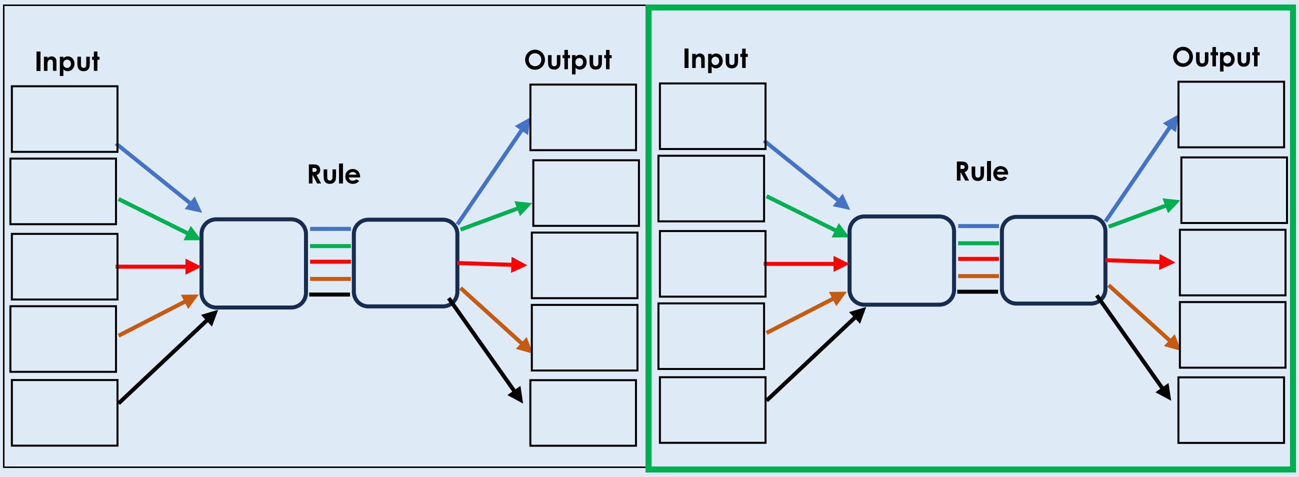
Date		Classwork		Homework	

1. Elspeth is making this growing pattern with blue and red cell phones.



a) Describe the patterns of blue phones is formed.

b) Make a flow diagram to show how the number of blue phones can be calculated.



c) Write a number sentence to show how you can calculate the number of red cell phones.

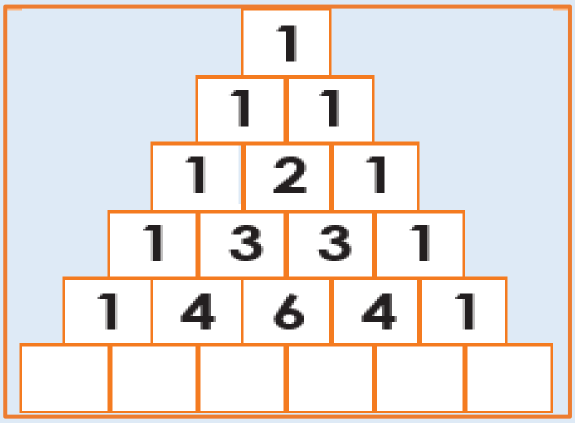
Signature:		Date:	

