Teacher Notes for Ultimate Non-Calculator Challenge
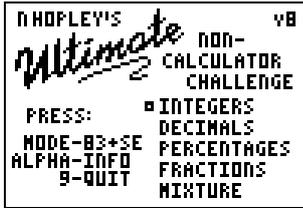
Compatibility: TI-83+/83+SE/84+/84+SE

Run The Program Called: **NONCALC**

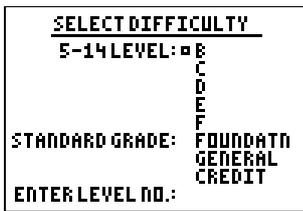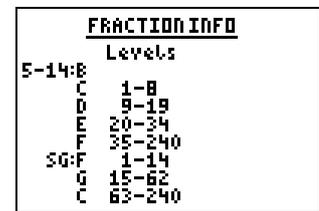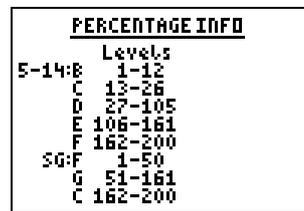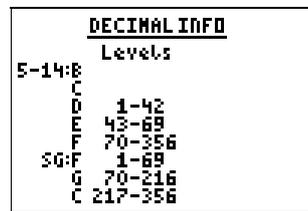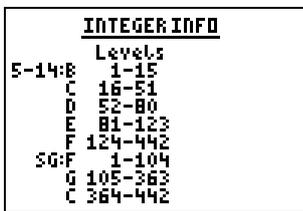CALCULATOR SOFTWARE .CO .UK

▶ Summary

This program is designed to do as it is named - it will randomly generate questions according to the user's choice of topic, complexity and phrasing, using a database of over 1200 distinct levels, with the option of being timed on each question! After 10 questions, a performance summary screen is shown, and then you have the opportunity to do corrections of those questions that were repeatedly answered wrong.

▶ Features

```
N HOPLEY'S           v8
Ultimate  non-
           CALCULATOR
           CHALLENGE
PRESS:      □ INTEGERS
            DECIMALS
MODE-83+SE  PERCENTAGES
ALPHA-INFO  FRACTIONS
Q-QUIT      MIXTURE
```
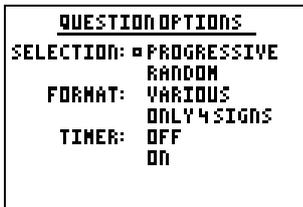
On the front title page, press **MODE** to cycle through 83+, 83+SE, 84+ and 84+SE. This selection ensures that the timing clock goes at the correct speed, when it is selected.

To view information on each category of questions, move the ❏ up and down using the arrow keys and press **ALPHA** to get one of the below four illustrated information screens, or press **ENTER** to select the category.

```
   INTEGER INFO
       Levels
5-14:B    1-15
    C    16-51
    D    52-80
    E    81-123
    F   124-442
SG:F    1-104
    G   105-363
    C   364-442
```

```
   DECIMAL INFO
       Levels
5-14:B
    C
    D    1-42
    E   43-69
    F   70-356
SG:F    1-69
    G   70-216
    C  217-356
```

```
   PERCENTAGE INFO
       Levels
5-14:B    1-12
    C    13-26
    D    27-105
    E   106-161
    F   162-200
SG:F    1-50
    G    51-161
    C   162-200
```

```
   FRACTION INFO
       Levels
5-14:B
    C    1-8
    D    9-19
    E   20-34
    F   35-240
SG:F    1-14
    G    15-62
    C    63-240
```

```
   SELECT DIFFICULTY
5-14 LEVEL: □ B
              C
              D
              E
              F
STANDARD GRADE: FOUNDATN
                GENERAL
                CREDIT
ENTER LEVEL NO.:
```

With the exception of **DECIMALS** and **FRACTIONS**, all topics have questions covering 5-14 levels B to F and Standard Grade levels F, G & C

If you wish to answer 10 questions on a specific level number, then press **ENTER** with the box against the bottom item. The arrow keys then increase the level number by ± 1 and ± 10.

```
   QUESTION OPTIONS
SELECTION: □ PROGRESSIVE
             RANDOM
  FORMAT:   VARIOUS
             ONLY 4 SIGNS
  TIMER:    OFF
             ON
```

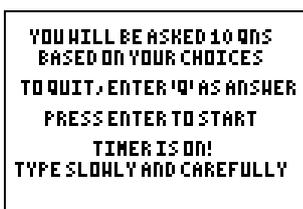**PROGRESSIVE** gives 10 questions that becoming increasingly complex.
RANDOM gives 10 random questions from the chosen difficulty level.

