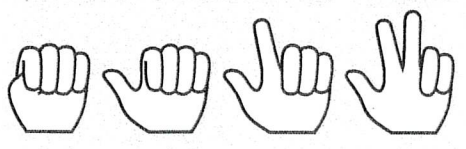


OA4-1 Increasing Sequences

Find the **difference** between 15 and 12 by counting on your fingers.



Say: 12 13 14 15

When you say 15, you have 3 fingers up. So the difference or gap between 12 and 15 is 3.

1. Find the difference between the numbers by counting up. Write your answer in the circle. (If you know your subtraction facts, you may find the answer without counting.)

a) 2 5

b) 3 8

c) 6 8

d) 4 9

e) 12 16

f) 13 17

g) 21 26

h) 37 39

i) 26 29

j) 32 37

k) 24 29

l) 44 47

m) 51 55

n) 46 49

o) 28 32

p) 34 39

q) 89 91

r) 62 71

s) 87 89

t) 59 63

BONUS ▶

u) 96 101

v) 97 102

w) 98 104

x) 117 122

y) 219 223

z) 146 151

aa) 99 108

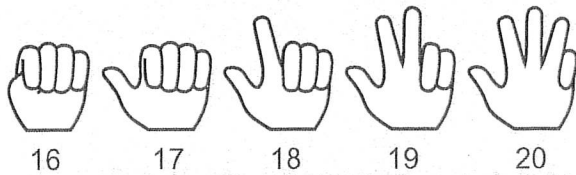
bb) 99 107

2. Why is 17 85 harder to solve than 81 85?

Three horizontal lines for writing an answer.

What number is 4 **more than** 16? (Or: What is $16 + 4$?)

You can find the answer by counting on your fingers. Say 16 with your fist closed, then count up from 16 until you have raised 4 fingers.



The number 20 is 4 **more than** 16.

3. Add the number in the circle to the number beside it. Write your answer in the blank.

- | | | | | | | | | | | | |
|-------|-----|-------|-------|-----|-------|-------|-----|-------|-------|-----|-------|
| a) 5 | (4) | _____ | b) 8 | (2) | _____ | c) 7 | (3) | _____ | d) 3 | (4) | _____ |
| e) 17 | (5) | _____ | f) 18 | (4) | _____ | g) 14 | (8) | _____ | h) 19 | (6) | _____ |
| i) 30 | (8) | _____ | j) 27 | (9) | _____ | k) 34 | (7) | _____ | l) 32 | (5) | _____ |
| m) 67 | (2) | _____ | n) 85 | (5) | _____ | o) 42 | (3) | _____ | p) 68 | (4) | _____ |
| q) 54 | (6) | _____ | r) 63 | (5) | _____ | s) 98 | (4) | _____ | t) 93 | (8) | _____ |

BONUS ▶

- | | | | | | | | | | | | |
|--------|-----|-------|--------|-----|-------|--------|-----|-------|--------|-----|-------|
| u) 132 | (5) | _____ | v) 378 | (4) | _____ | w) 499 | (3) | _____ | x) 997 | (5) | _____ |
|--------|-----|-------|--------|-----|-------|--------|-----|-------|--------|-----|-------|

4. Fill in the missing numbers.

- | | | |
|----------------------------|----------------------------|----------------------------|
| a) _____ is 4 more than 6 | b) _____ is 6 more than 5 | c) _____ is 5 more than 7 |
| d) _____ is 1 more than 19 | e) _____ is 6 more than 34 | f) _____ is 5 more than 18 |
| g) _____ is 8 more than 29 | h) _____ is 7 more than 24 | i) _____ is 8 more than 37 |

BONUS ▶

- | | |
|-----------------------------|--------------------------------|
| j) _____ is 5 more than 168 | k) _____ is 9 more than 793 |
| l) _____ is 3 more than 699 | m) _____ is 4 more than 79,498 |

Continue this number pattern:

6 , 8 , 10 , 12 , ?

Step 1: Find the **difference** between the first two numbers.

$\begin{array}{cccc} \textcircled{2} & \textcircled{} & \textcircled{} & \textcircled{} \\ 6 & , & 8 & , & 10 & , & 12 & , & \underline{} \end{array}$

Step 2: Check that the difference between the other numbers in the pattern is also 2.

