

# **CONSTRUCTION MASTER™ PRO**

## **POCKET REFERENCE GUIDE**

For Models:

4065 v3.1 – Construction Master Pro  
4080 v3.1 – Construction Master Pro Trig



**CALCULATED  
INDUSTRIES®**

# CONSTRUCTION MASTER™ PRO

The *Construction Master Pro* calculators help you save time, cut costly errors and build *like a pro!*

## **Quickly Solve:**

- *Feet-Inches-Fractions, Yards, Metric Dimensional Problems and Conversions*
- *Problems Involving All Fractions – 1/2 through 1/64ths!*
- *Areas, Volumes and Weights*
- *Column/Cone Area and Volume*
- *Blocks/Bricks, Drywall and Footings*  
(NOT AVAILABLE ON TRIG MODEL #4080)
- *Circle/Arc Calculations*
- *Common, Hip/Valley, Jack Rafter Lengths (regular and irregular) and Cut Angles*
- *Rake-Wall Solutions*
- *Roofing Materials*
- *Stair Layout Solutions*
- *Trig Keys (TRIG MODEL #4080 ONLY)*

# TABLE OF CONTENTS

<b>KEY DEFINITIONS</b> .....	1
Basic Function Keys .....	1
Unit Keys .....	2
Length, Width and Height Keys (NOT AVAILABLE ON TRIG MODEL #4080) .....	2
Circle/Arc Keys .....	2
Construction Project Keys .....	3
Trigonometric Keys (TRIG MODEL #4080).....	5
Right Triangle/Roof Framing Keys.....	5
Stair Layout Key .....	7
Customizable Stair Settings .....	8
Miscellaneous Functions .....	9
<b>ENTERING DIMENSIONS</b> .....	10
Entering Linear Dimensions .....	10
Entering Square/Cubic Dimensions...	11
<b>EXAMPLES</b> .....	12
Adding and Subtracting Strings of Dimensions .....	12
Rectangular Area and Volume.....	12
Entering Square and Cubic and Adding a Waste Allowance .....	13
Using Multi-Function <b>Height</b> Key (NOT AVAILABLE ON TRIG MODEL #4080) .....	13
Dividing Dimensions .....	14
Linear Conversions.....	14
Square and Cubic Conversions.....	15
Blocks (NOT AVAILABLE ON TRIG MODEL #4080).....	15

Board Feet and Cost .....	15
Circle Area and Circumference.....	16
Circle/Arc Properties.....	16
Compound Miter .....	17
Concrete Columns .....	18
Concrete Footings (NOT AVAILABLE ON TRIG MODEL #4080) .....	19
Concrete Volume for Driveway .....	19
Converting D:M:S .....	20
Drywall (NOT AVAILABLE ON TRIG MODEL #4080).....	20
Polygon – <i>Brick Paving</i> .....	20
Roofing Materials.....	21
Squaring-Up a Foundation .....	22
Studs.....	22
<b>RIGHT ANGLE/FRAMING .....</b>	<b>24</b>
Pitch – <i>Converting Roof Angle</i> .....	24
Converting Slope .....	24
Angle – <i>Rise and Hypotenuse Known</i> (TRIG #4080 AND DESKTOP #44080 MODELS ONLY) .....	24
Common Rafter Length .....	25
Regular Hip/Valley and Jack Rafters ..	26
Irregular Hip/Valley .....	27
Rake-Wall – <i>No Base</i> .....	28
Rake-Wall – <i>With Base</i> .....	29
<b>STAIRS .....</b>	<b>30</b>
Stairs – <i>Given Rise and Run</i> .....	30
Stairs – <i>Given Rise Only</i> .....	31
Stairs – <i>Riser Limited Function</i> .....	32
<b>DEFAULT SETTINGS .....</b>	<b>33</b>

# KEY DEFINITIONS

## Basic Function Keys

---



Arithmetic operation keys.



Four-function (+, -, x, ÷) percent key.



Keys used for entering numbers.



**Off Key** — Turns all power off, clearing all non-permanent registers.



**On/Clear Key** — Turns on power. Pressing once clears the display. Pressing twice clears all temporary values.



**Convert Key** — Used with the dimensional keys to convert between dimensions or with other keys to access special functions.



**Store Key** — Used for storing values.



**Recall Key** — Recalls stored values.

## Unit Keys

---

<b>Yds</b>	Yards
<b>Feet</b>	Feet
<b>Inch</b>	Inch
<b>/</b>	Fraction Bar
<b>m</b>	Meters
<b>Conv</b> (7)	Centimeters
<b>Conv</b> (9)	Millimeters
<b>Conv</b> (2)	Acres

## Length, Width and Height Keys (NOT AVAILABLE ON TRIG MODEL #4080)

---

<b>Length</b>	Enters length for calculation of area or volume.
<b>Width</b>	Calculates area, square-up and perimeter.
<b>Height</b>	Calculates volume, wall area and total room area.

## Circle/Arc Keys

---

<b>Circ</b>	<b>Circle</b> — Calculates circle area and circumference.
<b>Arc</b>	Calculates Arc Length or Degree, chord length, segment area, pie slice area, segment rise, and length of arched segment wall studs.