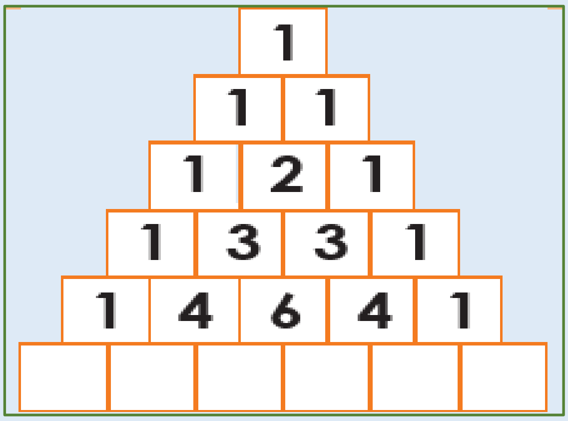
UNIT 7: NUMERIC/ NUMBER PATTERNS

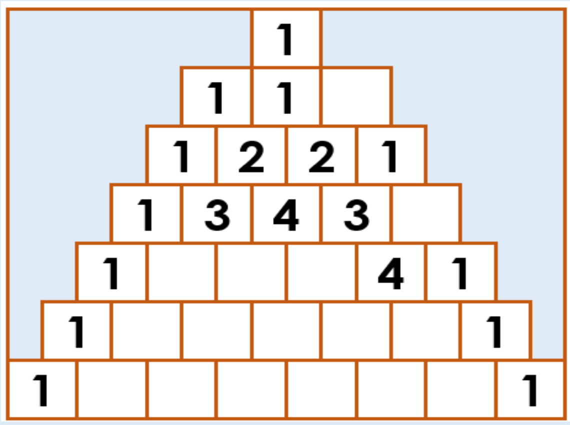
7.1. Having fun with number patterns

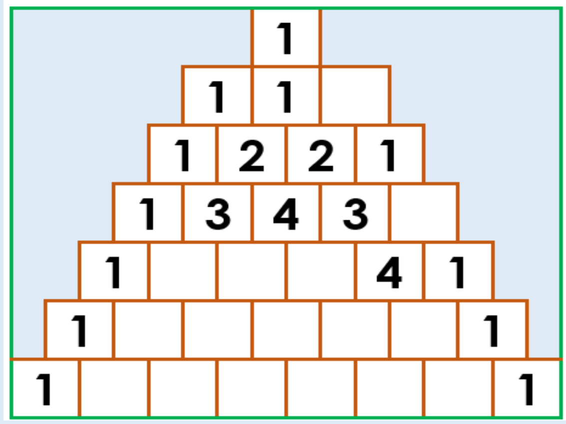
Date		Classwork		Homework	

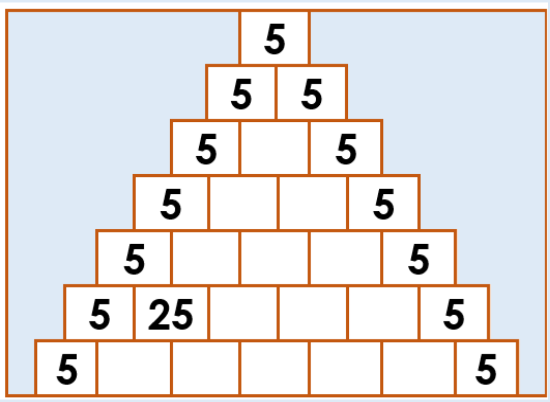
What will the missing numbers be?

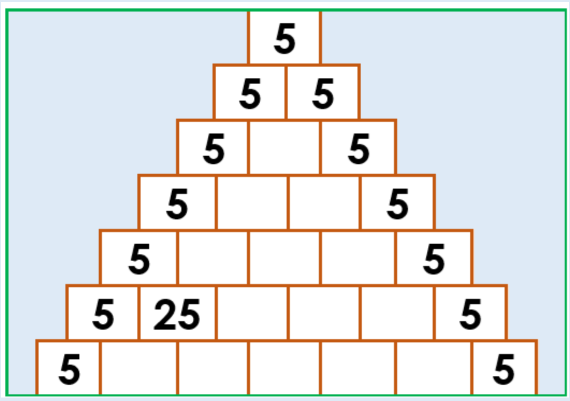












Signature:		Date:	

7.2. Seeing number patterns

Date		Classwork		Homework	

1. Talk about the patterns in the following table.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

2. How fast can you get the answer?

COLUMN					COLUMN				
A	B	C	D	E	A	B	C	D	E
2	4	6	11	15	2	4	6	11	15
4	8	12	22	30	4	8	12	22	30
6	12	18	33	45	6	12	18	33	45

3. Say which item does not fit with the others. Explain why you say so.

a) 5; 10; 13; 20; 25; 30; 35; 45; 55; 56

b) 10;12; 23; 24; 32; 36; 48; 40; 66; 98

4. Complete the following patterns.

3	+	5	=				30	+	50	=				300	+	500	=		
3	+	6	=				30	+	60	=				300	+	600	=		
7	+	2	=				70	+	20	=				700	+	200	=		

