Using variations to order numbers	Season	01
	Episode	09
	Time frame	1 period

Prerequisites : Variations of a function

Objectives :
– See how the variations and the graph of a function may be used to order numbers.

Materials :
– *18 different images under a function f.*
– *List of twenty pairs of numbers to order.*
– *Graphs sheet with the graphs of 6 functions.*
– *Answer sheets.*
– *Slideshow.*

1 – Ordering game

20 mins

Outside, there are two axes drawn on the floor. Each student is given one card. On one side of this card, there is a number and student have to rank them on the first line according to their number. Then the variation table of a function is shown. Students return their card so that they see the image of their number under the function and have to reorder them on the second line.
Other variation tables are shown ans student have to restart the movements. With the last function, students are gathered in 6 groups of 3 ordered images.

2 – Quizz

35 mins

Students are now working in teams done during part 1. Pairs of numbers are given. For each pair, teams have to find what function to use to order the numbers, over what interval, and finally order correctly the numbers. Answers must be written on an individual answer sheet that may be marked later on. An example is first shown with the slideshow.

Using variations to order numbers	Season	1
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	Document	Answer sheet

1. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

2. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

3. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

4. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

5. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

6. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

7. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

8. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

9. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

10. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

11. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

12. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

13. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

14. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

15. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

16. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

17. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

18. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

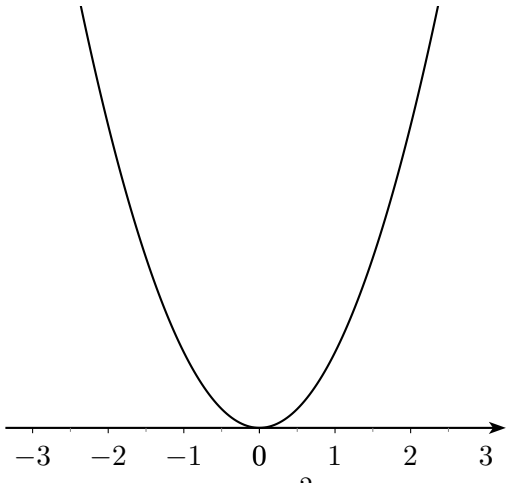
19. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

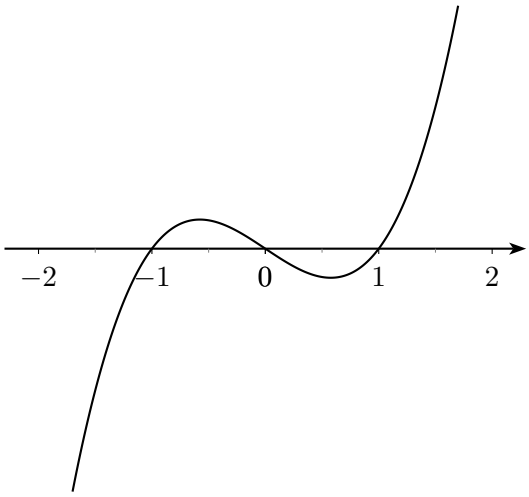
20. Function used : $x \longmapsto$ ☐ Interval ☐

Your answer ☐ $\leqslant$ $=$ $\geqslant$ ☐ (Circle the right symbol)

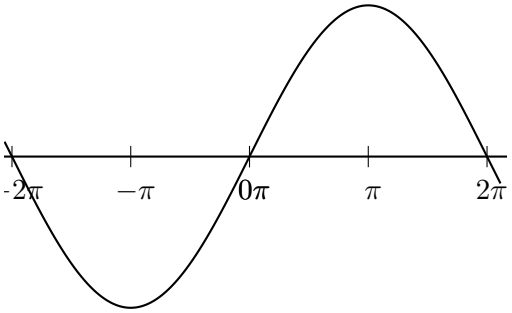
Using variations to order numbers	Season	1
	Episode	09
	Document	Graphs sheet



