KEMONOTONAN DAN KECEKUNGAN

INSPIRED BY mathspace

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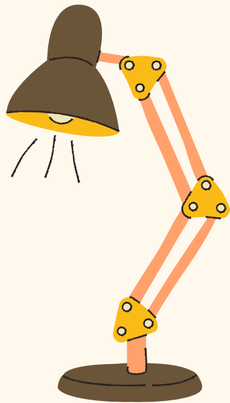
KEMONOTONAN

Kemonotonan merujuk pada sifat suatu fungsi yang dapat dianalisis menggunakan turunan pertama (turunan pertama adalah gradien fungsi). Lebih tepatnya, kita mengamati tanda dari turunan pertama untuk menentukan apakah suatu fungsi monoton naik, monoton turun, atau tidak monoton di suatu interval. Kemonotonan membantu kita memahami perubahan fungsi dalam suatu rentang nilai tertentu. Dengan menggunakan turunan pertama, kita dapat mengidentifikasi di mana fungsi meningkat atau menurun secara konsisten.

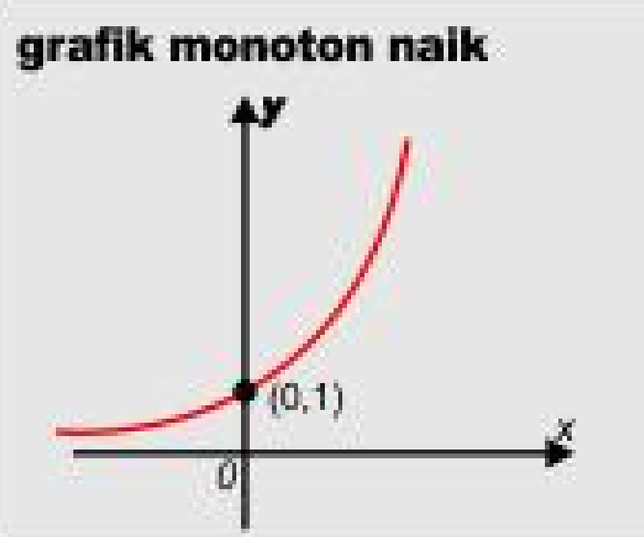


KEMONOTONAN

1 **Monoton Naik**

$f'(x) > 0 , x \in (a,b)$

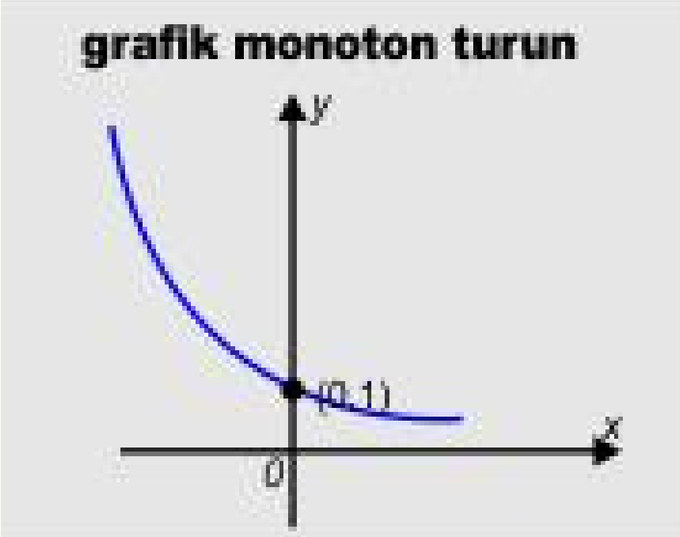
f monoton naik di titik (a,b)



2 **Monoton Turun**

$f'(x) < 0 , x \in (a,b)$

f monoton turun di titik (a,b)



