### Logarithms

**ARITHMETIC**

11

**Number of digits of a "very large" number**

**1262383049660586222684174870651169998454847760535761095005091**

**6182626818413620269880155156801376138071753405453485116413864**

**8904527031605516052768809525956360593996436471601951598338820**

**9962459578542172100149933776393858121960407273342250718005600**

**9672540900795541095168165737795933263322883148732515590778530**

**6844497786480339196258080068276001784958928193764231021494476**

**2837569186221071720202524163030311855918867830431407694380169**

**2528246980959705901641444238894928620825482303431806955690226**

**3087734268295039009305293951812087395919671958415360531431457**

**75307050594328881077553168201547775**

 Use the calculator to answer the following questions:

At times, it may be interesting to know the number of figures that the result of an operation has, without needing to know what that result is. One way to do this is to use the logarithms, as you will see below.

How many digits does the number 233 have?

**1**

 How many digits does the number 234 have?

**2**

 How many digits do the numbers 2300 and 2332 have?

**3**

How many digits does the number 2333 have? What happens when you try to answer this question using the calculator?

**4**

To answer the previous question, calculate the decimal logarithms of the following numbers:

**5**

2, 3, 31, 45, 405, 607, 1 234, 5 678, 12 345, 67 890, 12 3456, 789 012

Look at the entire part of each logarithm. What can you notice?

Apply what you discovered and solve question 3 again but in a different way.

**6**

Try to solve question 4 by the same method. What do you notice?

**7**

Do you know any property of the logarithms that can solve the error indicated by the calculator in the

**8**

question 7?

 From the conclusions you drew in question 7, figure out how many digits the number 2333 has?

**9**

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