**Conv** **Arc**

**Radius** — Enters or calculates circle radius.

## Construction Project Keys

---

**Conv** **Length**

**Blocks/Bricks** — Finds the number of blocks or bricks for a given area and stored block/brick size.

**Stor** **4** — *Stores block or brick size (default: 128 Square Inches area and 16 Inches length).*

**Conv** **8**

**Board Feet** — Enters or converts cubic values to Board Feet.

**Comp**  
**Miter**

**Compound Miter** — Calculates (based on entered spring and wall corner angle) miter angle, and bevel angle for cutting crown moulding.

**Stor** **Comp Miter** — *Stores value other than default spring (crown) angle of 45°.*

**Conv** **Circ**

**Column/Cone** — Calculates the volume and surface area of a Column and/or Cone.

**Conv** **Height**

**Drywall** — Calculates number of 4 x 8, 4 x 9 and 4 x 12 drywall sheets based on entered or calculated area.

**Conv** **Width**

**Footing** — Finds quantity of concrete, based on entered wall length and stored footing area.

**Stor** **6** — *Stores footing area (default: 264 Square Inches).*

**Conv** **Diag**

**Roof** — Calculates roof area, number of roof squares and bundles, and number of 4 x 8 sheets based on an entered or calculated plan area.

**Conv** **Run**

**Polygon** — Calculates full angle, bi-sect angle, side length, perimeter and area based on entered radius and number of sides.

**Conv** **5**

**Studs** — Calculates number of studs based on stored On-center spacing and entered length of wall.



## Trigonometric Keys (TRIG MODEL #4080)

- Sine** Finds the sine of a degree or undimensioned value.
- Conv Sine** **Arcsine ( $\sin^{-1}$ )** — Gives the angle for the Sine value.
- Cos** Finds the Cosine.
- Conv Cos** **Arccosine ( $\cos^{-1}$ )** — Gives the angle for the Cosine value.
- Tan** Finds the Tangent.
- Conv Tan** **Arctangent ( $\tan^{-1}$ )** — Gives the angle for the Tangent value.

## Right Triangle/Roof Framing Keys

- Pitch** Enters or calculates the slope (amount of “Rise” over 12” of “Run”).
- Conv Pitch** **Slope** — Enters a Pitch ratio, or slope (e.g.,  $\square \bullet \square 5$   $\square 8 \square 3$  **Conv Pitch**).
- Rise** Enters or calculates the vertical leg of a right triangle.
- Conv Rise** **Rake-Wall** — Finds the stud sizes based on entered right triangle values.

- Run** Enters or calculates the horizontal leg of a right triangle.
- Diag** **Diagonal** — Enters or calculates the Diagonal leg, or Common rafter.
- Hip/V** **Hip/Valley** — Calculates length of the regular or irregular Hip/Valley rafter.
- Conv** **Hip/V** Enters *irregular* pitch used to calculate lengths of the irregular Hip/Valley and Jack rafters.
- Jack** Calculates Jack rafter lengths on the *regular*-pitched roof side.
- Conv** **Jack** Calculates Jack rafter lengths on the *irregular*-pitched roof side.
- Stor** **5** — *Stores On-center spacing value (default: 16") for rafters and Rake-Walls. Also used for studs.*

## Stair Layout Key

---

### **Stair**

Given rise and/or run and stored variables, calculates or displays:

#### **Press   Result**

1	Riser Height
2	Number of Risers
3	Riser Overage/ Underage
4	Tread Width
5	Number of Treads
6	Tread Overage/ Underage
7	Stairwell Opening
8	Stringer Length
9	Angle of Incline
10	Stored or Calculated Run
11	Stored or Calculated Rise
12	Stored Desired Riser Height
13	Stored Desired Tread Width
14	Stored Headroom
15	Stored Floor Thickness

**Conv** **Stair**

**Riser Limited** —  
Recalculates *Riser Height* and other stair values if you're limited by local code. The calculated Riser Height will never exceed the *stored* Desired Riser Height.

## STAIR DEFAULT VALUES

- 7-1/2" Desired Riser Height
- 10" Desired Tread Width
- 10" Floor Thickness
- 6'8" Headroom

## Customizable Stair Settings

- Stor** **7** Stores Desired Riser Height.
- Stor** **9** Stores Desired Tread Width.
- Stor** **8** Stores Floor Thickness.
- Conv** **Stor** **Stor** Sets Headroom. See large User's Guide, Preference Settings, for details.
- Stor** **Stor**

## Miscellaneous Functions

---

<b>←</b>	Backspace Key
<b>Rcl</b> <b>=</b>	Paperless Tape
<b>Conv</b> <b>Stor</b>	Preference Settings
<b>Conv</b> <b>÷</b>	(1/x) Reciprocal
<b>Conv</b> <b>×</b>	Clear All
<b>Conv</b> <b>—</b>	(+/-) Toggle
<b>Conv</b> <b>+</b>	Pi ( $\pi$ ) 3.141593
<b>Conv</b> <b>◻</b>	Converts between D:M:S and Decimal Degrees.
<b>Conv</b> <b>%</b>	$x^2$
<b>Conv</b> <b>←</b>	( $\sqrt{x}$ ) Square Root
<b>Conv</b> <b>/</b>	Exponential Notation ( $x10^y$ )
<b>Conv</b> <b>0</b>	Total Cost (based on entry of per unit cost)
<b>Stor</b> <b>0</b>	Stores Weight per Volume
<b>Conv</b> <b>6</b>	Tons
<b>Conv</b> <b>4</b>	Pounds
<b>Conv</b> <b>3</b>	Metric Tons
<b>Conv</b> <b>1</b>	Kilograms
<b>M+</b>	Memory +
<b>Conv</b> <b>M+</b>	(M-) Memory Minus