Signature:		Date:	

7.3. Investigate and extend patterns

Date		Classwork		Homework	

1. Investigate how each pattern is formed and fill in the missing numbers.

a)	122	124	126						
b)	366	369	372						
c)	155	160	165						
d)	520	530	540						
e)	375	350	325						
f)	550	500	450						

1. Fill in the missing numbers.

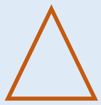
a)	100; 102; 104; 106, 108; …						
b)	114; 111; 108; 105; 102; …						
c)	3; 6; 9; 12; 15; …						
d)	3; 6; 12; 18; 36; …						
e)	2; 3; 4; 5; 8; …						
f)	1; 3; 6; 10; …						

Signature:		Date:	

7.4. Describing Number Patterns

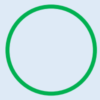
Date		Classwork		Homework	

1. Give a collective name of the numbers that form patterns illustrated by each shape.



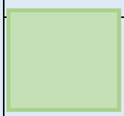
C:

C:



C:

C:



C:

2. Describe how each pattern is formed

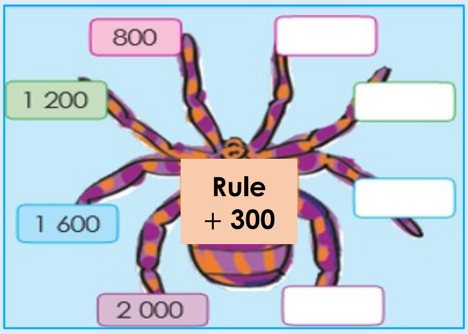
a)	100; 102; 104; 106, 108; …
b)	114; 111; 108; 105; 102; ..
c)	3; 6; 9; 12; 15; ….
d)	3; 6; 12; 18; 36; …
e)	2; 3; 4; 5; 8; …

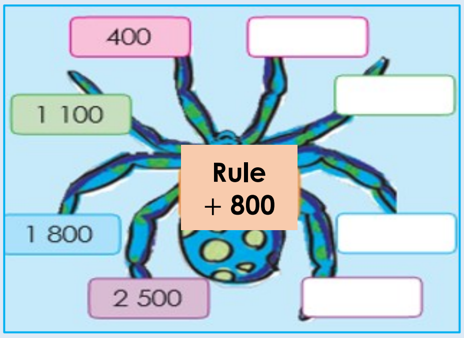
Signature:		Date:	

7.5. Number patterns and rules

Date		Classwork		Homework	

1. Complete the following.





A **rule** is a set of instruction that tell you how to transform or manipulate a set of numbers to create a pattern

2. Complete the flow diagrams.

a)

1 200	+ 125		1 200	+ 125	
1 349			1 349		
1 498			1 498		
1 647			1 647		

b)

1	+1 00		1		
2			2		
3			3		
4			4		

c)

1 120	+ 1 000		1 120	+ 1 000	
1 360			1 360		
1 600			1 600		
1 840			1 840		

d)

2 030	– 500		2 030	– 500	
4 215			4 215		
6 400			6 400		
8585			8585		

Signature:		Date:	

7.6. Patterns and general rule

Date		Classwork		Homework	

Example:

Theo's mother often sends him to buy candles for their home.

The candles cost R4 each.

1. Complete this table to calculate the cost of different numbers of candles.

Number of candles	1	2	3	4	5	6		10		20		
Cost in rands	4	8	12	16								100

2. This is Theo's method: (horizontal relationship)

Number of candles	1	2	3	4	5	6	10	20
Cost (rands)	4	8	12	16	20			

+4 +4 +4 +4 +4

a) Is Theo's method, correct?

b) Describe Theo's method in words.

c) Use Theo's method to calculate cost for 5, 17 and 30 candles.