$\begin{array}{cccc} \textcircled{2} & \textcircled{2} & \textcircled{2} & \textcircled{2} \\ 6 & , & 8 & , & 10 & , & 12 & , & \underline{} \end{array}$

Step 3: Add 2 to the last number in the sequence.

6 , 8 , 10 , 12 , 14

5. Extend the following patterns. Start by finding the gap between the numbers.

a) $\begin{array}{cccc} \textcircled{} & \textcircled{} & \textcircled{} & \textcircled{} \\ 1 & , & 3 & , & 5 & , & \underline{} & , & \underline{} \end{array}$

b) $\begin{array}{cccc} \textcircled{} & \textcircled{} & \textcircled{} & \textcircled{} \\ 0 & , & 2 & , & 4 & , & \underline{} & , & \underline{} \end{array}$

c) $\begin{array}{cccc} \textcircled{} & \textcircled{} & \textcircled{} & \textcircled{} \\ 3 & , & 7 & , & 11 & , & \underline{} & , & \underline{} \end{array}$

d) $\begin{array}{cccc} \textcircled{} & \textcircled{} & \textcircled{} & \textcircled{} \\ 2 & , & 6 & , & 10 & , & \underline{} & , & \underline{} \end{array}$

e) $\begin{array}{cccc} \textcircled{} & \textcircled{} & \textcircled{} & \textcircled{} \\ 1 & , & 4 & , & 7 & , & \underline{} & , & \underline{} \end{array}$

f) $\begin{array}{cccc} \textcircled{} & \textcircled{} & \textcircled{} & \textcircled{} \\ 5 & , & 9 & , & 13 & , & \underline{} & , & \underline{} \end{array}$

BONUS ▶

g) $\begin{array}{cccc} \textcircled{} & \textcircled{} & \textcircled{} & \textcircled{} \\ 1 & , & 11 & , & 21 & , & \underline{} & , & \underline{} \end{array}$

h) $\begin{array}{cccc} \textcircled{} & \textcircled{} & \textcircled{} & \textcircled{} \\ 5 & , & 12 & , & 19 & , & \underline{} & , & \underline{} \end{array}$

i) $\begin{array}{cccc} \textcircled{} & \textcircled{} & \textcircled{} & \textcircled{} \\ 21 & , & 24 & , & 27 & , & \underline{} & , & \underline{} \end{array}$

j) $\begin{array}{cccc} \textcircled{} & \textcircled{} & \textcircled{} & \textcircled{} \\ 86 & , & 88 & , & 90 & , & \underline{} & , & \underline{} \end{array}$

6. Aya reads 5 pages of her book each night. Last night she was on page 72.

What page will she reach tonight? Tomorrow night?

$\frac{72}{\text{last night}}$ $\underline{}$ tonight $\underline{}$ tomorrow

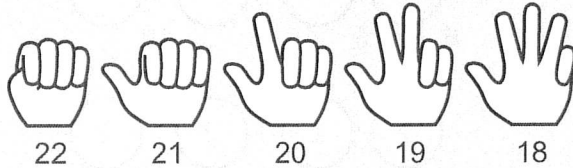
7. Nick reads 3 pages of his book each night. Last night he was on page 51.

What page will he reach tonight? $\underline{}$ Tomorrow night? $\underline{}$

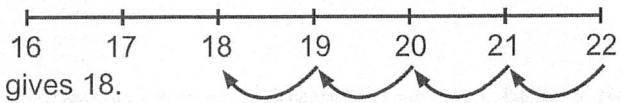
OA4-2 Decreasing Sequences

What number must you subtract from 22 to get 18?

Evan finds the answer by counting backward on his fingers.

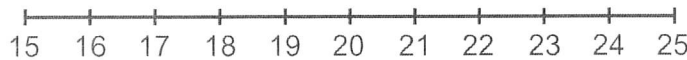


He could use a number line to help:



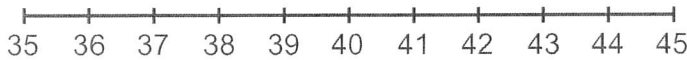
Evan has raised 4 fingers. So 4 subtracted from 22 gives 18.