- Stor** **1** (M1) Storage Register  
**Stor** **2** (M2) Storage Register  
**Stor** **3** (M3) Storage Register  
**Rcl** **Rcl** Recall and Clear M+  
**Rcl** **M+**, **1**, **2** or **3** Recall M+, M1, M2 or M3

## ENTERING DIMENSIONS

### Entering Linear Dimensions

*Examples of entering Linear Dimensions:*

DIMENSION	KEYSTROKE
Clear calculator 5 Feet 1-1/2 Inch	<b>On/C</b> <b>5</b> <b>Feet</b> <b>1</b> <b>Inch</b> <b>1</b> <b>/</b> <b>2</b> *
Clear calculator 5 Yards	<b>On/C</b> <b>5</b> <b>Yds</b>
Clear calculator 17.5 Meters	<b>On/C</b> <b>1</b> <b>7</b> <b>.</b> <b>5</b> <b>m</b>
Clear calculator 100 Centimeters	<b>On/C</b> <b>1</b> <b>0</b> <b>0</b> <b>Conv</b> <b>7</b>
Clear calculator 500 Millimeters	<b>On/C</b> <b>5</b> <b>0</b> <b>0</b> <b>Conv</b> <b>9</b>

*\*If a denominator is not entered, the fractional setting value is used.*

## Entering Square/Cubic Dimensions

*Examples of entering Square and Cubic Dimensions:*

KEYSTROKE	DISPLAY
-----------	---------

<b>On/C</b> <b>On/C</b>	0.
-------------------------	----

*Enter numeric value and press desired unit key once to label value as "Linear:"*

<b>1</b> <b>0</b> <b>0</b> <b>Feet</b>	<b>100 FEET</b>
--	-----------------

KEYSTROKE	DISPLAY
-----------	---------

<b>On/C</b> <b>On/C</b>	0.
-------------------------	----

*Enter numeric value and press desired unit key twice to label value as "Square:"*

<b>1</b> <b>0</b> <b>0</b> <b>Feet</b> <b>Feet</b>	<b>100 SQ FEET</b>
--	--------------------

KEYSTROKE	DISPLAY
-----------	---------

<b>On/C</b> <b>On/C</b>	0.
-------------------------	----

*Enter numeric value and press desired unit key three times to label value as "Cubic:"*

<b>1</b> <b>0</b> <b>0</b> <b>Feet</b> <b>Feet</b> <b>Feet</b>	<b>100 CU FEET</b>
--	--------------------

*Note: If you pass the desired dimensional format, keep on pressing the dimensional unit key until the desired result is displayed again.*

*Note: Feet-Inches format cannot be used to enter Square or Cubic values.*

# EXAMPLES

## Adding and Subtracting Strings of Dimensions

---

*Add the following measurements:*

- 6 Feet 2-1/2 Inches
- 11 Feet 5-1/4 Inches
- 18.25 Inches

*Then subtract 2-1/8 Inches.*

KEYSTROKE

DISPLAY

6 Feet 2 Inch 1 / 2 +

1 1 Feet 5 Inch 1 / 4 +

1 8 • 2 5 Inch = 19 FEET 2 INCH

- 2 Inch 1 / 8 = 18 FEET 11-7/8 INCH

## Rectangular Area and Volume\*

---

*Find the area and volume:*

- Length: 20 Feet 6-1/2 Inches
- Width: 12 Feet 8-1/2 Inches
- Height: 18 Inches

KEYSTROKE

DISPLAY

2 0 Feet 6 Inch 1 / 2 Length

1 2 Feet 8 Inch 1 / 2 Width Width

AREA 261.0503 SQ FEET

1 8 Inch Height Height VOL 14.5028 CU YD

*\*If using the Trig model (#4080), multiply (LxWxH) in Feet-Inches-Fractions.*



## Entering Square and Cubic and Adding a Waste Allowance

---

*Add a 10% waste allowance to 55 Square Feet. Then add a 20% waste allowance to 150 Cubic Feet:*

KEYSTROKE	DISPLAY
<b>5</b> <b>5</b> <b>Feet</b> <b>Feet</b> <b>+</b> <b>1</b> <b>0</b> <b>%</b>	60.5 SQ FEET
<b>1</b> <b>5</b> <b>0</b> <b>Feet</b> <b>Feet</b> <b>Feet</b> <b>+</b> <b>2</b> <b>0</b> <b>%</b>	180. CU FEET

## Using Multi-Function **Height** Key (NOT AVAILABLE ON TRIG MODEL #4080)

---

*Find the volume, wall area and total room area of a room measuring 15' x 20'. The room is 8' tall.*

KEYSTROKE	DISPLAY
<b>On/C</b> <b>On/C</b>	0.
<b>1</b> <b>5</b> <b>Feet</b> <b>Length</b>	LNTH 15 FEET 0 INCH
<b>2</b> <b>0</b> <b>Feet</b> <b>Width</b>	WDTH 20 FEET 0 INCH
<b>8</b> <b>Feet</b> <b>Height</b>	HGHT 8 FEET 0 INCH
<b>Height</b>	VOL 2400. CU FEET
<b>Height</b>	WALL 560. SQ FEET
<b>Height</b>	ROOM 860. SQ FEET

