Installing Program on Handheld Devices

The TI-Nspire document "skills.tns" contains the entire package of practice programs. Installation is straightforward:

1. Install the file "skills.tns" in the MyLib folder in each handheld.
2. Refresh the libraries by going to 'documents' then 'refresh library.'

Each practice program can be initiated from any calculator page within any document, including the scratchpad. A text command typed into a calculator initiates a program, and the program operates through dialogue boxes until it is exited. When using the program, students can enter a limited number of text commands to guide the program.

- **skills\eqpractice**: Practice Solving 1-Variable Linear Equations
- **skills\ysolver()**: Practice rearranging 2-Variable Linear Equations
- **skills\slopeint()**: Practice with lines in slope-intercept form
- **skills\std()**: Practice with lines in standard form
- **skills\ptslope()**: Practice with lines in point-slope form

**NOTE:** The initiation command uses a back-slash rather than a forward slash. This character can be accessed by pressing the ‘?!’ button or using the keyboard shortcut 'shift' + ‘÷’.

```
command | exit | exit | exit | exit | exit | exit
---------|------|------|------|------|------|------
result   |      |      |      |      |      |      
command  |  back|  back|      |      |      |      
result   |      |      |      |      |      |      
command  | newlevel| newlevel|      |      |      |      
result   |      |      |      |      |      |      
```

**NOTE:** The scratchpad cannot be accessed during program usage.
Intended Usage.

This set of programs is intended for independent student use, and its purpose is to provide deliberate practice after classroom instruction. Ideally, students will have been shown how to solve "2-step" linear equations before they begin level 1. Likewise, students should be exposed to be combining like terms and distributing before they work independently on levels 3 and 5, respectively.

With regard to student work, the program serves as both a guide for and source of traditional paper and pencil practice. Students are expected to copy the given equation and to solve it on their own paper. The program on the handheld tracks student progress and performance within a session, but above all, the teacher should inspect each student's work for consistency and correctness.

Usage for Assessment

For formative assessment, the user of the program can enter a command which will summarize the results for an individual practice session. The teacher can then view both a student's percentage of correctly solved equations and also any progress that the student has made in levels of difficulty. With a skills tracker, the teacher can assess a student's facility with equations over time.

For summative assessment, the program can be used easily to create paper and pencil tests for students as well. Given the proper command, an electronic copy of a test will be generated, and the test will contain various levels of difficulty (adjustable by teacher) and also an adjustable number of problems.

Programs for generating practice are also included in the Nspire document 'skills.tns.' Each program is intended to be used on the teacher software and they all work best when viewed in computer mode rather than handheld mode. The generated practice is designed to be copied from the Nspire screen and pasted into Microsoft Excel. A brief description of each is included below.

practicegen()

This program generates one-variable linear equations and a solution key. The practice is numbered and labeled by level. The program offers the user control over both the levels that will be generated and the number of problems per level.

testgen()

This program produces problem sets similar to practicegen(), but the problems are numbered consecutively and they are not separated by level. The resultant format is more appropriate for a summative assessment.

ysolvegen()

This program generates two-variable linear equations, but it does not produce the solution set of equations that have been solved for $y$. The program offers the user control over both the levels that will be generated and the number of problems per level ( A bug in the program causes it to malfunction if 4 problems per level are selected, so avoid that number.).

ptslopegen()

This program generates two-variable linear equations in Point-Slope form that can be graphed on a standard Cartesian plane that extends from -10 to 10 in both the $x$ and $y$ directions.

stdgen()

This program generates two-variable linear equations in Standard form that can be graphed on a standard Cartesian plane that extends from -10 to 10 in both the $x$ and $y$ directions.
## Algebra Skills Tracker

Course _________________________        Teacher _____________________________           Period ______

<table>
<thead>
<tr>
<th>Student Name</th>
<th>eqpractice</th>
<th>ysolver</th>
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</table>
## Algebra Skills Tracker

Course _________________________        Teacher __________________________           Period __________

<table>
<thead>
<tr>
<th>Student Name</th>
<th>y = mx+b</th>
<th>y - y₁ = m(x - x₁)</th>
<th>Ax + By = C</th>
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<tbody>
<tr>
<td></td>
<td>slope</td>
<td>y-int</td>
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Flowchart of Levels and Notes for Program eqpractice()

- Levels 1-11 produce equations with integral answers.
- Levels not addressed in the flowchart are the same as the previous level but with negatives added in for increased difficulty.

