



Teacher Notes for Indices

Compatibility: TI-83/83+/83+SE/84+/84+SE

Run The Program Called: **INDICES**

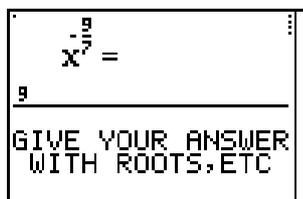
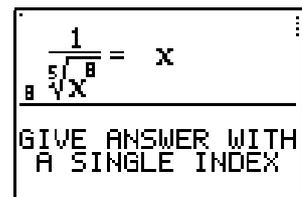
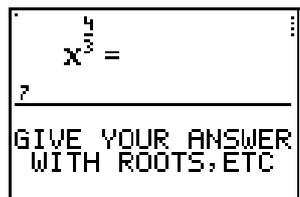
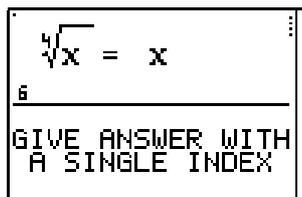
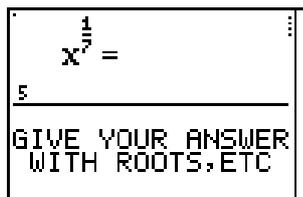
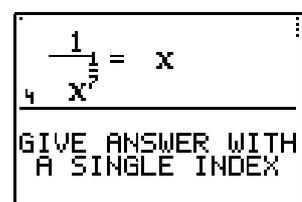
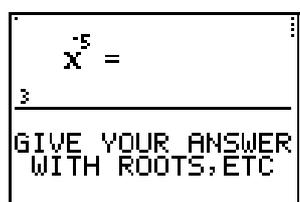
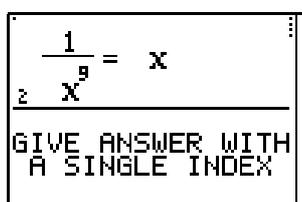
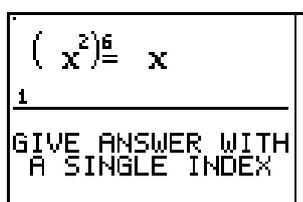
► Summary

This program provides practice of writing roots, reciprocals, etc in index form and vice versa. There are 10 levels - the first 9 are graded, and the 10th provides a mixture of previous levels.

For each level, a menu system operates asking you what you want. Down the left side of this sheet are sample screen shots from level 9 that illustrate how this menu system works.

► Features

Firstly, please find below sample screenshots from each of the levels 1 to 8. Level 9 is described in the notes below, whilst level 10 is a mixture of levels 4, 5, 6, 7, 8 and 9.



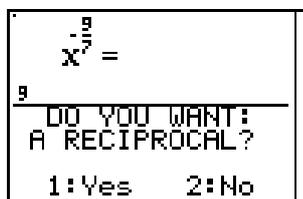
Depending upon which conversion is being tested, it will prompt you for:

- negative *and/or* fractional index
- reciprocal *and/or* root *and/or* brackets

(on the lower levels, not all of these options are asked for)

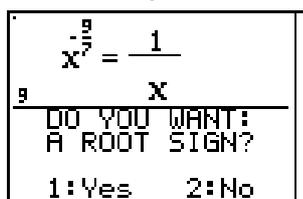
After you have decided upon the structure of your answer, it will ask you for the numbers for each of the various positions.

↓ press ENTER



You will then be asked to confirm whether you want to submit your answer as it is shown. By choosing no, you can re-enter it again. You can re-enter your answer as many times as you want, with no penalty.

↓ yes



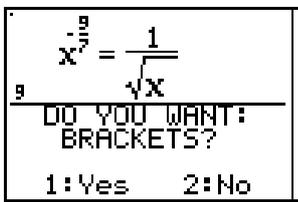
When you submit your answer you will be told if it is correct, or not.

If not correct, you will be given one more try before you are shown the correct answer alongside your latest incorrect attempt.

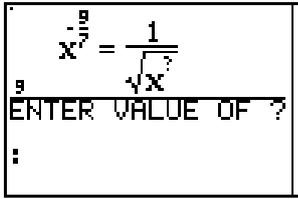
↓ yes

You move up a level when you answer 3 consecutive questions correctly at the first submission. The exception to this is level 10 where you must answer 10 consecutive questions correctly to complete the program.

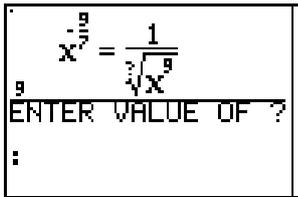
[see next page]



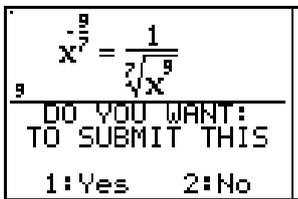
↓ yes



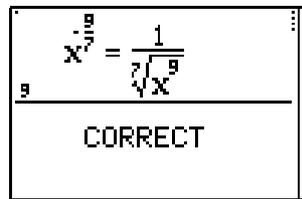
↓ enter 9



↓ enter 7



yes
→



Down the far left of the screen is a bar that starts as a dot, but gets longer as more questions are answered correctly for each level. When the bar reaches the horizontal line on the screen, you are on the last question for that level. Hence, as a teacher, you can see at a glance how far students are through each level, the number of which is shown in the bottom left hand corner. Level 10 shows a * instead of a number.

Sample screens from the first 9 levels are shown on the next page, to help see which skill is being tested at each level. There are also technical points to note regarding how the program operates.

To quit the program, press the **CLEAR** button anytime that you are prompted for a “1:Yes 2:No” response.

► Suggestions

It can often be beneficial for the teacher to spend the last 5/10 minutes of the previous lesson demonstrating via a viewpanel to the class, the program that they will subsequently be using themselves. This aids their familiarity with the task they will face and the menu options they will have to choose from, without the distraction of having a calculator in front of them at the time.

Demonstrate the program on level 1 so that the nature of how the program operates is clear. Without telling the students any more about indices, let them try questions but do let them know that you expect them to get some questions wrong. They can be reassured that they will not go down a level if they repeatedly enter incorrect answers.

Their task is to learn from the correct answers that are (eventually) given.

Even when they are asked by the program if they want a reciprocal, do not tell the students what a reciprocal is. Let them answer “Yes” to find out what such a thing is.

At the end of the lesson, time can be spent finding out from students all the new words, notations or relationships that they discovered from using the program.

When they are given the option of “Do you want Brackets?”, students typically answer “No.” If a student completes all levels successfully, instruct them to return to level 8 and answer “Yes” each time to the Brackets question. When they have again completed levels 8, 9 and 10, you can be sure that they are fully proficient in all forms of index conversion.

The discussion of when would brackets be helpful, and why the whole process is consistent with the normal laws of indices can profitably take place in a subsequent lesson.

This program can be used as a good revision exercise in advance of starting differential calculus questions.

► Technical Information

- for $x^{\frac{a}{b}}$, you can input your answer either as $\sqrt[b]{x^a}$ or as $(\sqrt[b]{x})^a$. However, the program will always show correct answers in the $\sqrt[b]{x^a}$ format.
- it will accept non-simplified fractions as correct (eg. $\frac{6}{8}$ for $\frac{3}{4}$)
- “redundant” digits are not displayed (\sqrt{x} instead of $\sqrt[2]{x}$, x instead of x^1)