## Dividing Dimensions

*Divide 15 Feet 3-3/4 Inches into thirds  
(divide by 3):*

KEYSTROKE

DISPLAY

**1** **5** **Feet** **3** **Inch** **3** **/** **4** **÷** **3** **=**  
5 FEET 1-1/4 INCH

## Linear Conversions

*Convert 10 Feet 6 Inches to other dimensions,  
including Metric:*

KEYSTROKE

DISPLAY

**1** **0** **Feet** **6** **Inch**      10 FEET 6 INCH  
**Conv** **Feet** \*      10.5 FEET  
**Conv** **Inch** \*      126. INCH  
**Conv** **Yds**      3.5 YD  
**Conv** **m**      3.200 M  
**Conv** **9** (mm)      3200.4 MM  
**Conv** **7** (cm)      320.04 CM

*\*Repeated presses of **Feet** or **Inch** will toggle  
between Feet-Inch-Fractions and Decimal Feet  
or Inches.*

## Square and Cubic Conversions

*Convert 14 Square Feet to Square Yards:*

KEYSTROKE

DISPLAY

**1** **4** **Feet** **Feet**  
**Conv** **Yds**

14 SQ FEET  
1.555556 SQ YD

*Convert 12 Cubic Feet to Cubic Yards:*

KEYSTROKE

DISPLAY

**1** **2** **Feet** **Feet** **Feet**  
**Conv** **Yds**

12 CU FEET  
0.444444 CU YD

## Blocks (NOT AVAILABLE ON TRIG MODEL #4080)

*How many blocks (block size 8" x 16") will you need to build a retaining wall measuring 8' x 22'?*

KEYSTROKE

DISPLAY

**On/C** **On/C**  
**8** **Feet** **X** **2** **2** **Feet** **=**  
**Conv** **Length** (Blocks)

0.  
176. SQ FEET  
BLKS 198.

## Board Feet and Cost

*Find the total Board Feet for the following boards: 2 x 4 x 16, 2 x 10 x 18 and 2 x 12 x 20. What is the total cost at \$275 per MBM?*

(Cont'd)

(Cont'd)

KEYSTROKE	DISPLAY
<b>On/C</b> <b>On/C</b>	0.
<b>2</b> <b>X</b> <b>4</b> <b>X</b> <b>1</b> <b>6</b> <b>Conv</b> <b>8</b> <b>M+</b>	BDFT 10.66667 <b>M</b>
<b>2</b> <b>X</b> <b>1</b> <b>0</b> <b>X</b> <b>1</b> <b>8</b> <b>Conv</b> <b>8</b> <b>M+</b>	BDFT 30. <b>M</b>
<b>2</b> <b>X</b> <b>1</b> <b>2</b> <b>X</b> <b>2</b> <b>0</b> <b>Conv</b> <b>8</b> <b>M+</b>	BDFT 40. <b>M</b>
<b>Rcl</b> <b>Rcl</b>	BDFT 80.66667
<b>X</b> <b>2</b> <b>7</b> <b>5</b> <b>Conv</b> <b>0</b> (Cost)	\$22. <sup>18</sup>

## Circle Area and Circumference

*Find the area and circumference of a circle with a diameter of 25 Inches:*

KEYSTROKE	DISPLAY
<b>On/C</b> <b>On/C</b>	0.
<b>2</b> <b>5</b> <b>Inch</b> <b>Circ</b>	DIA 25 INCH
<b>Circ</b>	AREA 490.8739 SQ INCH
<b>Circ</b>	CIRC 78-9/16 INCH

## Circle/Arc Properties

*Find Arc properties given a 5-foot diameter and an Arc length of 3 Feet 3 Inches:*

KEYSTROKE	DISPLAY
1. Enter Circle diameter and Arc length:	
<b>On/C</b> <b>On/C</b>	0.
<b>5</b> <b>Feet</b> <b>Circ</b>	DIA 5 FEET 0 INCH
<b>3</b> <b>Feet</b> <b>3</b> <b>Inch</b> <b>Arc</b>	ARC 3 FEET 3 INCH

2. Find Degree of Arc, Chord Length, Segment Area, Pie Slice Area and Segment Rise:

<b>Arc</b>	<b>ARC 74.48°</b>
<b>Arc</b>	<b>CORD 3 FEET 0-5/16 INCH</b>
<b>Arc</b>	<b>SEG 1.051381 SQ FEET</b>
<b>Arc</b>	<b>PIE 4.0625 SQ FEET</b>
<b>Arc</b>	<b>RISE 0 FEET 6-1/8 INCH*</b>

\*You may also find arched segment wall stud sizes, based on the stored o.c. After the segment rise, the calculator will display the stored o.c., then calculate the stud sizes with each successive press of the **Arc** key. See large User's Guide for example.

## Compound Miter

If the wall corner angle is 60° and the spring (crown) angle is 38°, find the miter angle and bevel angle for installing crown moulding:

KEYSTROKE	DISPLAY
<b>On/C</b> <b>On/C</b>	<b>0.</b>
<b>3</b> <b>8</b> <b>Stor</b> <b>Comp Miter</b>	<b>SPRG</b> <b>STORED</b> <b>38.00°</b>
<b>6</b> <b>0</b> <b>Comp Miter</b>	<b>MITR</b> <b>46.84°</b>
<b>Comp Miter</b>	<b>BEVL</b> <b>43.03°</b>
<b>Comp Miter</b>	<b>SPRG</b> <b>STORED</b> <b>38.00°</b>
<b>Comp Miter</b>	<b>CRNR</b> <b>60.00°</b>