KEMONOTONAN

CONTOH SOAL

1 Tentukan monoton naik dan turun untuk
$f(x)=2x^3-3x^2-12x+7$

Jawab :

f(x) monoton naik ketika $f'(x) > 0$

f(x) monoton turun ketika $f'(x) < 0$

Uji salah satu titik

titik 0 => $0^2 - 0 - 2 = -2$

titik 3 => $3^2 - 3 - 2 = 4$

titik -2 => $-2^2 - (-2) - 2 = 8$

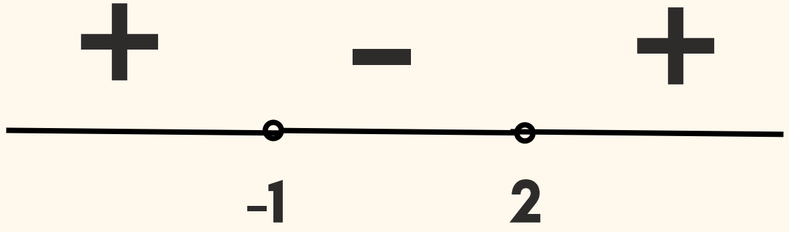
Menentukan $f'(x) = 6x^2-6x-12$

<=> $6x^2-6x-12 = 0$ (Bagi 6)

<=> $x^2 - x - 2 = 0$

<=> $(x + 1), (x - 2) = 0$

TP : $x = -1$ atau $x = 2$



Maka,

monoton naik => $f'(x) > 0$

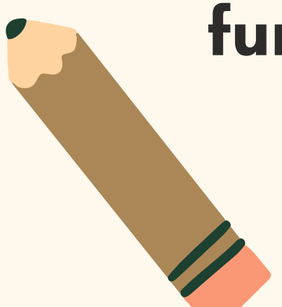
$(-\infty, -1)$ atau $(2, \infty)$

monoton turun => $f'(x) < 0$

(-1, -2)

KECEKUNGAN

Kecekungan (concavity) merujuk pada sifat suatu fungsi yang dianalisis melalui turunan kedua. Turunan kedua memberikan informasi tentang perubahan gradien atau kemiringan fungsi, sehingga membantu mengidentifikasi apakah fungsi tersebut cekung ke atas (concave up) atau cekung ke bawah (concave down) pada suatu interval.Analisis kecekungan membantu kita memahami bentuk lengkungan dari grafik fungsi. Misalnya, di suatu interval, fungsi mungkin memiliki bagian yang melengkung ke atas, yang kemudian dapat berubah menjadi melengkung ke bawah.



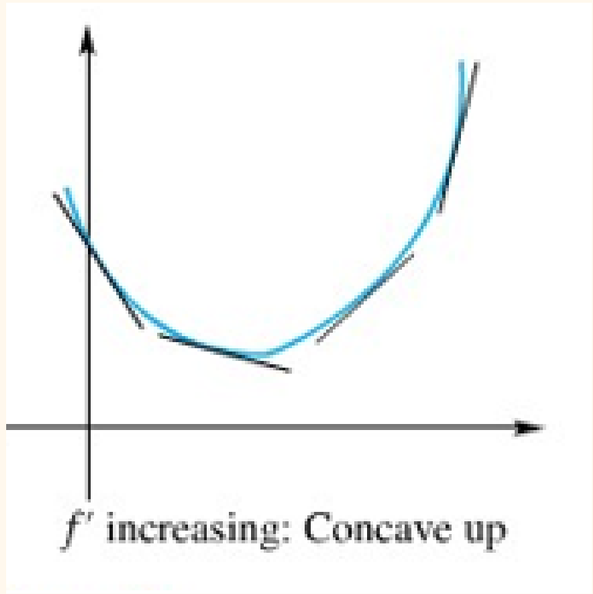
KECEKUNGAN

1

Cekung Ke Atas

$f''(x) > 0 , x \in (a,b)$

f cekung ke atas di titik (a,b)