1. What number must you **subtract** from the greater number to get the lesser number?



- | | | | |
|------------------------------------------|-------------------------------|-------------------------------|-------------------------------|
| a) 23 <input type="text" value="-3"/> 20 | b) 24 <input type="text"/> 19 | c) 21 <input type="text"/> 16 | d) 22 <input type="text"/> 15 |
| e) 24 <input type="text"/> 17 | f) 19 <input type="text"/> 16 | g) 23 <input type="text"/> 17 | h) 25 <input type="text"/> 19 |

2. Find the gap between the numbers by counting backward on your fingers.



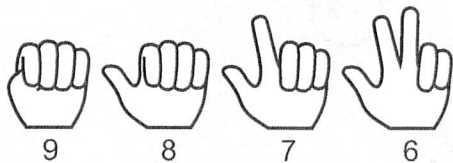
- | | | | |
|------------------------------------------|-------------------------------|-------------------------------|-------------------------------|
| a) 42 <input type="text" value="-4"/> 38 | b) 41 <input type="text"/> 39 | c) 42 <input type="text"/> 37 | d) 38 <input type="text"/> 37 |
| e) 41 <input type="text"/> 37 | f) 40 <input type="text"/> 36 | g) 42 <input type="text"/> 35 | h) 43 <input type="text"/> 35 |

3. Find the gap between the numbers by counting backward on your fingers (or by using your subtraction facts).

- | | | | |
|-------------------------------|--------------------------------|-------------------------------|-------------------------------|
| a) 86 <input type="text"/> 81 | b) 58 <input type="text"/> 52 | c) 50 <input type="text"/> 48 | d) 80 <input type="text"/> 78 |
| e) 52 <input type="text"/> 47 | f) 67 <input type="text"/> 63 | g) 45 <input type="text"/> 36 | h) 62 <input type="text"/> 56 |
| i) 58 <input type="text"/> 51 | j) 101 <input type="text"/> 97 | k) 82 <input type="text"/> 76 | l) 97 <input type="text"/> 89 |

What number is 3 less than 9? (Or: What is $9 - 3$?)

Keitha finds the answer by counting on her fingers.



The number 6 is 3 less than 9.

4. Subtract the number in the circle from the number beside it. Write your answer in the blank.

- a) $3 - 2 = \underline{\quad}$ b) $12 - 3 = \underline{\quad}$ c) $8 - 4 = \underline{\quad}$ d) $9 - 1 = \underline{\quad}$
 e) $8 - 5 = \underline{\quad}$ f) $10 - 4 = \underline{\quad}$ g) $5 - 1 = \underline{\quad}$ h) $9 - 2 = \underline{\quad}$

BONUS ▶

- i) $28 - 4 = \underline{\quad}$ j) $35 - 6 = \underline{\quad}$ k) $57 - 8 = \underline{\quad}$ l) $62 - 4 = \underline{\quad}$

5. Fill in the missing numbers.

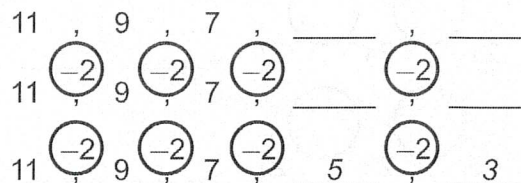
- a) $\underline{\quad}$ is 4 less than 7 b) $\underline{\quad}$ is 2 less than 9 c) $\underline{\quad}$ is 5 less than 17
 d) $\underline{\quad}$ is 4 less than 20 e) $\underline{\quad}$ is 4 less than 32 f) $\underline{\quad}$ is 5 less than 40

In a **decreasing sequence**, each number is less than the one before it.

Let's extend the pattern in this decreasing sequence.

Step 1: Find the gap.

Step 2: Extend the pattern.