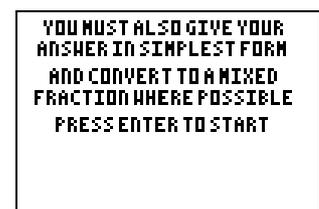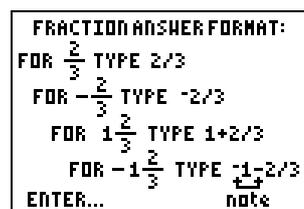**VARIOUS** chooses questions to be given in a variety of visual formats.
ONLY 4 SIGNS means all questions will be given using only +, −, × and ÷

When **VARIOUS** is chosen, both visual layout and phrasing of the question are changed. For example, amongst others, the words "sum", "product", "from X take Y", "take Y from X" and "difference" are used. Questions can also be shown in a "vertical" layout format for +, − and ×, or in long division format for ÷ calculations.
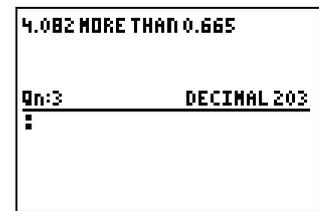
The **VARIOUS** option cannot be selected for **FRACTIONS**, and the **ONLY 4 SIGNS** option cannot be selected for **PERCENTAGES**. For this topic, it can also ask for amounts to be increased and decreased by specified %'s. eg if it asked for 6 INCREASED BY 300%, then that would be 24.

```
YOU WILL BE ASKED 10 QNS
 BASED ON YOUR CHOICES
TO QUIT, ENTER 'Q' AS ANSWER
 PRESS ENTER TO START
     TIMER IS ON!
TYPE SLOWLY AND CAREFULLY
```

With the timer on, type answers slowly - the clock will slow during entry so your time is not affected.

```
FRACTION ANSWER FORMAT:
        2
FOR     ─   TYPE 2/3
        3
          2
FOR    −─   TYPE -2/3
          3
          2
FOR   1 ─   TYPE 1+2/3
          3
          2
FOR  −1 ─   TYPE -1-2/3
          3
ENTER...        note
```

```
YOU MUST ALSO GIVE YOUR
ANSWER IN SIMPLEST FORM
AND CONVERT TO A MIXED
FRACTION WHERE POSSIBLE
 PRESS ENTER TO START
```

Be careful to use the minus button (−), rather than the subtract button when entering negative answers, but note the convention needed for entering fractional answers.
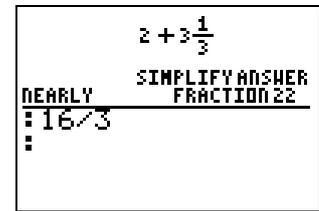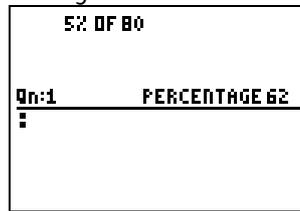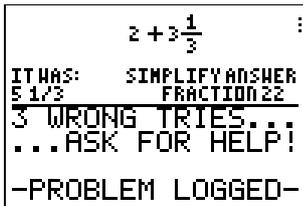
```
              83
             -48
             ___
Qn:3         INTEGER 142
:
```

```
4.082 MORE THAN 0.665

Qn:3         DECIMAL 203
:
```
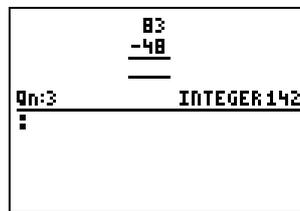
On the **FRACTIONS** level, you must enter answers as fractions, not decimal equivalents.

If you enter +, −, ✳ or / in your answer for topics other than **FRACTIONS**, then this will be interpreted as trying to do a calculation and you will be accused of cheating!