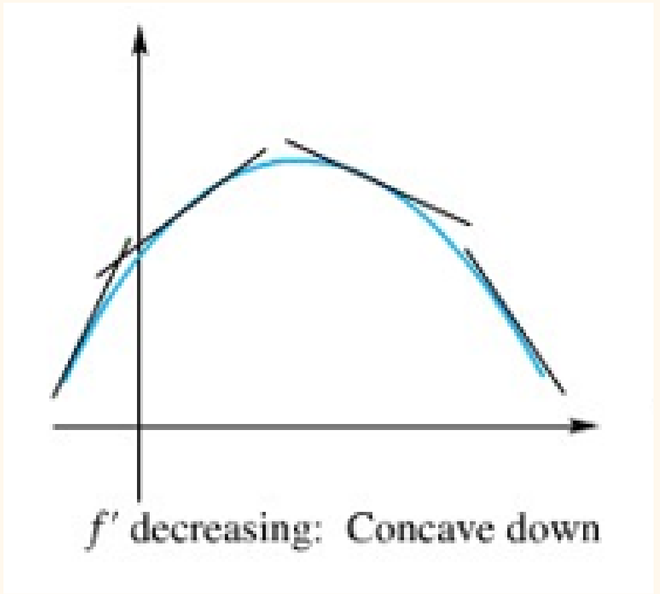


2

Cekung Ke Bawah

$f''(x) < 0 , x \in (a,b)$

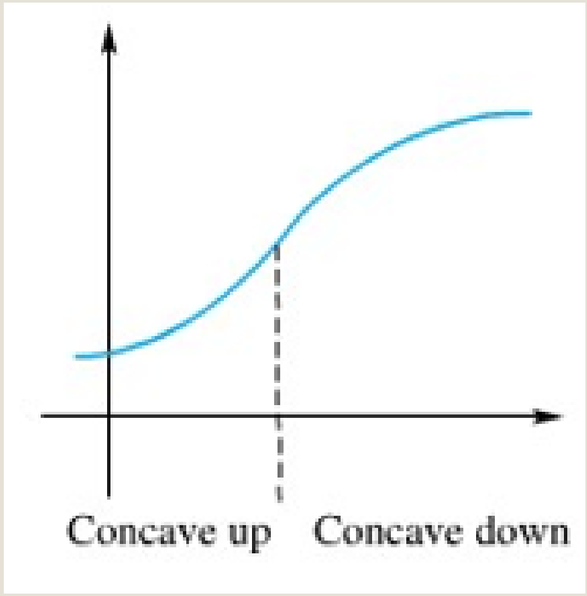
f cekung ke bawah di titik (a,b)



KECEKUNGAN

3 **Titik Belok**

$f''(x) = 0$



KECEKUNGAN

CONTOH SOAL

1 Tentukan di selang manakah fungsi naik, turun, cekung ke atas dan cekung ke bawah $f(x)=\frac{1}{3}x^3-x^2-3x+4$

Jawab :

Menentukan nilai f'(x)

<=> $f'(x) = x^2-2x-3 > 0$

<=> $(x-3), (x+1) > 0$

TP : $x = 3$ atau $x = -1$

Uji salah satu titik

titik 0 => $0^2 - 2(0) - 3 = -3$

titik 4 => $4^2 - 2(4) - 3 = 5$

titik -2 => $-2^2 - (2)(-2) - 3 = 5$

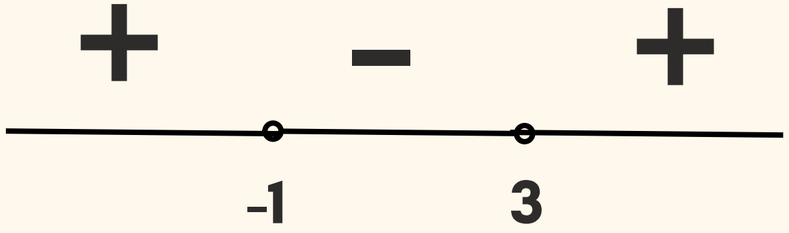
Maka,

F monoton naik pada saat f'(x)>0

$(-\infty, -1)$ atau $(3, \infty)$

F monoton turun pada saat f'(x)<0

(-1, 3)