6. Extend the following decreasing sequences.

- a) $10, 9, 8, \underline{\quad}, \underline{\quad}$

- c) $23, 22, 21, \underline{\quad}, \underline{\quad}$

- b) $14, 12, 10, \underline{\quad}, \underline{\quad}$

- d) $24, 21, 18, \underline{\quad}, \underline{\quad}$

OA4-3 Increasing and Decreasing Sequences

1. Extend the patterns, using the gap provided.

Example 1: 6 , 7 , 8 , 9

Example 2: 8 , 6 , 4 , 2

a) 5 , 10 , _____ , _____ , _____

b) 1 , 4 , _____ , _____ , _____

c) 3 , 6 , _____ , _____ , _____

d) 12 , 10 , _____ , _____ , _____

e) 12 , 14 , _____ , _____ , _____

f) 25 , 20 , _____ , _____ , _____

2. Extend the patterns by first finding the gap.

Example: 3 , 5 , 7 , _____

Step 1: 3 , 5 , 7 , _____

Step 2: 3 , 5 , 7 , 9

a) 5 , 8 , 11 , _____ , _____

b) 2 , 4 , 6 , _____ , _____

c) 6 , 10 , 14 , _____ , _____

d) 1 , 3 , 5 , _____ , _____

e) 21 , 24 , 27 , _____ , _____

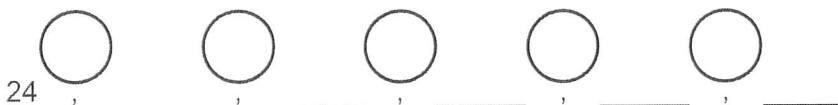
f) 12 , 17 , 22 , _____ , _____

g) 25 , 23 , 21 , _____ , _____

h) 59 , 54 , 49 , _____ , _____

3. Ahmed has a box of 24 pears. He eats 3 each day.

How many are left after 5 days? _____



4. Emma has \$17. She saves \$4 each day. How much money has she saved after 4 days?

OA4-4 Pattern Rules

1. Continue the sequence by *adding* the number given.

- | | | | |
|------------|-----------------------------|-------------|-----------------------------|
| a) (add 3) | 31, 34, _____, _____, _____ | b) (add 5) | 70, 75, _____, _____, _____ |
| c) (add 2) | 24, 26, _____, _____, _____ | d) (add 10) | 50, 60, _____, _____, _____ |
| e) (add 4) | 31, 35, _____, _____, _____ | f) (add 9) | 11, 20, _____, _____, _____ |
| g) (add 6) | 10, 16, _____, _____, _____ | h) (add 7) | 70, 77, _____, _____, _____ |

2. Continue the sequence by *subtracting* the number given.

- | | | | |
|-----------------|----------------------|-----------------|------------------------|
| a) (subtract 2) | 14, 12, _____, _____ | b) (subtract 3) | 15, 12, _____, _____ |
| c) (subtract 5) | 75, 70, _____, _____ | d) (subtract 3) | 66, 63, _____, _____ |
| e) (subtract 4) | 46, 42, _____, _____ | f) (subtract 7) | 49, 42, _____, _____ |
| g) (subtract 3) | 91, 88, _____, _____ | h) (subtract 5) | 131, 126, _____, _____ |

BONUS ►

Make a rule for a pattern. Then make a pattern given by the rule.

My rule: _____

My pattern: _____, _____, _____, _____, _____

3. Which one of the following sequences was made by adding 3? Circle it.

Hint: Check all the numbers in the sequence.

A. 3, 5, 9, 12

B. 3, 6, 8, 12

C. 3, 6, 9, 12

4. Look at the sequence: 72, 64, 56, 48, 40,

Zannat says this sequence was made by subtracting 7 each time.

Farouk says it was made by subtracting 8.

Who is right? Explain. _____

5. What number was added each time to make the pattern?

- | | | | |
|-----------------------|-----------|-------------------|-----------|
| a) 2, 5, 8, 11 | add _____ | b) 3, 6, 9, 12 | add _____ |
| c) 15, 17, 19, 21 | add _____ | d) 44, 46, 48, 50 | add _____ |
| e) 41, 46, 51, 56 | add _____ | f) 19, 22, 25, 28 | add _____ |
| g) 243, 245, 247, 249 | add _____ | h) 21, 27, 33, 39 | add _____ |
| i) 15, 18, 21, 24 | add _____ | j) 41, 45, 49, 53 | add _____ |

6. What number was subtracted each time to make the pattern?

- | | | | |
|-----------------------|----------------|--------------------|----------------|
| a) 18, 16, 14, 12 | subtract _____ | b) 35, 30, 25, 20 | subtract _____ |
| c) 100, 99, 98, 97 | subtract _____ | d) 41, 38, 35, 32 | subtract _____ |
| e) 17, 14, 11, 8 | subtract _____ | f) 99, 97, 95, 93 | subtract _____ |
| g) 180, 170, 160, 150 | subtract _____ | h) 100, 95, 90, 85 | subtract _____ |
| i) 27, 25, 23, 21 | subtract _____ | j) 90, 84, 78, 72 | subtract _____ |

7. State the rule for the following patterns.

- | | | | |
|--------------------------|-----------------------|-------------------------|------------------|
| a) 119, 112, 105, 98, 91 | <u>subtract</u> _____ | b) 1, 9, 17, 25, 33, 41 | <u>add</u> _____ |
| c) 101, 105, 109, 113 | _____ | d) 110, 99, 88, 77 | _____ |

8. Find the rule for the pattern, then fill in the blanks.

12, 17, 22, _____, _____, _____ The rule is: _____

9. Look at the pattern: 5, 8, 11, 14, 17,

Keith says the pattern rule is "Start at 5 and subtract 3 each time."