The number on the right next to the chosen category name, is the level number that you are currently being asked on.
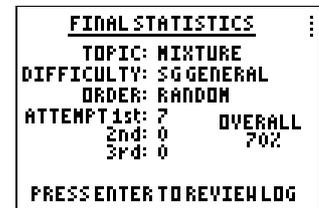
```
        5% OF 80

Qn:1         PERCENTAGE 62
:
```

```
            2+3 1/3
          SIMPLIFY ANSWER
NEARLY      FRACTION 22
:16/3
:
```

For **FRACTIONS**, if you type in an answer that is equivalent to the correct one, then you have one more chance to enter the correct answer.

```
            2+3 1/3              :
IT WAS:   SIMPLIFY ANSWER
5 1/3      FRACTION 22
3 WRONG TRIES...
...ASK FOR HELP!

-PROBLEM LOGGED-
```
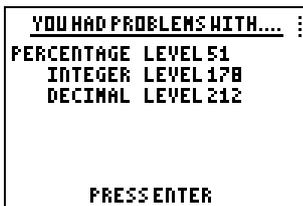
If you enter in three wrong answers, on any topic or level, the problem is logged for checking and correcting later. The next question will be on the same level and topic, so it is worth the students acting on the message that they are told!

If an answer with a syntax error is entered, the program will stop and report the error. If this happens, run the program NONCALC again and the first screen displayed will give you the option of returning to the current question.

At the end of 10 questions, they are presented with a summary stats screen that details how many questions were answered correctly on the 1ˢᵗ, 2ⁿᵈ and 3ʳᵈ attempts, along with an overall percentage and the mean time per question, if the TIMER was ON.
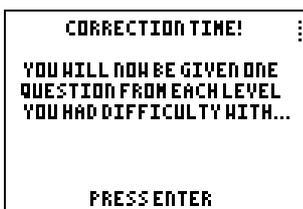
```
FINAL STATISTICS         :
     TOPIC: MIXTURE
DIFFICULTY: SG GENERAL
    ORDER: RANDOM
ATTEMPT 1st: 7
        2nd: 0      OVERALL
        3rd: 0        70%

PRESS ENTER TO REVIEW LOG
```

If they type "**Q**" to quit, their stats so far are shown, which includes the question that they chose not to answer as an incorrect response.

```
YOU HAD PROBLEMS WITH....  :
PERCENTAGE LEVEL 51
   INTEGER LEVEL 178
   DECIMAL LEVEL 212




     PRESS ENTER
```

Where there were questions that were logged after 3 incorrect inputs, then the next screen shows which levels these were, before it progresses to delivering a similar question on each level for "correction".

```
CORRECTION TIME!          :

 YOU WILL NOW BE GIVEN ONE
 QUESTION FROM EACH LEVEL
 YOU HAD DIFFICULTY WITH...


     PRESS ENTER
```

▶ **Suggestions**

As there are a large number of options for the user to select from, it is recommended that this program is used "little and often" with classes. This will allow students to become familiar with the type of challenges they will have to complete and be aware of the increase in difficulty when moving from Foundation to General, say, or General to Credit.

If they wish, the teacher can also use the OHP Display Acetate to help students become conversant with the words and layout of questions that they will face.

The program is best used for consolidation of techniques, rather than for introduction of new methods. However, each type of problem can often present a unique type of question for which "shortcuts" can be employed and it is not always possible to anticipate these in advance. There will always be an amount of "here's a way to tackle that particular question…"

▶ Grade Descriptors

The following table roughly outlines what each level contains
- further details can be found in official 5-14 and Standard Grade Documentation.

Level	INTEGERS	DECIMALS	PERCENTAGES	FRACTIONS
5-14 B	1⇨2 sf's, mainly +, but also ×.	n/a	100% of 1⇨3 sf's	n/a
5-14 C	1⇨3 sf's, mainly +,−, but also ×,÷.	n/a	10% of 1⇨2 sf's	a unitary fraction +,−, ×, a N number.
5-14 D	1⇨4 sf's, mainly +,−, but also ×,÷.	1⇨4 sf's, 1⇨2 dp's, mainly +, −.	1%, 5%'s, 10%'s, 100%'s of 1⇨3 sf's	as level C, with larger numbers.
5-14 E	1⇨4 sf's, mix of +,−, ×, ÷.	as level D, but also ×, ÷ by N nos.	as level D, but harder numbers.	simple mixed fractions +,−, ×, a N number
5-14 F	as B to E, but both Q & A can be ∈Z	as level E, but up to 1⇨4 dp's with ×, ÷	any % of 1⇨3 sf's	from level E to +, −, ×, ÷ of mixed fractions
SG F	as levels B to E	as levels D to E	as levels C, $\frac{1}{2}$ of D + E	as levels C to D
SG G	as levels E to F, but no × or ÷ of -ve's.	as levels E to F, but answers can be -ve.	the other $\frac{1}{2}$ of levels D + E	as level E to include +, −, × of simple fractions.
SG C	+,−, ×, ÷ on 1⇨4 sf integers.	1⇨4 sf's, 1⇨4 dp's, with +, −, ×, ÷.	as level F	as level F