KECEKUNGAN

CONTOH SOAL

1 Tentukan di selang manakah fungsi tersebut naik, turun, cekung ke atas dan cekung ke bawah

a. $f(x)=\frac{1}{3}x^3-x^2-3x+4$

Jawab :

f(x) cekung keatas ketika f''(x) > 0

f(x) cekung kebawah ketika f''(x) < 0

Menentukan nilai f''(x)

<=> $f'(x) = x^2-2x-3 > 0$

<=> $f''(x) = 2x-2 > 0$

<=> $x > 1$

maka f(x) cekung keatas pada $(1, \infty)$

dan cekung kebawah pada $(-\infty, 1)$

Titik belok :

$f''(x) = 0$

<=> $2x-2 = 0$

<=> $2x = 2$

<=> $x = 1$

subtitusi x = 1 ke f(x)

$f(1) = \frac{1}{3}(1)^3-(1)^2-3(1)+4 = 1/3$

Maka titik belok : (x,y) = (1,1/3)


TERIMAKASIH!

MULTIPLYING USING STANDARD ALGORITHM

By lining up the numbers vertically, we can multiply each number separately by following a series of steps.

42 × 36
will look like this

	tens	ones
	4	2
×	3	6

TRY THIS!

Rayne hands out juice boxes at a school event. In the first hour, she gave out 10 juice boxes, and another 10 for the next hour.

If Rayne gave out twice as many juice boxes in the third hour as she did in the first two hours, which expression represents the number of juice boxes she gave out in the third hour?

A. $(10 + 10) \times 2$

B. $10 \times (10 + 2)$

C. $10 + (10 \div 2)$

D. $(10 \times 2) + 10$

TODAY, YOU LEARNED TO...

Write simple numerical expressions.

It is possible to translate word problems into numerical expressions.

Use a grouping symbol.

One should solve numbers inside a grouping symbol (parentheses or "round brackets") first.

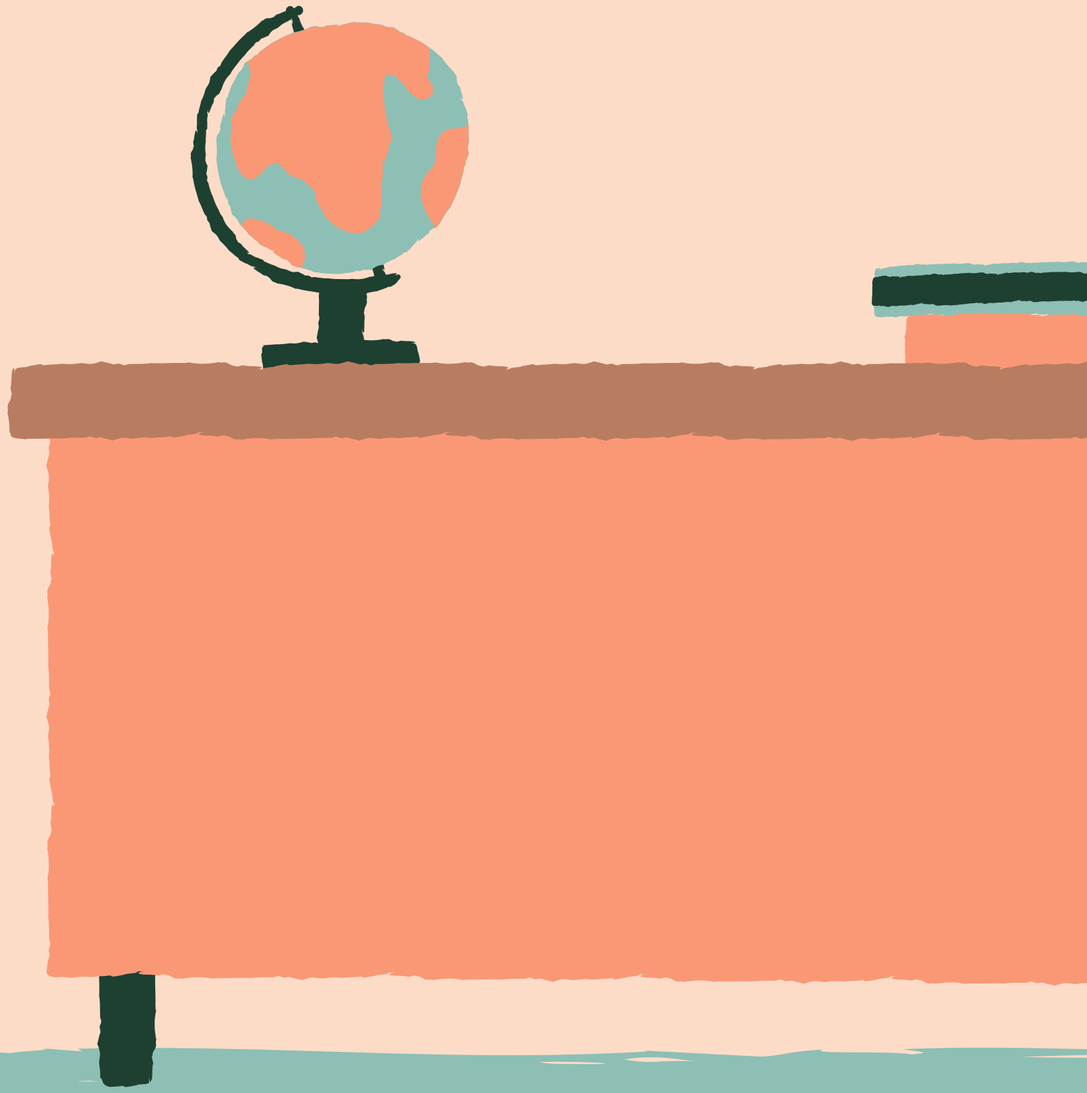
Follow the order of operations.