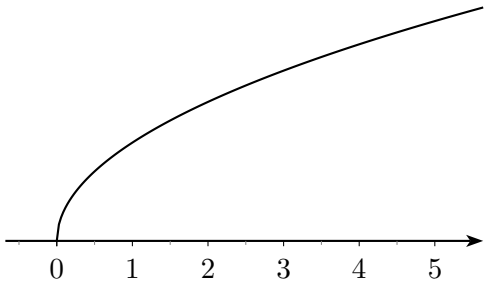
$x \mapsto x^2$



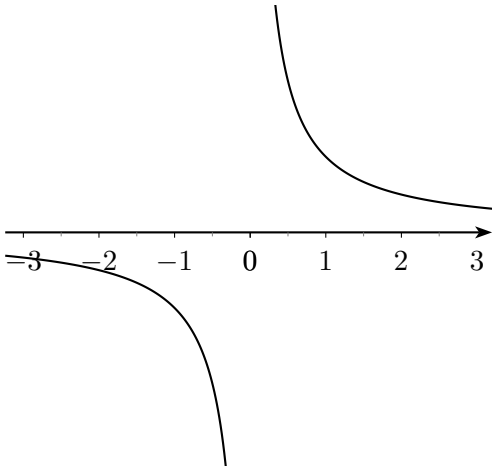
$x \mapsto x^3 - x$



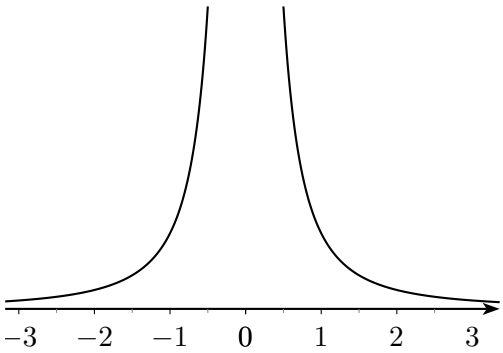
$x \mapsto \sin(x)$



$x \mapsto \sqrt{x}$



$x \mapsto \frac{1}{x}$



$x \mapsto \frac{1}{x^2}$

Document 1 Pairs of numbers

1. π^2 and 9.
2. $\sin 2.3$ and $\sin 2.7$.
3. $(\frac{3}{4})^2$ and $(\frac{5}{4})^2$.
4. $(\frac{1}{4})^3 - \frac{1}{4}$ and $(\frac{4}{17})^3 - \frac{4}{17}$.
5. $0.98^3 - 0.98$ and $1.02^3 - 1.02$.
6. $\frac{1}{2.17}$ and $\frac{1}{-2.17}$.
7. $(-2.5)^3 + 2.5$ and $(-\pi)^3 + \pi$.
8. $\frac{1}{(-2.01)^2}$ and $\frac{1}{(-1.99)^2}$.
9. $\frac{1}{\pi}$ and $\frac{1}{4}$.
10. $\sqrt{7}$ and $\sqrt{10}$.
11. $\sin 0$ and $\sin(-\pi)$.
12. $\sqrt{5.17}$ and $\sqrt{5.71}$.
13. $(-2.17)^2$ and $(-1.5)^2$.
14. $\sin -3$ and $\sin -2$.
15. $-\frac{1}{\sqrt{7}}$ and $-\frac{1}{\sqrt{10}}$.
16. $\sin -1$ and $\sin 1$.
17. $\frac{1}{\pi^2}$ and $\frac{1}{3.15^2}$.
18. 1.1^2 and $(-1.1)^2$.
19. $\sqrt{\pi + 2}$ and $\sqrt{6}$.
20. $\frac{1}{0.75^2}$ and $\frac{1}{0.66^2}$.

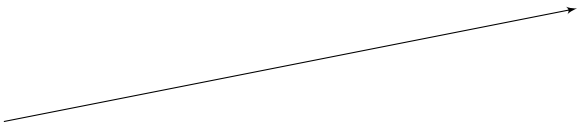
Document 2 Images to order

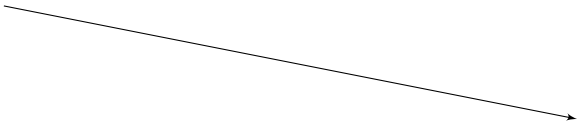
$f(-10)$	$f(-9)$	$f(-8.8)$
$f(-6.5)$	$f(-4)$	$f(-3.1)$
$f(-2.9)$	$f(0)$	$f(0.5)$
$f(1.1)$	$f(1.2)$	$f(2.1)$
$f(4.3)$	$f(4.4)$	$f(4.5)$
$f(5.1)$	$f(9.9)$	$f(10)$

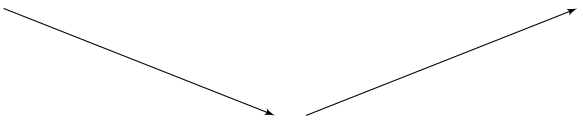
Document 3 Numbers to order

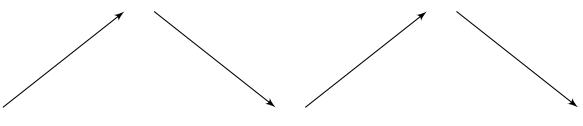
-10	-9	-8.8
-6.5	-4	-3.1
-2.9	0	0.5
1.1	1.2	2.1
4.3	4.4	4.5
5.1	9.9	10

Document 4 Variation Tables

x	-10						10
$f(x)$							

x	-10						10
$f(x)$							

x	-10			0			10
$f(x)$							

x	-10		-5		0		5		10
$f(x)$									

x	-10		-7		-3		1		4		5		10
$f(x)$