**Level 1**

\[ ax + b = c \]

2-step equations
- add or subtract
- always division

**Level 3**

\[ ax + b + cx = d \]

Combining like terms.

**Level 5**

\[ a(bx + c) = d \]

Distributive property.

**Level 7**

\[ ax + b(cx + d) = f \]

Distributive property & combining like terms.

**Level 9**

\[ ax + b = cx + d \]

Variable on both sides of the equation.
- no distributing or combining like terms

**Level 11**

\[ ax + b + cx = ex + f + gx \]

Variable on both sides with combining like terms.

**Level 13**

\[ a(bx + c) = d(ex + f) \]

Variable on both sides with distributive property.
- answer may be non-integral

**Level 15**

\[ ax + b(cx + d) = ex + f(gx + h) \]

Variable on both sides with distributing and combining like terms.
- answer may be non-integral
Flowchart of Levels and Notes for Program `ysolver()`

- Mastery of level 5 indicates that students are ready to manipulate equations in slope-intercept form and that they are ready for the `ptslope()` program.
- Mastery of level 11 indicates that students are ready to manipulate equations in slope-intercept form and that they are ready for the `stdform()` program.

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Already solved for $y$. Simply checking if students can identify an equation that is already solved for $y$.</th>
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</thead>
<tbody>
<tr>
<td>$y = ax + b$</td>
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</table>

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<thead>
<tr>
<th>Level 2</th>
<th>Solve for $y$ in one step, either addition or subtraction</th>
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<tbody>
<tr>
<td>$y + a = mx + b$</td>
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<tr>
<th>Level 4</th>
<th>Students must distribute a coefficient and then add or subtract to solve for $y$</th>
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<tbody>
<tr>
<td>$y + a = c(dx + e)$</td>
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<thead>
<tr>
<th>Level 6</th>
<th>Solve for $y$ in one step, always division.</th>
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<tbody>
<tr>
<td>$ay = cx + d$</td>
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<table>
<thead>
<tr>
<th>Level 7</th>
<th>Solve for $y$ in two steps: first add or subtract, then divide.</th>
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<tbody>
<tr>
<td>$ay + b = cx + d$</td>
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<tr>
<th>Level 9</th>
<th>Solve for $y$ by adding or subtracting the $x$ term and then dividing by $a$</th>
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<tbody>
<tr>
<td>$ay + bx = c$</td>
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<tr>
<th>Level 10</th>
<th>Solve for $y$ by adding or subtracting the $x$ term and then dividing by $a$.</th>
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<tr>
<td>$ax + by = c$</td>
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<tr>
<th>Level 11</th>
<th>Same as Level 10, except the slope will typically be non-integral</th>
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<tbody>
<tr>
<td>$ax + by = c$</td>
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Flowchart of Levels and Notes for Program addeq()

- Levels 1-4 are for practicing with linear combinations. Students do not actually solve until level 5.
- Levels 5 and 6 have integral solutions that are located on a Cartesian grid extending from -10 to 10 in both the x and y directions.