One must keep in mind a few rules when solving numerical expressions.

ASSIGNMENT

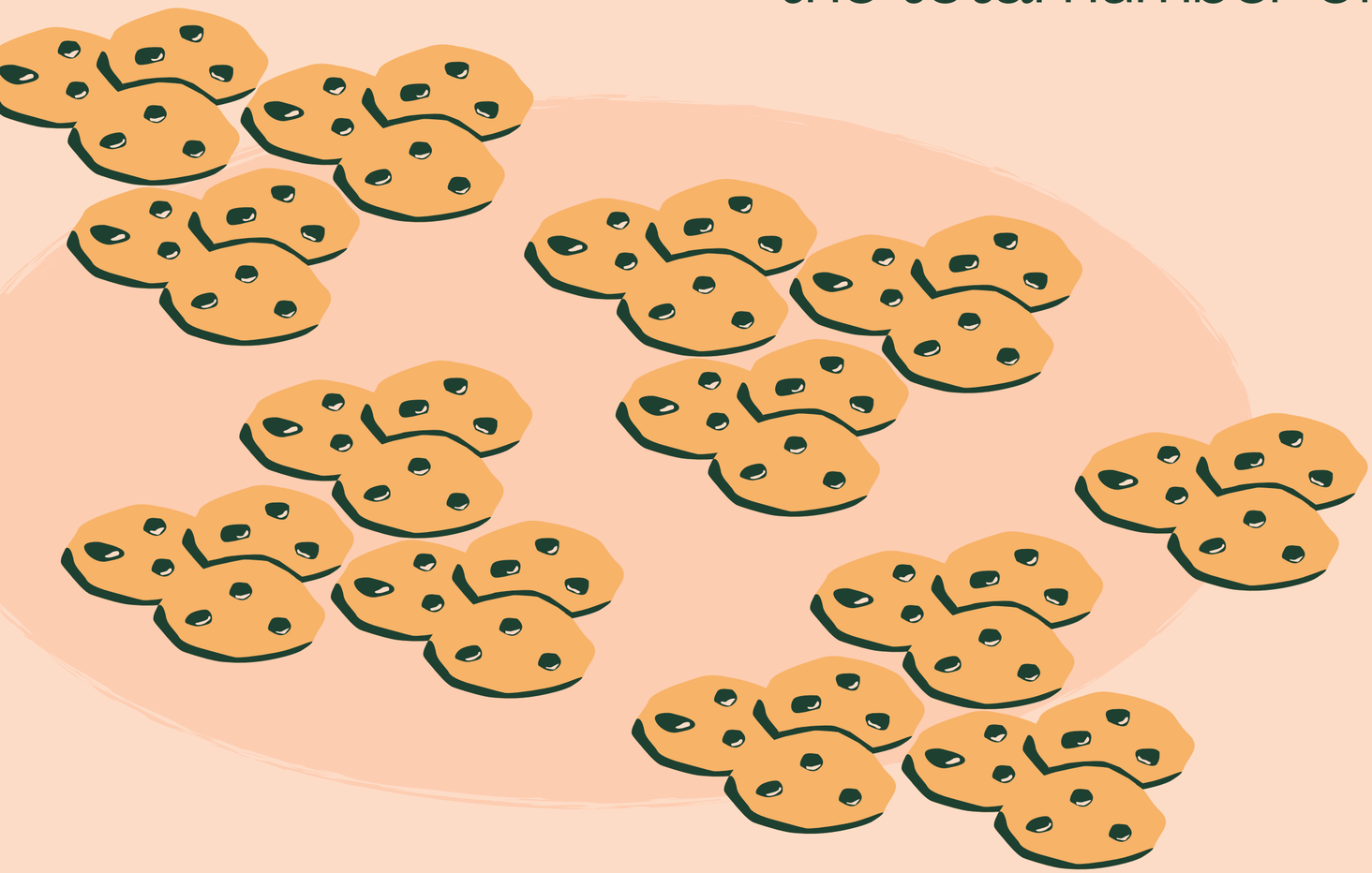
A mnemonic is a pattern of letters or numbers to help you remember things.

Look for an effective mnemonic to help you remember the rules in the order of operations. Then, prepare to share it with the class next session.



DISCOVERY TIME!

Can you identify the expression that represents the total number of cookies?



$9 \div 4 + 3$

$4 \times 9 + 3$

$9 + 9 + 9 + 9 + 3$

WRITING EXPRESSIONS

SAMPLE PROBLEM

Erin bought 15 bags of potato chips and shared 6 with her friends. She then put the remaining bags of potato chips equally into 3 small boxes.

How many bags of potato chips were placed in each box?

Can you show what happens to these bags of chips?

6 friends got one each

remaining bags are
in the 3 boxes

How can we write the problem using an expression?

You must do operations
inside the brackets first!

$$(15 - 6) \div 3$$

total number of bags of chips

shared with friends

number of boxes

OPERATIONS IN ACTION!

Think

Solve the following items using the correct order of operations on your own.

$$25 \div 5 \times 6$$

$$8 \times (3 + 5)$$

Pair

Discuss your answers with your seatmate.

Share

Volunteer to share what you discussed with your partner with the entire class.

GROUPING SYMBOL IN EXPRESSIONS

Perform the operations inside the brackets first!

$$(15 - 6) \div 3$$

Parentheses or "round brackets" can be used to group numbers.

Examples:

$$(3 + 3) \times 12$$

Add 3 and 3 first before performing multiplication.

$$(24 \times 3) \div (4 + 12)$$

Perform operations inside the parentheses first before dividing.

ANSWER KEY

TRY THIS!

Rayne hands out juice boxes at a school event. In the first hour, she gave out 10 juice boxes, and another 10 for the next hour.