Cost for 5 candles	**Cost for 17 candles**	**Cost for 30 candles**

3. This is Nadia's method: (vertical relationship called general rule)

Number of candles	1	2	3	4	5	6	10	20
	$\downarrow \times 4$	$\downarrow \times 4$	$\downarrow \times 4$	$\downarrow \times 4$	$\downarrow \times 4$			
Cost in rands	4	8	12	16				

a) Is Nadia's method, correct?

b) Describe Nadia's method in words.

c) Use Nadia's method to calculate cost for 5, 17 and 30 candles.

Cost for 5 candles	**Cost for 17 candles**	**Cost for 30 candles**

4. Which method do you prefer? Why?

Signature:		**Date:**	

7.7. General rules for number patterns

Date		Classwork		Homework	

1. Complete the table by filling in the next three terms of the pattern.

Input	1	2	3	4	5	6	7	8	9	10
Output (Term)	5	7	9							

2. How did you get the next term from the previous term?

3. Is what you get above the same throughout the pattern?

If the difference between the terms of a pattern is the same thought the pattern, it is called a **constant difference.**

4. Write each output (term) using the constant difference. Complete the table.

Input	1	2	3	4
Out put	5	7	9	11
	2 + 3	**2** + **2** + 3		
Groups of 2	1 × **2**+ 3	2 × **2**+ 3		

5. Describe the general rule in words

6. Write any number sentence in the pattern

7. Write the general rule for the pattern in the form of a number sentence using any place holder, where the place holder is the input value.

Signature:		Date:	

7.8. General rules for Numeric patterns, continued.

Date		Classwork		Homework	

1. Complete the table by filling in the next three terms of the pattern.

Input	1	2	3	4	5	6	7	8	9	10
Output (Term)	3	6	9							

2. How did you get the next term from the previous term?

3. Is what you get above the same throughout the pattern?

4. Write each output (term) using the constant difference. Complete the table.

Input	1	2	3	4
Out put	3	6	9	12
	3	**3** + **3**		
Groups of 2	1 × **3**	2 × **3**		

5. Describe the general rule in words

6. Write any number sentence in the pattern

7. Write the general rule for the pattern in the form of a number sentence using any place holder, where the place holder is the input value.

Signature:		Date:	

7.9. General rules for Numeric patterns, continued.

Date		Classwork		Homework	

1. Complete the table by filling in the next three terms of the pattern.

Input	1	2	3	4	5	6	7	8	9	10
Output (Term)	2	4	8							

2. How did you get the next term from the previous term?

3. Is what you get above the same throughout the pattern?

If the ratio between the terms of a pattern is the same thought the pattern, it is called a **constant ratio.**

4. Write each output (term) using the constant ratio. Complete the table.

Input	1	2	3	4
Out put	2	4	8	16
	2	**2** $\times$ **2**		

5. Describe the general rule in words

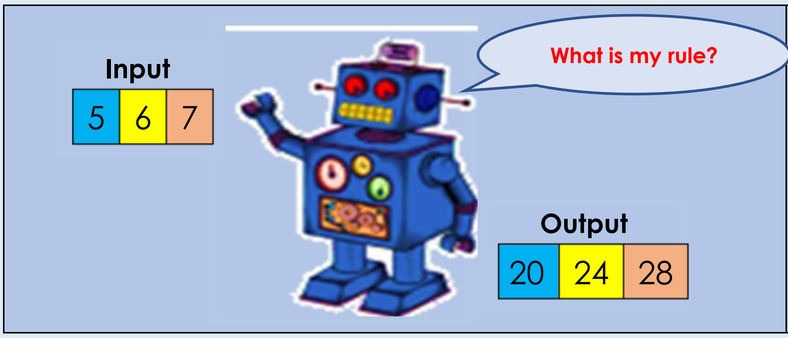
6. Write any number sentence in the pattern

Signature:		**Date:**	

7.10. Flow diagrams: Input, output and rule

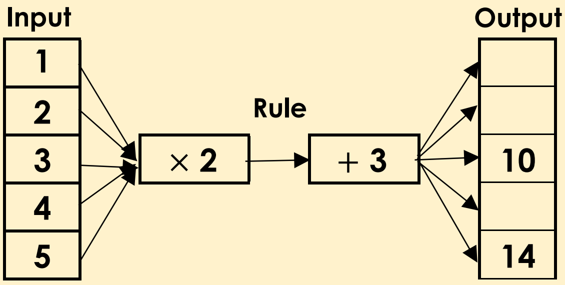
Date		Classwork		Homework	

1. Study the robot. What is it telling us? Complete the table.



Rule	
Input	Output
5	20
6	24
7	28
8	
9	
10	

How fast can you calculate the output value?