## Concrete Columns

---

Find the total Cubic Yards and Tons of concrete (using 1.5 tons per cu. yd) required for three (3) columns, each with a diameter of 5 Feet 2-3/4 Inches and a height of 10 Feet:

### KEYSTROKE

### DISPLAY

---

1. Recall stored Weight per Volume:

**On/C** **On/C** 0.  
**Rcl** **0** **STORED** 1.5 Ton Per CU YD

2. Enter diameter:

**5** **Feet** **2** **Inch** **3** **/** **4** **Circ**  
DIA 5 FEET 2-3/4 INCH

3. Find total volume:

**1** **0** **Feet** **Height** **Conv** **Circ** (Column/Cone)  
COL 214.7607 CU FEET  
**Conv** **Yds** 7.954101 CU YD  
**X** **3** **=** 23.8623 CU YD

4. Convert to tons:

**Conv** **6** (ton) 35.79345 Ton

Trig Model (#4080) Users: As this model does not have a **Height** key, you must enter the height using the **Rise** key.

## Concrete Footings (NOT AVAILABLE ON TRIG MODEL #4080)

---

*Find the volume of concrete required for an 8" x 16" footing that measures 100 Feet in length:*

KEYSTROKE	DISPLAY
<b>On/C</b> <b>On/C</b>	0.
<b>8</b> <b>Inch</b> <b>X</b> <b>1</b> <b>6</b> <b>Inch</b> <b>=</b>	128. SQ INCH
<b>Stor</b> <b>6</b> <b>F-AR</b> <b>STORED</b>	128. SQ INCH
<b>1</b> <b>0</b> <b>0</b> <b>Feet</b> <b>Conv</b> <b>Width</b> (Footing)	FTG 3.292181 CU YD

## Concrete Volume for Driveway

---

*Calculate the Cubic Yards of concrete required to pour a driveway that measures: 45 Feet 5 Inches long x 13 Feet 6 Inches wide x 5 Inches deep. If concrete is \$65 per Cubic Yard, what will it cost?*

KEYSTROKE	DISPLAY
<b>On/C</b> <b>On/C</b>	0.
<b>4</b> <b>5</b> <b>Feet</b> <b>5</b> <b>Inch</b>	45 FEET 5 INCH
<b>X</b> <b>1</b> <b>3</b> <b>Feet</b> <b>6</b> <b>Inch</b>	13 FEET 6 INCH
<b>X</b> <b>5</b> <b>Inch</b> <b>=</b>	9.461806 CU YD
<b>X</b> <b>6</b> <b>5</b> <b>Conv</b> <b>0</b> (Cost)	\$615. <sup>02</sup> (total cost)

## Converting D:M:S

*Convert 23° 42' 39" to decimal degrees:*

KEYSTROKE	DISPLAY
<b>On/C</b> <b>On/C</b>	0.
<b>2</b> <b>3</b> <b>◦</b> <b>4</b> <b>2</b> <b>′</b> <b>3</b> <b>9</b>	<b>DMS</b> 23.42.39
<b>Conv</b> <b>◦</b> ( <i>dms</i> $\leftrightarrow$ <i>deg</i> )	23.71°

## Drywall

**(NOT AVAILABLE ON TRIG MODEL #4080)**

*Find the number of 4 x 8, 4 x 9 and 4 x 12 sheets needed to cover an area of 125 Square Feet:*

KEYSTROKE	DISPLAY
<b>On/C</b> <b>On/C</b>	0.
<b>1</b> <b>2</b> <b>5</b> <b>Feet</b> <b>Feet</b>	125 SQ FEET
<b>Conv</b> <b>Height</b> ( <i>Drywall</i> )	<b>4X8</b> 3.90625
<b>Height</b>	<b>4X9</b> 3.472222
<b>Height</b>	<b>4X12</b> 2.604167

## Polygon — Brick Paving

*Find the Full Angle, Bi-sect Angle, Side Length, Perimeter and Area of a Polygon for paving a brick patio. The radius is 7 Feet 5 Inches and the number of sides is five:*



KEYSTROKE DISPLAY

---

**On/C On/C** 0.  
**7 Feet 5 Inch Conv Arc** (Radius) RAD 7 FEET 5 INCH  
**5 Conv Run** (Polygon) FULL 108.00°  
**Run** HALF 54.00°  
**Run** SIDE 8 FEET 8-5/8 INCH  
**Run** PER 43 FEET 7-1/8 INCH  
**Run** AREA 130.7868 SQ FEET

## Roofing Materials

---

*Find the roof area, number of roofing squares and bundles of shingles, stored bundles size, and number of 4 x 8 sheets needed for an 8" pitched roof covering a floor size of 15' x 13':*

KEYSTROKE DISPLAY

---

**On/C On/C** 0.  
**8 Inch Pitch** PTCH 8 INCH  
**1 5 Feet X 1 3 Feet =** 195. SQ FEET  
**Conv Diag** (Roof) ROOF 234.3608 SQ FEET  
**Diag** SQRS 2.34  
**Diag** BNDL 7.03  
**Diag** B-SZ 33.33  
**Diag** 4X8 7.32

## Squaring-Up a Foundation

*Square-up a 15' 6" x10' 2" foundation:\**

KEYSTROKE	DISPLAY
<b>On/C</b> <b>On/C</b>	0.
<b>1</b> <b>5</b> <b>Feet</b> <b>6</b> <b>Inch</b> <b>Length</b>	LNTH 15 FEET 6 INCH
<b>1</b> <b>0</b> <b>Feet</b> <b>2</b> <b>Inch</b> <b>Width</b>	WDTH 10 FEET 2 INCH
<b>Width</b> <b>Width</b>	SQUP 18 FEET 6-7/16 INCH