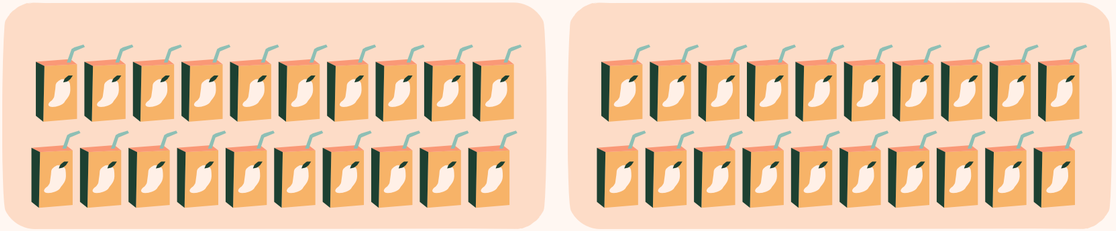
If Rayne gave out twice as many juice boxes in the third hour as she did in the first two hours, which expression represents the number of juice boxes she gave out in the third hour?

A. (10 + 10) × 2

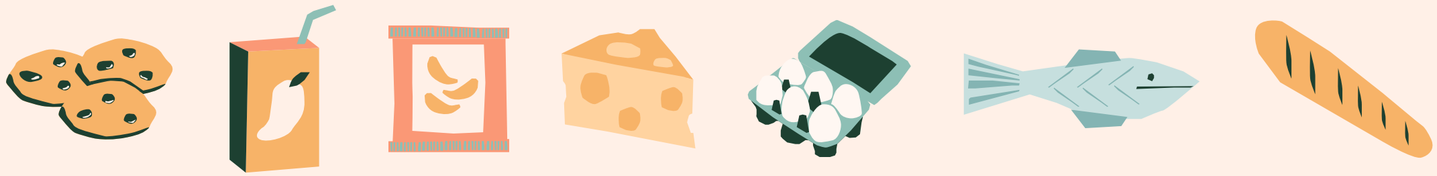
First hour

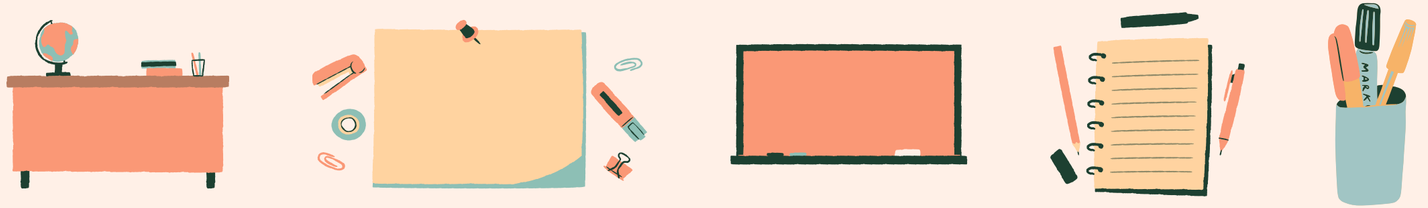
Second hour

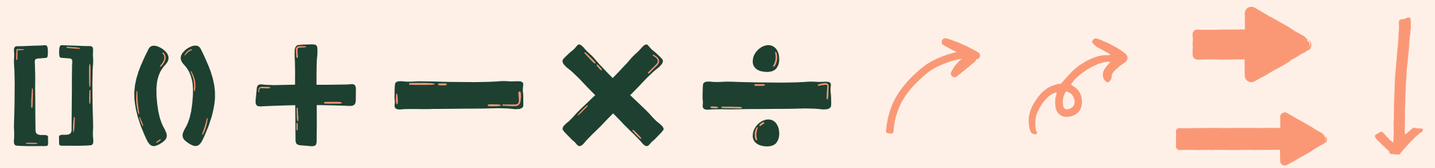
40 juice boxes were handed out on the third hour



RESOURCE PAGE







Use these icons and illustrations in your Canva Presentation. Happy designing! Don't forget to delete this page before presenting.

PRESS THESE KEYS WHILE ON PRESENT MODE!

B for blur

C for confetti

D for a drumroll

M for mic drop

O for bubbles

Q for quiet

U for unveil

Any number from **0-9** for a timer