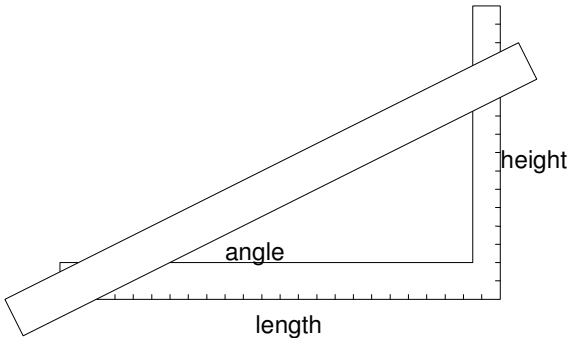
It is hard to get an accurate angle with a protractor. Old time woodworkers traditionally did not have protractors so they used the ratio of two unit values to set an angle. They just remembered the ratios for the angles they used the most. For example a **20**° angle is a ratio, **4** units high and **11** units long, or **4:11**. The table below gives you the ratios for angles from 1° to 45° in 1° increments. (22.5° is also included) As you can see the error is never more than $^{5}/_{100}$ of a degree.



It is easy to set an angle with a carpenter square. Suppose you want **15**°. The table says that is a ratio of **15:56**. Set the length to **14" (56/4)** and the height to **3¾" (15/4)**, clamp a straight edge to the square, and you have **15**°. You could also set the length to **21" (56*3/8)** and the height **to 5⅝" (15*3/8")**. Choose the values that best fit your application making sure to keep the ratio to **15:56** for **15**°.

Angle	*Ratio*	*Error*
1°	1 : 56	*+.02°*
2°	1 : 28	*+.05°*
3°	1 : 19	*+.01°*
4°	2 : 29	*-.05°*
5°	3 : 34	*.04°*
6°	2 : 19	*+.01°*
7°	7 : 57	*0°*
8°	7 : 50	*-.03°*
9°	3 : 19	*-.03°*
10°	3 : 17	*+.01°*
11°	6 : 31	*-.05°*
12°	10 : 47	*+.01°*
13°	3 : 13	*-.01°*
14°	1 : 4	*+.04°*
15°	15 : 56	*0°*
16°	2 : 7	*-.05°*
17°	15 : 49	*+.02°*
18°	12 : 37	*-.03°*
19°	10 : 29	*+.03°*
20°	4 : 11	*-.02°*
21°	5 : 13	*+.04°*
22°	19 : 47	*+.01°*
22.5°	12 : 29	*-.02°*

Angle	*Ratio*	*Error*
23°	14 : 33	*-.01°*
24°	4 : 9	*-.04°*
25°	7 : 15	*+.02°*
26°	19 : 39	*-.03°*
27°	24 : 47	*+.05°*
28°	17 : 32	*-.02°*
29°	5 : 9	*+.05°*
30°	15 : 26	*-.02°*
31°	3 : 5	*-.04°*
32°	5 : 8	*+.01°*
33°	13 : 20	*+.02°*
34°	25 : 37	*+.05°*
35°	7 : 10	*-.01°*
36°	8 : 11	*+.03°*
37°	40 : 53	*+.04°*
38°	18 : 23	*+.05°*
39°	17 : 21	*-.01°*
40°	26 : 31	*-.01°*
41°	27 : 31	*+.05°*
42°	9 : 10	*-.01°*
43°	14 : 15	*+.03°*
44°	27 : 28	*-.04°*
45°	1 : 1	*0°*

For angles great than 45° degrees just flip the ratios. **89° is 56:1**, **88°** is **28:1**, etc.