Jane says the rule is "Add 4 each time."

Molly says the rule is "Start at 5 and add 3 each time."

- a) Whose rule is correct? _____
- b) What mistakes did the others make? _____
- _____
- _____

OA4-5 Introduction to T-tables

Abdul makes a growing pattern with blocks.

He records the number of blocks in each figure in a **T-table**.

He writes the number of blocks he adds each time he makes a new figure in a circle.

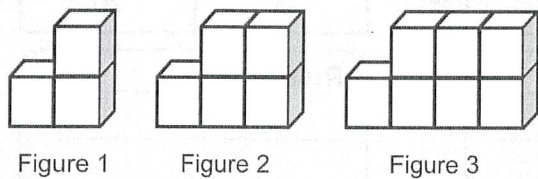
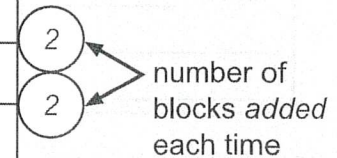


Figure	Number of Blocks
1	3
2	5
3	7



The number of blocks in the figures are 3, 5, 7,

Abdul writes a **rule** for this number pattern: *Start at 3 and add 2 each time.*

1. Abdul makes another growing pattern with blocks. How many blocks does he add to make each new figure? Write your answer in the circles. Then write a rule for the pattern.

a)

Figure	Number of Blocks
1	3
2	7
3	11

Rule: *Start at 3 and*

b)

Figure	Number of Blocks
1	2
2	6
3	10

Rule: _____

c)

Figure	Number of Blocks
1	2
2	4
3	6

Rule: _____

d)

Figure	Number of Blocks
1	1
2	6
3	11

Rule: _____

e)

Figure	Number of Blocks
1	5
2	9
3	13

Rule: _____

f)

Figure	Number of Blocks
1	12
2	18
3	24

Rule: _____

g)

Figure	Number of Blocks
1	2
2	10
3	18

Rule: _____

h)

Figure	Number of Blocks
1	3
2	6
3	9

Rule: _____

i)

Figure	Number of Blocks
1	6
2	13
3	20

Rule: _____

BONUS ▶ Extend the number pattern. How many blocks would be used in the 6th figure?

a)

Figure	Number of Blocks
1	2
2	7
3	12

b)

Figure	Number of Blocks
1	3
2	6
3	9

c)

Figure	Number of Blocks
1	3
2	8
3	13

2. Amy makes an increasing pattern with blocks. After making the 3rd figure, she has only 14 blocks left. Does she have enough blocks to complete the 4th figure?

a)

Figure	Number of Blocks
1	3
2	7
3	11

yes no

b)

Figure	Number of Blocks
1	7
2	10
3	13

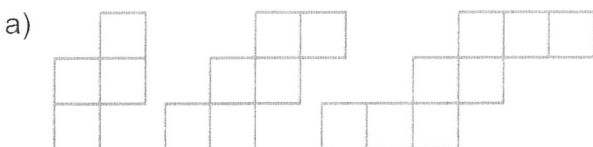
yes no

c)

Figure	Number of Blocks
1	1
2	5
3	9

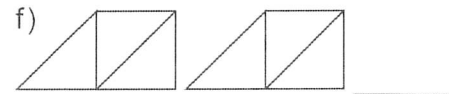
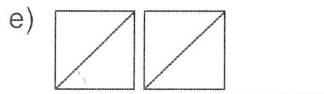
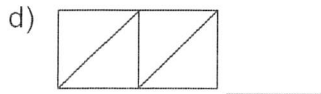
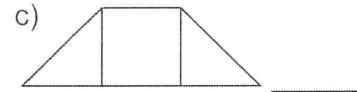
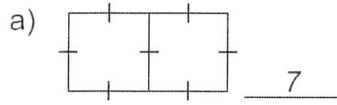
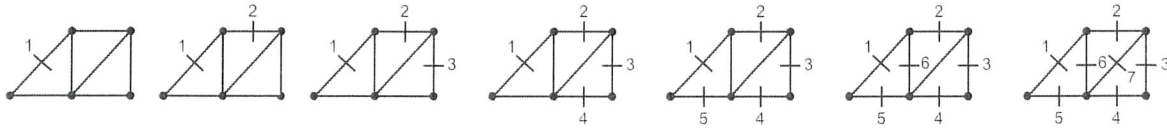
yes no