**Level 1**

\[ ax + by = c \]
\[ +(dx + ey = f) \]

Practice adding linear equations
- student adds equations and enters resultant equation
- all positive numbers in answers

**Level 2**

\[ ax + by = c \]
\[ -(dx + ey = f) \]

Practice subtracting linear equations
- student subtracts equations and enters resultant equation
- all positive numbers in answers

**Level 3**

\[ ax + by = c \]
\[ +(dx + ey = f) \]

Practice adding linear equations
- student adds equations and enters resultant equation
- answers typically contain negatives
- variables may eliminate

**Level 4**

\[ ax + by = c \]
\[ -(dx + ey = f) \]

Practice subtracting linear equations
- student subtracts equations and enters resultant equation
- answers typically contain negatives
- variables may eliminate

**Level 5**

\[ ax + by = c \]
\[ +(dx + ey = f) \]

Solving a system by addition
- student adds equations and enters resultant equation.
- either \( x \) or \( y \) will eliminate
- prompts user to enter \( x \) and \( y \) separately

**Level 6**

\[ ax + by = c \]
\[ -(dx + ey = f) \]

Solving a system by addition
- student subtracts equations and enters resultant equation.
- either \( x \) or \( y \) will eliminate
- prompts user to enter \( x \) and \( y \) separately
Practice with Linear Equations in Slope-Intercept Form

You will be using a program on the TI-Nspire to practice graphing equations of lines in Slope-Intercept form:

\[ y = mx + b \]

You will use this worksheet to record your work as you complete tasks.

To begin, follow the instructions below:

1. Open the scratchpad
2. Type in the following text:
   \[ \text{skills}\backslash\text{slopeint()} \]
3. Press ‘enter.’

The program will instructions and prompt you for information. Use the blanks below to record your answers. Graph the line on the grid provided. The graph may help answer the questions as well.

- equation: ____________
- slope : ____________
- y-intercept : ____________
- first point : ____________
- second point : ____________
- x-intercept : ____________
Practice with Linear Equations in Point-Slope Form

You will be using a program on the TI-Nspire to practice graphing equations of lines in Point-Slope form:

\[ y - y_1 = m(x - x_1) \]

You will use this worksheet to record your work as you complete tasks.

To begin, follow the instructions below:

1. Open the scratchpad
2. Type in the following text:
   ```plaintext
   skills\ptslope()
   ```
3. Press ‘enter.’

The program will instructions and prompt you for information. Use the blanks below to record your answers. Graph the line on the grid provided. The graph may help answer the questions as well.

- equation: ____________
- slope : ____________
- first point : ____________
- second point : ____________
- y-intercept : ____________
- x-intercept 
- slope-intercept form: ____________

PLEASE NOTE: The command uses a back-slash rather than a forward slash. This character can be accessed by pressing the ‘?!’ button (shortcut is ‘shift’ + ‘+’).
Practice with Linear Equations in Standard Form

You will be using a program on the TI-Nspire to practice graphing equations of lines in Standard form:

\[ Ax + By = C \]

You will use this worksheet to record your work as you complete tasks.

To begin, follow the instructions below:

1. Open the scratchpad
2. Type in the following text:
   
   \texttt{skills\stdform()}

3. Press ‘enter.’

The program will instructions and prompt you for information. Use the blanks below to record your answers. Graph the line on the grid provided. The graph may help answer the questions as well.

- equation: ____________
- x-intercept: ____________
- y-intercept: ____________
- first point: ____________
- second point: ____________
- slope: ____________
- slope-intercept form: ____________
Solve each equation for the unknown variable.

Level 1
1) \(1k+2=-6\) 1._______ 1. \(k=-8\) Level 1
2) \(-1k-4=6\) 2._______ 2. \(k=-10\)

Level 2
1) \(-8-4k=-64\) 1._______ 1. \(k=14\) Level 2
2) \(2+3k=-4\) 2._______ 2. \(k=-2\)

Level 3
1) \(5k+10+6k=32\) 1._______ 1. \(k=2\) Level 3
2) \(7k+10+4k=65\) 2._______ 2. \(k=5\)

Level 4
1) \(-5k+6+3k=16\) 1._______ 1. \(k=-5\) Level 4
2) \(4k+6+6k=-64\) 2._______ 2. \(k=-7\)

Level 5
1) \(9(3k-8)=36\) 1._______ 1. \(k=4\) Level 5
2) \(4(8k+6)=-40\) 2._______ 2. \(k=-2\)