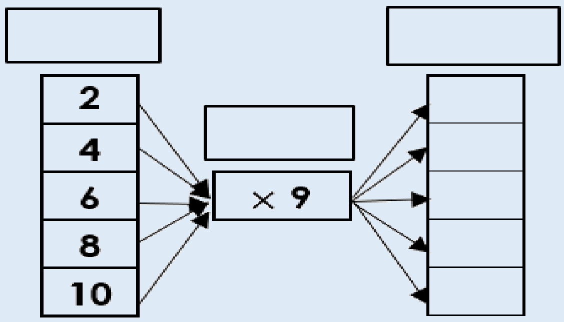


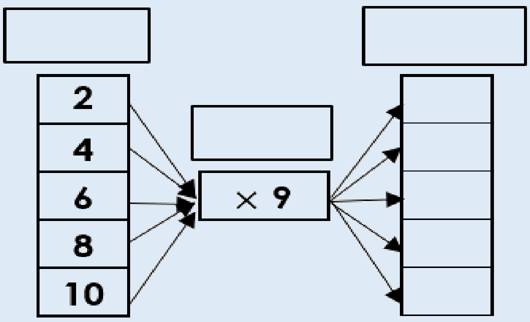
A **flow diagram** is balanced when the **input** (as changed by the **rule**) is equal to the output.

An important fact about the rule is that the order of operations may not be changed!

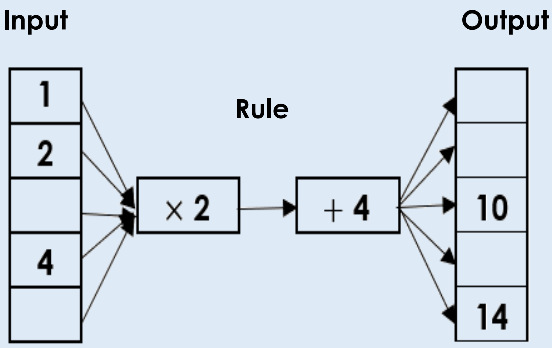
2. Complete the flow diagram

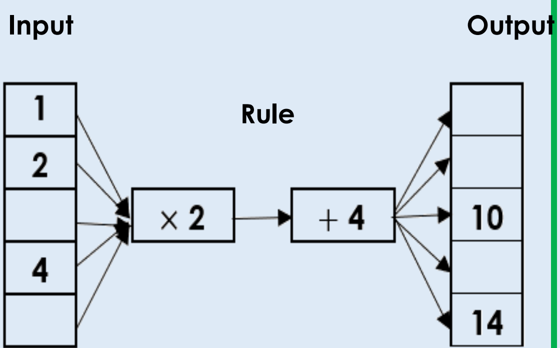
a)





b)





Signature:		Date:	

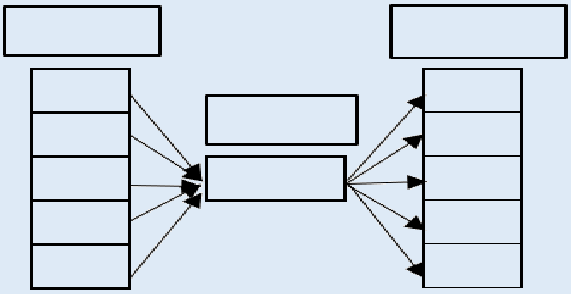
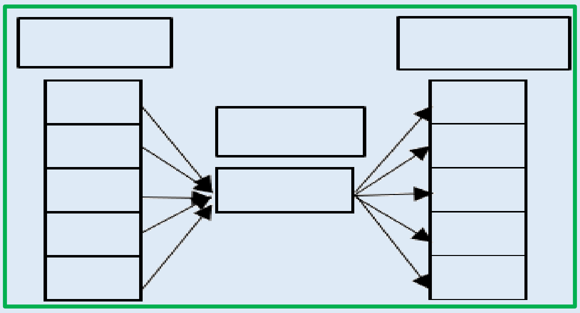
7.11. Flow diagrams: Input, output and rule, continued.