### \*Alternative Method, or for Trig model (#4080) Owners:

*Square-up a 15' 6" x10' 2" foundation.*

KEYSTROKE	DISPLAY
<b>On/C</b> <b>On/C</b>	0.
<b>1</b> <b>5</b> <b>Feet</b> <b>6</b> <b>Inch</b> <b>Run</b>	RUN 15 FEET 6 INCH
<b>1</b> <b>0</b> <b>Feet</b> <b>2</b> <b>Inch</b> <b>Rise</b>	RISE 10 FEET 2 INCH
<b>Diag</b>	DIAG 18 FEET 6-7/16 INCH

## Studs

---

*Find the number of 16-inch On-center studs\* required for a wall measuring 25 feet in length:*

KEYSTROKE	DISPLAY
<b>On/C</b> <b>On/C</b>	0.
<b>2</b> <b>5</b> <b>Feet</b> <b>Conv</b> <b>5</b> (Studs)	STUD 20.

*\*If you are working with a number other than 16 Inches On-center, change it via **Stor** **5** (e.g., 18 Inches o.c., enter **1** **8** **Inch** **Stor** **5**), then recalculate above).*

# RIGHT ANGLE/FRAMING

## Pitch — *Converting Roof Angle*

*Find the % Grade, Slope and Pitch in Inches if the roof angle is 30.25°:*

KEYSTROKE

DISPLAY

**On/C** **On/C**

0.

**3** **0** **◦** **2** **5** **Pitch**

PTCH 30.25°

**Pitch**

%GRD 58.31828

**Pitch**

SLP 0.583183

**Pitch**

PTCH 7 INCH

## Converting Slope

*Find the Pitch in Inches, Pitch Degrees, and Percent Grade if the slope is 0.625:*

KEYSTROKE

DISPLAY

**On/C** **On/C**

0.

**◦** **6** **2** **5** **Conv** **Pitch** (Slope)

SLP 0.625

**Pitch**

PTCH 7-1/2 INCH

**Pitch**

PTCH 32.01°

**Pitch**

%GRD 62.5

## Angle — *Rise and Hypotenuse Known*

(TRIG #4080 AND DESKTOP #44080 MODELS ONLY)

*Find the angle that connects the Rise and Hypotenuse of a Right Triangle, if the Rise is 6 Feet and the Hypotenuse is 10 Feet in length:*

**KEYSTROKE****DISPLAY**

1. Use trigonometry formula (divide the rise by the hypotenuse):

**On/C** **On/C** 0.

**6** **Feet** **÷** **1** **0** **Feet** **=** 0.6

2. Solve for angle or degrees:minutes:seconds:

**Conv** **Cos** ( $\cos^{-1}$ ) 53.13°

**Conv** **◻** ( $dms \leftrightarrow deg$ ) **DMS** 53.07.48

## **Common Rafter Length**

---

Find the point-to-point length of the Common rafter on a 7/12-pitched roof with a span of 28 Feet. What are the angle cuts?

**KEYSTROKE****DISPLAY**

1. Enter Pitch:

**On/C** **On/C** 0.

**7** **Inch** **Pitch** **PTCH** 7 INCH

2. Enter half the span as the run:

**2** **8** **Feet** **÷** **2** **=** 14 FEET 0 INCH

**Run** **RUN** 14 FEET 0 INCH

3. Find the Common and cuts:

**Diag** **DIAG** 16 FEET 2-1/2 INCH

**Diag** **PLMB** 30.26°

**Diag** **LEVL** 59.74°

## Regular Hip/Valley and Jack Rafters

*A roof's Pitch is 9/12 and half the total span is 6 Feet. Find the lengths of the Common, Hip/Valley and Jack rafters. Also find the incremental jack adjustment and the cut angles. (Jack rafters at 16" On-center spacing.)*

### KEYSTROKE

### DISPLAY

1. Find the Common rafter length:

<b>On/C</b>	<b>On/C</b>		<b>0.</b>
<b>6</b>	<b>Feet</b>	<b>Run</b>	<b>RUN 6 FEET 0 INCH</b>
<b>9</b>	<b>Inch</b>	<b>Pitch</b>	<b>PTCH 9 INCH</b>
<b>Diag</b>	<b>(Common)</b>	<b>DIAG</b>	<b>7 FEET 6 INCH</b>

2. Find the Hip/Valley rafter length and cut angles; then the incremental jack adjustment, Jack rafter lengths and cut angles:

<b>Hip/V</b>	<b>H/V</b>	<b>9 FEET 7-1/4 INCH</b>
<b>Hip/V</b>	<b>PLMB</b>	<b>27.94°</b>
<b>Hip/V</b>	<b>LEVL</b>	<b>62.06°</b>
<b>Hip/V</b>	<b>CHK1</b>	<b>45.00°</b>
<b>Jack</b>	<b>JKOC</b>	<b>STORED 16 INCH</b>
<b>Jack</b>	<b>INCR</b>	<b>1 FEET 8 INCH</b>
<b>Jack</b>	<b>JK 1</b>	<b>5 FEET 10 INCH</b>
<b>Jack</b>	<b>JK 2</b>	<b>4 FEET 2 INCH</b>
<b>Jack</b>	<b>JK 3</b>	<b>2 FEET 6 INCH</b>