The table below <u>roughly</u> outlines an equivalent table that would be for the National Curriculum of England and Wales, and GCSE Examination Tiered papers

Level	INTEGERS	DECIMALS	PERCENTAGES	FRACTIONS
NC 3	1⇨3 sf's, mainly +, but also ×.	n/a	100% of 1⇨3 sf's	a unitary fraction +,−, ×, a N number.
NC 4	1⇨4 sf's, mainly +,−, but also ×,÷.	1⇨4 sf's, 1⇨2 dp's, mainly +, −.	10% of 1⇨2 sf's	simple mixed fractions +, −, ×, a N number
NC 5	1⇨4 sf's, mainly ×,÷, but also +,−.	as level 4, but also ×, ÷ by multiples of 10^n	1%, 5%'s, 10%'s, 100%'s of 1⇨3 sf's	simple +, −, × using at least 1 unitary fraction
NC 6	as 3 to 5, but both Qn & Ans can be ∈Z	as levels 4 and 5, but also 3 dp's and some -ve answers	as level 5, but harder numbers.	+, −, ×, ÷ with simple mixed fractions
NC 7	as 6, but with more complex negative qns.	as levels 4 to 6, but also 4 dp's	any % of 1⇨3 sf's	as level 6 but with non-unitary fractions.
GCSE Foundation	roughly as NC levels 3 and 4	as levels 4 and 5	as levels 3, 4 and $\frac{1}{2}$ of 5	as levels 3 to 5, with some of 6.
GCSE Intermediate	roughly as NC levels 5 to 7	as levels 6 and 7	the other $\frac{1}{2}$ of level 5 and up to 1sf % of 1⇨3 sf's	as level 6.
GCSE Higher	more demanding 4 sf and negative qns	qns with both 3 and 4 sf's, and some -ve answers.	2⇨3 sf's % of any quantity	as level 7.

▶ Acknowledgements

A section of code used in this program is gratefully acknowledged to Raymond Bonneau.

FRACTION ANSWER FORMAT:

FOR $\frac{2}{3}$ TYPE 2/3

FOR $-\frac{2}{3}$ TYPE -2/3

FOR $1\frac{2}{3}$ TYPE 1+2/3

FOR $-1\frac{2}{3}$ TYPE -1-2/3

ENTER...   note

A+B	add A and B	**E × F**	times E by F
	A plus B		multiple E by F
A	A added onto B	**E**	E lots of F
+ B	sum of A and B	**× F**	E times F
	A more than B		product of E and F
			if E=2, 3 or 4:
			double, triple or
			quadruple F
C–D	take D from C	**G ÷ H**	divide G by H
	from C take D		G divided by H
C	C subtract D	**H)‾G**	G split into H parts
– D	C minus D		H divided into G
	C take away D	**$\frac{G}{H}$**	if H=2, 3, 4, 5, 10, 100
	D less than C		half of G, third of G,
			quarter of G, a fifth
***difference between* C *and* D**			of G, a tenth of G,
			hundredth of G.

N HOPLEY'S Ultimate non-CALCULATOR CHALLENGE

www.CalculatorSoftware.co.uk

Name: _____

circle your chosen options

Date	Topic	Level	Order	Score	Time
—/—	Int Dec Per Frac	B C D E F F G C	PROG RAND	%	sec
—/—	Int Dec Per Frac	B C D E F F G C	PROG RAND	%	sec
—/—	Int Dec Per Frac	B C D E F F G C	PROG RAND	%	sec
—/—	Int Dec Per Frac	B C D E F F G C	PROG RAND	%	sec
—/—	Int Dec Per Frac	B C D E F F G C	PROG RAND	%	sec
—/—	Int Dec Per Frac	B C D E F F G C	PROG RAND	%	sec
—/—	Int Dec Per Frac	B C D E F F G C	PROG RAND	%	sec
—/—	Int Dec Per Frac	B C D E F F G C	PROG RAND	%	sec
—/—	Int Dec Per Frac	B C D E F F G C	PROG RAND	%	sec
—/—	Int Dec Per Frac	B C D E F F G C	PROG RAND	%	sec