Date		Classwork		Homework	

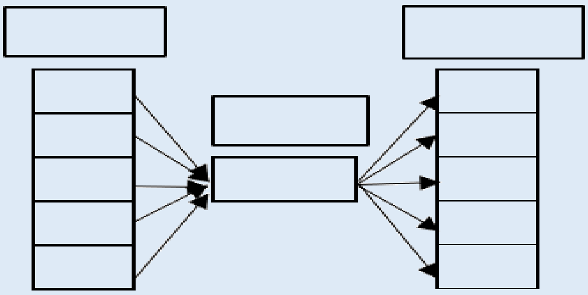
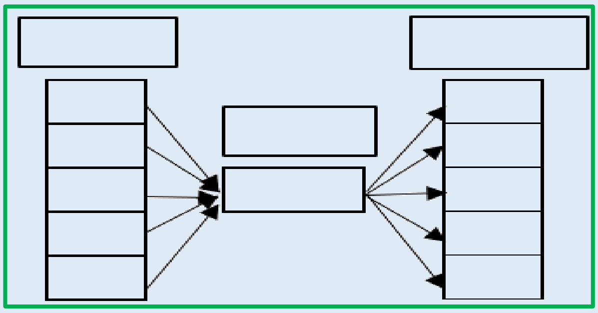
1. Answer the following.

a) Write a number pattern with 6 numbers for the following:
I am counting in 3's. I start with an even number smaller than 4. What is my pattern?

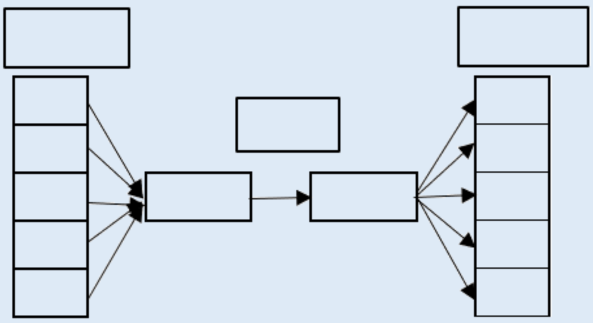
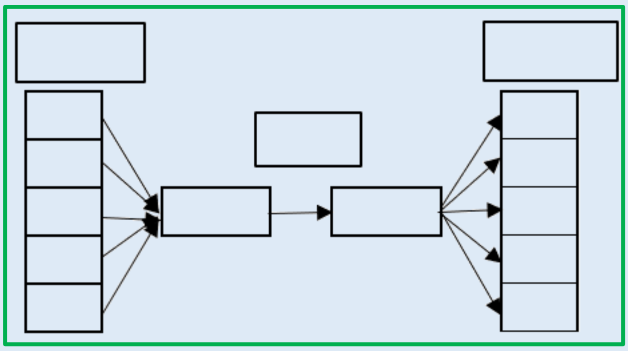
b) Represent the pattern you got in (a) in a flow diagram.

2. My input numbers are 1, 2, 3, 4 and 5. My rule is × **10.** What will my output numbers be? Show in a flow diagram.

3. My input numbers are 1, 3, 4, 5 and 7. My rule is × **10** + **6**. What will my output numbers be? Show in a flow diagram.