3. How many squares are needed to make the 5th figure in the pattern?
 Make a table to show your answer.



OA4-6 T-tables

1. Count the number of line segments in each figure. Hint: Count around the outside of the figure first, marking each line segment as you count. Example:



2. Continue the pattern below, then complete the table.

Figure 1



Figure 2

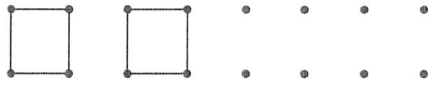


Figure 3



Figure 4



Figure	Number of Line Segments
1	4
2	8
3	
4	

How many line segments would Figure 5 have? _____

3. Continue the pattern below, then complete the table.

Figure 1



Figure 2

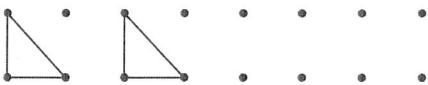


Figure 3



Figure 4

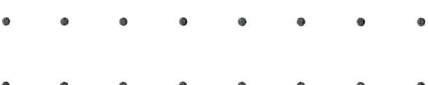


Figure	Number of Line Segments
1	
2	
3	
4	

How many line segments would Figure 5 have? _____

4. Continue the pattern below, then complete the table.

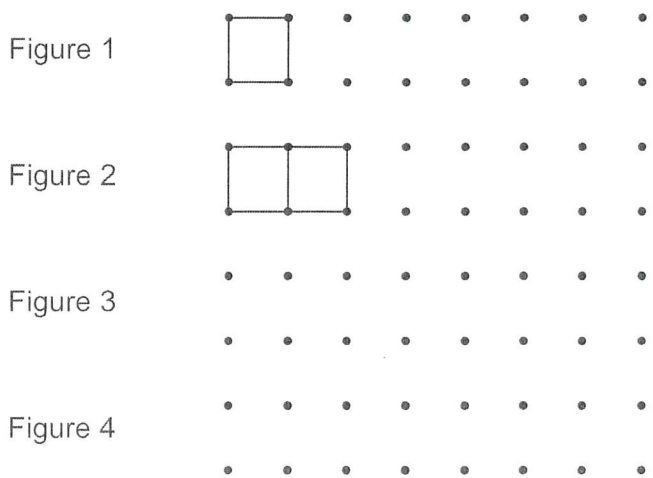


Figure	Number of Line Segments
1	
2	
3	
4	

- a) How many line segments would Figure 5 have? _____
- b) How many line segments would Figure 6 have? _____
- c) How many line segments would Figure 7 have? _____

5. Continue the pattern below, then complete the table.

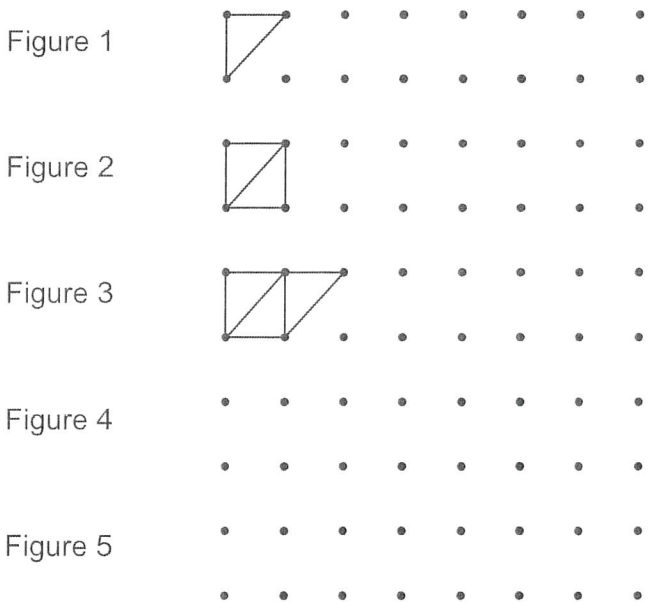


Figure	Number of Line Segments
1	
2	
3	
4	
5	

- a) How many line segments would Figure 6 have? _____
- b) How many line segments would Figure 7 have? _____
- c) How many line segments would Figure 8 have? _____