<b>Jack</b>	<b>JK 4 0 FEET 10 INCH</b>
<b>Jack</b>	<b>JK 5 0 FEET 0 INCH</b>
<b>Jack</b>	<b>PLMB 36.87°</b>
<b>Jack</b>	<b>LEVL 53.13°</b>
<b>Jack</b>	<b>CHK1 45.00°</b>

## Irregular Hip/Valley

*A roof has a 9/12 Pitch, an irregular Pitch of 8/12, and half the span is 6 Feet 7 Inches. Solve the Hip/Valley length. On-center spacing is 16 Inches.*

KEYSTROKE	DISPLAY
-----------	---------

1. Find Common rafter length:

<b>On/C</b> <b>On/C</b>	<b>0.</b>
<b>9</b> <b>Inch</b> <b>Pitch</b>	<b>PTCH 9 INCH</b>
<b>6</b> <b>Feet</b> <b>7</b> <b>Inch</b> <b>Run</b>	<b>RUN 6 FEET 7 INCH</b>
<b>Diag</b>	<b>DIAG 8 FEET 2-3/4 INCH</b>

2. Enter On-center spacing and irregular Pitch; find irregular Hip rafter:

<b>1</b> <b>6</b> <b>Inch</b> <b>Stor</b> <b>5</b> (o.c.)	<b>OC</b> <b>STORED</b> <b>16 INCH</b>
<b>8</b> <b>Inch</b> <b>Conv</b> <b>Hip/V</b> (lr/Pitch)	<b>IPCH 8 INCH</b>
<b>Hip/V</b>	<b>IH/V 11 FEET 0-7/8 INCH</b>

## Rake-Wall – No Base

Find each stud size in a Rake-Wall with a peak of 3 Feet 6 Inches, and a length of 5 Feet. Use 16 Inches as your On-center spacing (default; already stored):

**KEYSTROKE**

**DISPLAY**

1. Enter Rise and Run:

<b>On/C</b>	<b>On/C</b>				<b>0.</b>
<b>3</b>	<b>Feet</b>	<b>6</b>	<b>Inch</b>	<b>Rise</b>	<b>RISE 3 FEET 6 INCH</b>
<b>5</b>	<b>Feet</b>		<b>Run</b>		<b>RUN 5 FEET 0 INCH</b>

2. Find stud lengths:

<b>Conv</b>	<b>Rise</b>	<i>(R/Wall)</i>			
			<b>RWOC</b>	<b>STORED</b>	<b>16 INCH</b>
<b>Rise</b>			<b>RW 1</b>		<b>2 FEET 6-13/16 INCH</b>
<b>Rise</b>			<b>RW 2</b>		<b>1 FEET 7-5/8 INCH</b>
<b>Rise</b>			<b>RW 3</b>		<b>0 FEET 8-3/8 INCH</b>
<b>Rise</b>			<b>BASE</b>		<b>0 FEET 0 INCH</b>

3. Find Rake-Wall angle of incline:

<b>Rise</b>					<b>RW 34.99°</b>
-------------	--	--	--	--	------------------



## Rake-Wall – With Base

Find each stud size in a Rake-Wall with a peak of 4 Feet, a length of 8 Feet, and a base of 5 Feet. Use 16 Inches as your On-center spacing:

**KEYSTROKE**

**DISPLAY**

1. Enter Rise and Run:

<b>On/C</b>	<b>On/C</b>	<b>0.</b>
<b>4</b>	<b>Feet Rise</b>	<b>RISE 4 FEET 0 INCH</b>
<b>8</b>	<b>Feet Run</b>	<b>RUN 8 FEET 0 INCH</b>

2. Enter base and find stud lengths and angle of incline:

<b>5</b>	<b>Feet Conv Rise</b>	<b>(R/Wall)</b>	<b>BASE 5 FEET 0 INCH</b>
<b>Rise</b>			<b>RWOC <b>STORED</b> 16 INCH</b>
<b>Rise</b>			<b>RW 1 8 FEET 4 INCH</b>
<b>Rise</b>			<b>RW 2 7 FEET 8 INCH</b>
<b>Rise</b>			<b>RW 3 7 FEET 0 INCH</b>
<b>Rise</b>			<b>RW 4 6 FEET 4 INCH</b>
<b>Rise</b>			<b>RW 5 5 FEET 8 INCH</b>
<b>Rise</b>			<b>BASE 5 FEET 0 INCH</b>
<b>Rise</b>			<b>RW 26.57°</b>

# STAIRS

## Stairs — Given Rise and Run

You're going to build a stairway that has a floor-to-floor height of 10 Feet 1 Inch, a run of 12 Feet 5 Inches, and a desired riser height of 7-1/2 Inches (default). Find the stair values:

### KEYSTROKE

### DISPLAY

1. Enter rise and run:

**On/C** **On/C** 0.

**1** **0** **Feet** **1** **Inch** **Rise**  
RISE 10 FEET 1 INCH

**1** **2** **Feet** **5** **Inch** **Run**  
RUN 12 FEET 5 INCH

2. Recall stored 7-1/2" desired riser height, then find the stair values:

**Rcl** **7** R-HT **STORED** 7-1/2 INCH

**Stair** R-HT  7-9/16 INCH

**Stair** RSRS 16.

**Stair** R+/- 0 INCH

**Stair** T-WD  9-15/16 INCH

**Stair** TRDS 15.

**Stair** T+/- 0-1/16 INCH

**Stair** OPEN 9 FEET 10-1/4 INCH

**Stair** STRG 15 FEET 7-5/16 INCH

**Stair** INCL 37.27°

## Stairs — Given Rise Only

You're building a stairway with a total rise of 9 Feet 11 Inches. Using the default riser height of 7-1/2 Inches and tread width of 10 Inches, find the stair values:

KEYSTROKE

DISPLAY

1. Enter known Rise:

**On/C** **On/C**

0.