Signature:		Date:	

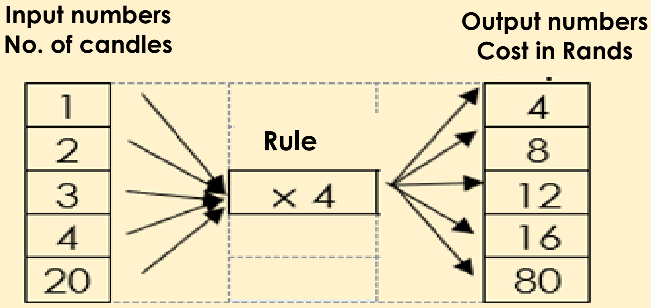
7.12. Equivalent forms

Date		Classwork		Homework	

We can describe the cost of the candles in different ways:

- **In words**: The candles cost R4 each.
- As a **calculation plan (rule)**: Cost of candles = Number of candles × 4

  Output = Input × 4
- In a **flow diagram:**



- **In number sentence**

Open number sentence	Closed number sentence
3 × 4 = ________	3 × 4 = 12

1. When the son was born, his father was 30 years old. How old is the father when the son is 12 years old?
   Over the years, the son's mother wrote down the father's and the son's ages in a table, like this:

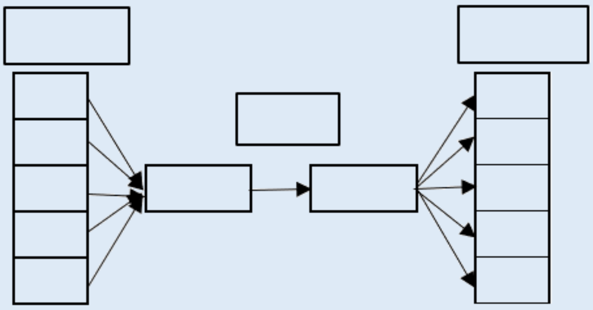
Son's age in years	0	1	2	3	4	5	6		12		20
Father's age in years	30	31	32	33	34	35					

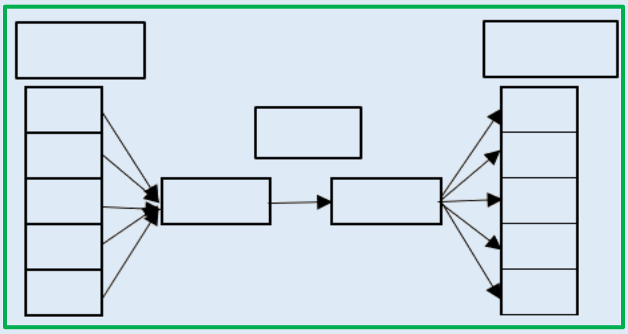
a) Describe the father's age.

b) Write the general rule to determine the father's age in own words.

c) Write the number sentence for the pattern.

d) Represent the son's age and the father's age in a flow diagram





2. Study the pattern below and answer the following questions

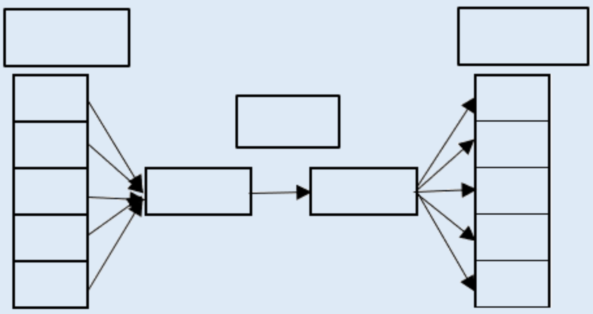
   1; 4; 7; 10; 13; 16; 19; 22; 25; 28; 25

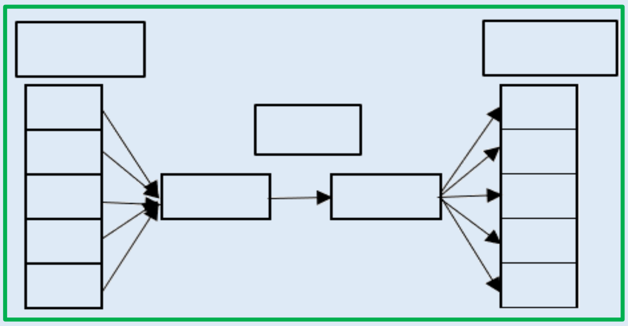
a) Describe how the pattern is formed

b) Represent the pattern in a table.

Rule:										

c) Represent the pattern in a flow diagram





d) Write the number sentence for the pattern.

Signature:		**Date:**	