6. Complete each table. How many young would 5 animals have?

a)

Arctic Fox	Number of Cubs
1	5
2	10

b)

Woodchuck	Number of Pups
1	4
2	8

c)

White-tailed deer	Number of Fawns
1	2
2	4

d)

Osprey	Number of Eggs
1	3
2	6

7. Complete each table. How much money would Claude earn for 4 hours of work?

a)

Hours Worked	Dollars Earned
1	\$9

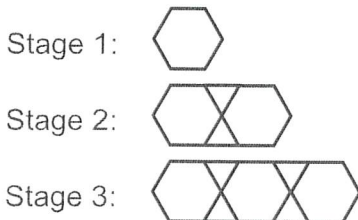
b)

Hours Worked	Dollars Earned
1	\$10

c)

Hours Worked	Dollars Earned
1	\$8

8. Peter makes a design using triangles and hexagons. He adds two triangles and a hexagon at each stage.

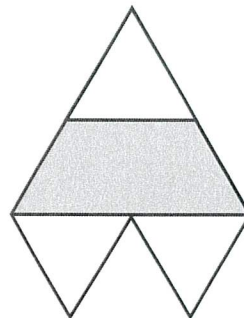


Stage	Hexagons	Triangles
1	1	0
2	2	
3		

a) Fill in the table.

b) Peter has 6 hexagons and 9 triangles. Does he have enough triangles to use all 6 hexagons? _____

9. Hanna makes Christmas ornaments like the one shown. She has 5 trapezoids (the shaded figure). Fill in the table to show how many triangles she will need.



Number of Ornaments	Trapezoids	Triangles

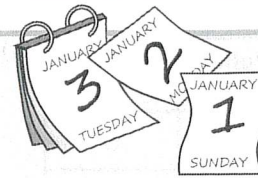
OA4-7 Patterns Involving Time

The days of the week:

Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday

The months of the year:

January, February, March, April, May, June, July, August, September, October, November, December



1. Solve the problem by filling in the T-table.

- a) Harry starts work on Tuesday morning. He repairs 4 bikes each day.

How many bikes has he repaired by Friday evening? _____

Day	Total Number of Bikes Repaired
Tuesday	4

- b) Meryl saves \$20 in July. She saves \$10 each month after that.

How much has she saved by the end of October? _____

Month	Saved
July	\$20

- c) During a snowstorm, 5 cm of snow falls by 6 p.m. Every hour after that, 3 cm of snow falls.

How deep is the snow at 9 p.m.?

Time	Depth of Snow
6 p.m.	5 cm

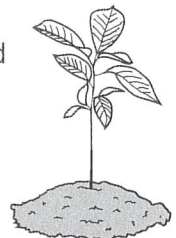
- d) Adria's maple sapling grows 3 cm in May. It grows 6 cm each month after that.

How tall is the sapling by the end of August?

Month	Height of Sapling
May	

- e) Karen writes 14 pages of her book in February. She writes 8 pages every month after that. How many pages has she written by the end of June?

- f) Mario starts work on Wednesday morning. He plants 5 trees each day. How many trees has he planted by Friday evening?



2. Fill in the table by subtracting the same number each time.

a) Sandhu lights a candle at 6 p.m. It is 30 cm tall.

At 7 p.m., the candle is 27 cm tall.

At 8 p.m., it is 24 cm tall.

- i) How many centimeters does the candle burn down every hour? _____
- ii) How tall is the candle at 11 p.m.? _____

Time	Height of the Candle
6 p.m.	30 cm
7 p.m.	27 cm
8 p.m.	24 cm
9 p.m.	
10 p.m.	

b) Lou has \$35 in his savings account at the end of March. He spends \$7 each month. How much does he have in his account at the end of June? _____

Month	Savings
March	\$35

c) Aponi has \$38 in her savings account at the end of October. She spends \$6 each month. How much does she have at the end of January? _____

Month	Savings

d) Karen has \$57 in her savings account at the end of June. She spends \$6 each month. How much does she have at the end of September? _____

Month	Savings

e) A fish tank contains 20 gallons of water at 5 p.m. Three gallons of water leak out each hour. How much water is left in the tank at 8 p.m.? _____

Time	Amount of Water

f) The snow is 19 cm deep at 3 p.m. Two centimeters of snow melt every hour. How deep is the snow at 7 p.m.?