**9** **Feet** **1** **1** **Inch** **Rise**

**RISE 9 FEET 11 INCH**

2. Recall stored desired stair riser height:

**Rcl** **7**

**R-HT** **STORED** **7-1/2 INCH**

3. Recall stored desired stair tread width:

**Rcl** **9**

**T-WD** **STORED** **10 INCH**

4. Find stair values:

**Stair**

**R-HT 7-7/16 INCH**

**Stair**

**RSRS 16.**

**Stair**

**R+/- 0 INCH**

**Stair**

**T-WD** **STORED** **10 INCH**

**Stair**

**TRDS 15.**

**Stair**

**T+/- 0 INCH**

**Stair**

**OPEN 10 FEET 1 INCH**

**Stair**

**STRG 15 FEET 6-15/16 INCH**

**Stair**

**INCL 36.64°**

## Stairs — Riser Limited Function

Calculate stairs using the Riser Limited function, if you must limit the Riser Size to 7-1/2 Inches:

KEYSTROKE	DISPLAY
-----------	---------

1. Enter Rise and Run:

<b>On/C</b>	<b>On/C</b>	0.
-------------	-------------	----

<b>1</b>	<b>0</b>	<b>Feet</b>	<b>1</b>	<b>Inch</b>	<b>Rise</b>	
						<b>RISE 10 FEET 1 INCH</b>

<b>1</b>	<b>2</b>	<b>Feet</b>	<b>5</b>	<b>Inch</b>	<b>Run</b>	
						<b>RUN 12 FEET 5 INCH</b>

2. Recall stored 7-1/2" Desired Riser height and find stair values:

<b>Rcl</b>	<b>7</b>	<b>R-HT</b>	<b>STORED</b>	7-1/2 INCH
------------	----------	-------------	---------------	------------

<b>Conv</b>	<b>Stair</b>	(Riser Limited)		
-------------	--------------	-----------------	--	--

<b>R-HT</b>	7-1/8 INCH
-------------	------------

<b>Stair</b>	<b>RSRS</b>	17.
--------------	-------------	-----

<b>Stair</b>	<b>R+/-</b>	0-1/8 INCH
--------------	-------------	------------

<b>Stair</b>	<b>T-WD</b>	<b>!</b>	9-5/16 INCH
--------------	-------------	----------	-------------

<b>Stair</b>	<b>TRDS</b>	16.
--------------	-------------	-----

<b>Stair</b>	<b>T+/-</b>	0 INCH
--------------	-------------	--------

<b>Stair</b>	<b>OPEN</b>	9 FEET 9-5/8 INCH
--------------	-------------	-------------------

<b>Stair</b>	<b>STRG</b>	15 FEET 7-5/8 INCH
--------------	-------------	--------------------

<b>Stair</b>	<b>INCL</b>	37.42°
--------------	-------------	--------

# DEFAULT SETTINGS

After a *Clear All* (**Conv** **X**), your calculator will return to the following settings:

<u>STORED VALUES</u>	<u>DEFAULT VALUE</u>
Desired Riser Height	7-1/2 INCH
Desired Tread Width	10 INCH
Floor Height	10 INCH
On-center Spacing	16 INCH
Weight per Volume	1.5 Ton Per CU YD
Block Area ( <i>except Trig model</i> )	128. SQ INCH
Block Length ( <i>except Trig model</i> )	16 INCH
Footing Area ( <i>except Trig model</i> )	264. SQ INCH
Spring (crown) Angle	45.00°

If you replace your batteries or perform a *Full Reset*\* (press **Off**, hold down **X**, and press **On/C**), your calculator will return to the following settings (in addition to those listed above):

<u>PREFERENCE SETTINGS</u>	<u>DEFAULT VALUE</u>
Fractional Resolution	1/16
Area Display	Standard
Volume Display	Standard

(Cont'd)

(Cont'd)

<u>PREFERENCE SETTINGS</u>	<u>DEFAULT VALUE</u>
Stairway Headroom	6 feet 8 inch
Rake-Wall	Descending
Arched Wall	Outside
Jack Rafters	Descending
Irregular Jack Spacing	OC-OC
Exponent	Off
Meter Linear Display	0.000
Decimal Degree Display	0.00°
Fractional Mode	Standard

*\*Depressing the Reset button located above the **Pitch** key will also perform a Full Reset.*





This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC rules.

Pocket Reference Guide copyrighted by Calculated Industries, Inc. © 2023.

Construction Master™ and Calculated Industries® are trademarks and registered trademarks of Calculated Industries, Inc.

ALL RIGHTS RESERVED

CALCULATED INDUSTRIES®

4840 Hytech Drive  
Carson City, NV 89706 USA  
1-800-854-8075 or 1-775-885-4900  
Fax: 1-775-885-4949  
E-mail: [info@calculated.com](mailto:info@calculated.com)  
[www.calculated.com](http://www.calculated.com)

*Designed in the USA*  
*Printed in the Philippines*

03/23



PRG4065E-G