Level 6
1) \(-6(-7k+4)=-24\) 1._______ 1. \(k=0\) Level 6
2) \(4(3k+8)=92\) 2._______ 2. \(k=5\)

Level 7
1) \(3k+7(1k+7)=99\) 1._______ 1. \(k=5\) Level 7
2) \(2k+4(6k+1)=-48\) 2._______ 2. \(k=-2\)

Level 8
1) \(4k-2(5k+1)=-38\) 1._______ 1. \(k=6\) Level 8
2) \(-6k-3(-4k-3)=3\) 2._______ 2. \(k=-1\)

Level 9
1) \(-7k-4=3k-14\) 1._______ 1. \(k=1\) Level 9
2) \(3k-7=-1k-43\) 2._______ 2. \(k=-9\)

Level 10
1) \(-6+6k=-8k-104\) 1._______ 1. \(k=-7\) Level 10
2) \(3k+1=19+6k\) 2._______ 2. \(k=-6\)

Level 11
1) \(8x + 9 - 2x = 8x + 7 - 3x\) 1._______ 1. \(k=-2\) Level 11
2) \(-6x - 4 + 7x = -3x + 24 + 2x\) 2._______ 2. \(k=14\)

Level 12
1) \(2 - 2x + 7 + 1x + 1x = -3 + 1x - 3 + 4 - 4x\) 1._______ 1. \(k=-11/3\) Level 12
2) \(-4 + 4 - 6 + 7x + 6x = 5x + 4 - 7 - 6 - 5x\) 2._______ 2. \(k=-3/13\)

Level 13
1) \(6(7x - 7) = -3(9x - 6)\) 1._______ 1. \(k=20/23\) Level 13
2) \(9(6x + 7) = -6(5x + 8)\) 2._______ 2. \(k=-37/28\)

Level 14
1) \(2x + 1(5x - 6) = -3x + 4(7x + 6)\) 1._______ 1. \(k=-15/14\) Level 14
2) \(3x + 2(-4x + 4) = -6x + 9(9x + 2)\) 2._______ 2. \(k=-1/8\)

Level 15
1) \(-9x - 3(-9x + 9) = -8x - 7(4x + 9)\) 1._______ 1. \(k=-2/3\) Level 15
2) \(-3x + 4(-6x - 4) = -9x + 8(-1x - 5)\) 2._______ 2. \(k=12/5\)
Solve each equation for y.

Level 1
1) y=−2x+2
2) y=10x+1
3) y=10/9x−4

Level 2
1) y−9=−2x+10
2) y+6=−5x+10
3) y+2=3x+7

Level 3
1) y−8=10x−1
2) y−8=−9x−7
3) y+2=5x−2

Level 4
1) y+4=−5(−4x−2)
2) y−3=2(−2x−2)
3) y−9=−2(−4x−4)

Level 5
1) y−10=5/3(x−15)
2) y−5=5/2(x−4)
3) y−2=4/5(x+20)

Level 6
1) 4y=12x−20
2) 3y=−9x−9
3) −4y=−12x−24

Level 7
1) −5y−1=−30x−26
2) 5y+2=−20x+12
3) 5y−1=−15x−21

Level 8
1) 4y−6=9x−14
2) −2y−6=10x−2
3) −4y−9=7x+11

Level 9
1) 3y+18x=−21
2) 3y−27x=−27
3) 5y+15x=15

Level 10
1) 36x−4y=16
2) −6x+2y=16
3) −35x−5y=45

Level 11
1) −10x−2y=−6
2) −5x+2y=6
3) −2x+9y=−36
Enter the number of examples you'd like: 5
\[ y + 6 = \frac{2}{5}(x + 5) \]
\[ y + 2 = \frac{1}{9}(x + 9) \]
\[ y - 9 = -\frac{1}{2}(x + 10) \]
\[ y - 2 = -\frac{1}{8}(x + 8) \]
Enter the number of examples you'd like: 5
x+2y=4
9x-2y=−18
5x+y=5
2x-9y=18
2x-5y=20