



11 1/2 minutes

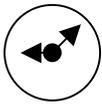
Optional Public/Private Class Work: Students review calculations with powered numbers

The teacher writes on the whiteboard as he reviews the rules for categories of powered numbers:

- *Concurrent elements and a powered number:* The teacher reminds the students of a homework problem in which a grandchild was taken to the theme park and every roller coaster ride cost him 8 korun. Grandmother gave him enough for 2 rides, which is 2×8 . Plus he received from his grandfather additional 5×8 korun. So he went on the roller coaster and he could have gone on the roller coaster how many times? SN: "7 times".
- *Powered numbers that have the same main numbers:* They work with an example that Ondras gives: $5^5 \times 5^6 = 5^{11}$. We also studied powered numbers with the same main number and its quotient. Give me an example of two powered numbers that have the same main numbers. $3^8 \div 3^6 = 3^2$.

The teacher says: "the next three rules apply to:" SN replies: "*Power of a product and power of a quotient*". A student gives an example of power of a product: $2^8 \times 3^8$. They go on to give an example of power of a quotient: $8^3 \div 2^3$. Next, they review power of the exponent and give an example: $(2^2)^5 = 2^3 \times 5 = 2^{15}$

The teacher reminds the students that these are the rules that they must master. "Those of you having difficulties with this should practice at home with your friends in order to get comfortable with this."



16 minutes

Public Class Work: Students go over homework

The teacher asks the class to turn to page 50. He begins with problem 1A. He calls Paul to the board and asks him to calculate 30^3 and to describe how he is going to figure it out. Paul says "first I multiply 3 to the third power equals to 27, and 3 to the 10th power is 1000 so that is 27,000."

	A	B
1. Vypočítej:	30^3	40^3
2. Pomnej čísla podle velikosti:	$(-3)^3, (-5)^3$	$(-4)^3, (-6)^3$
3. Zapíš jako mocnina o základe 2:	128	64
4. Zapíš jako mocnina o základe 7:	$7^2, 7^3$	$7^4, 7^5$
5. Vypočítej:	$6 \cdot 3^2 - 4 \cdot 3^3$	$8 \cdot 4^2 - 3 \cdot 4^3$
6. Vypočítej:	$1,2^{2^3}; 1,2^8$	$1,1^{10}; 1,1^8$
7. Učel x, pro které platí:	$8^x; 8^3 = 8^8$	$9^x; 9^4 = 9^8$
8. Zapíš číslo, které je větší:	$(7^3)^2, (7^2)^3$	$(6^2)^3, (6^3)^2$
9. Napiš rozvinutý zápis čísla:	305026	540307
10. Zapíš číslo ve tvaru $a \cdot 10^n$ ($1 \leq a < 10, n =$ přirozené číslo):	734000	582000

- **Problem 2A:** A student says that -3^4 is larger because we have an even number, negative coefficienty."

After each student finishes their problem on the board, they call on another student to come to the board to do the next problem

- **Problem 3A:** After beginning with $2^2 = 4, 2^3 = 8, 2^4 = 16$, a student ends up with the answer of $2^7 = 128$.
- **Problem 4A:** A student says the answer is 7^5 . The teacher asks which rule he followed to complete this problem. He points to one on the board.
- **Problem 5A:** The teacher asks Ratka to state the rule before calculating it. She points to the rule that has the same main number as well as the exponent. She goes on to calculate and explain: " 6×3^3 minus 4×3^3 is the same as 6×3^3 , which is equal to 54.
- **Problem 6A:** Vasnovsko points to the rule that deals with power of quotient with the same main number. The teacher reminds him that "calculating a problem means you come up with a number. You can calculate it in your head." He notes that "it's 144 (12×12), and you separated the two because of the decimal numbers".
- **Problem 7A:** After restating the problem, a student says that x equals 11 and he got that by adding 3 and 8.
- **Problem 8A:** Andulka says: "first I calculate what's in the parentheses. $7^2 = 49$."
- **Problem 9A:** Student says that $305,026 = 3 \times 105 + 5 \times 103 + 2 \times 101 + 6 \times 1$.
- **Problem 10A:** Write this number in a form $a \times 10^n$. The T says that is what we can use when we deal with large numbers on a calculator.



10 1/2 minutes

Public Class Work: Students work on page 51

Working on Problem 1: The teacher asks students to use a #2 pencil to calculate the problem that he dictates.

1. Vypočítej z paměti:
 $(-50)^5 + (-30)^3 + (-20)^2 + (-10)^1 + 0^{10} + 10^1 + 20^2 + 30^3 + 50^5$

He asks, "How will the pencil be useful to you?" SN: "when we have $(-50)^5 + 50^5$, it will equal zero." The teacher says you can cross it out lightly and asks for other numbers that can be crossed out. SN: " $(-30)^3$ and 30^3 ".

Kuba: " (-20) and 20^2 ." Several students disagree, saying: "It's an even exponent, so a positive number will come out of this. They go on to cross out $(-10)^1, 10^1$ and 0^{10} and calculate the remaining numbers $(-20) + 20^2 = 800$.

Working on Problem 4: Alenka is asked to come to the board to do 4A(a) & 4A(b) (calculate the 2nd root of the number).

4. Vypočítej druhou odmocninu s přesností, která je uvedena pod číslem v závorce; nejprve však proved a zápis odhad:

	a)	b)	c)	d)
A	$\sqrt{6}$ (na desetiny)	$\sqrt{60}$ (na jednotky)	$\sqrt{600}$ (na jednotky)	$\sqrt{6000}$ (na desítky)
B	$\sqrt{7}$ (na desetiny)	$\sqrt{70}$ (na jednotky)	$\sqrt{700}$ (na jednotky)	$\sqrt{7000}$ (na desítky)

T: "We do an estimate, based on what?"
 S: "The closest squared number, the squared number is 4 and the root is 2". Students use calculators and a table chart to calculate to the nearest decimal number.



11 minutes

Private Class Work: Students work individually or in pairs

The teacher instructs students "on your own or in a group of two, please do number 16." "Do the problem in your personal notebook. If your group of two is still having troubles, you may turn to another group for assistance."

16. Střecha domu

Na obrázku je valbová střecha domu, výška hřebene střechy je 5,5 m. Majitel chce celou střechu pokrýt měděným plechem. Vypočítej, kolik čtvercových metrů plechu bude potřebovat; připočítej 15 % na prostřihání a spoje plechů.

As the students work individually or in pairs, the teacher sits at his desk facing the students watching them work. He occasionally speaks to the class saying: "You will work with an area of what kind of geometric configuration? To calculate the area of a triangle, you need to know what?" (SS reply: height and length.) "To calculate trapezoid, you need to know what?" (SS reply base and height.) "You'll calculate the height based on your knowledge of the Pythagorean theorem."

With about 5 minutes left, the teacher circulates, asking students questions, looking over their work and answering student's questions.