

Curriculum Progression

Example

Resource

A dot moving around a circle.

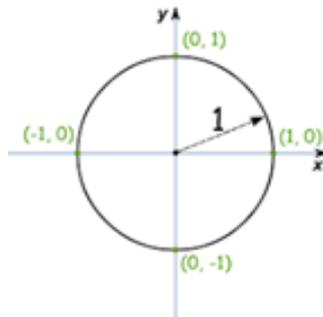


“When is the dot highest? Once this point is agreed, I state that the height of the dot at this

point is 1. I ask When is the dot lowest? Once this is agreed I state that the height at this point is 1. I ask When is the height of the dot zero?”

Take a read of [Dave Hewitt's description](#) on how to introduce this.

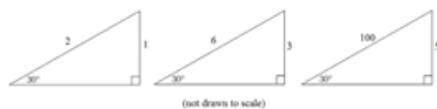
Introduce the unit circle during a geometry unit looking at circumference and area of circles. Also, when labelling of parts of a circle to include the unit circle as a special case. (no reference to Sin, Cos or Tan)



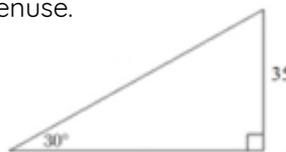
What is the area of this circle?

A [visual demonstration](#) of the area of a circle.

Emphasizing similarity of triangles with a named angle (no reference to Sine, Cosine or Tan).

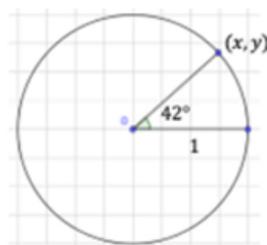


Then show them something like this one and see if they can find the hypotenuse.



An extension with different angles is described in this [blog by Jo Morgan](#).

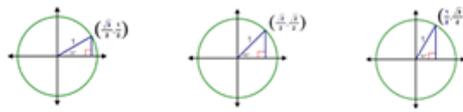
Using Sine and Cosine to find coordinates on the unit circle.



Find these coordinates.

Here is an excellent worksheet designed to build on working with the unit circle with [simple tasks](#) introducing it.

An attempt to develop Pythagoras with a unit circle including some surds for exact values.



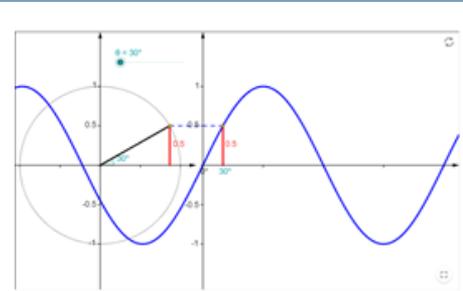
Without calculators developing a sense of the ratios using a table.

Table of trigonometric ratios

Angle	Sine	Cosine	Tangent	Angle	Sine	Cosine	Tangent	Angle	Sine	Cosine	Tangent
1	0.0175	0.9998	0.0175	31	0.5150	0.8572	0.6009	61	0.8746	0.4848	1.8040
2	0.0349	0.9994	0.0350	32	0.5299	0.8480	0.6249	62	0.8829	0.4695	1.8807
3	0.0523	0.9986	0.0524	33	0.5446	0.8367	0.6494	63	0.8932	0.4540	1.9626
4	0.0698	0.9976	0.0699	34	0.5592	0.8239	0.6745	64	0.9000	0.4388	2.0501
5	0.0872	0.9963	0.0875	35	0.5736	0.8102	0.7002	65	0.9033	0.4239	2.1443
6	0.1045	0.9945	0.1051	36	0.5878	0.7956	0.7265	66	0.9135	0.4092	2.2460
7	0.1219	0.9925	0.1228	37	0.6018	0.7802	0.7536	67	0.9205	0.3950	2.3559
8	0.1392	0.9903	0.1403	38	0.6157	0.7641	0.7813	68	0.9272	0.3814	2.4753
9	0.1564	0.9877	0.1584	39	0.6293	0.7473	0.8098	69	0.9336	0.3684	2.6051
10	0.1736	0.9848	0.1763	40	0.6428	0.7300	0.8391	70	0.9397	0.3560	2.7476
11	0.1908	0.9816	0.1944	41	0.6561	0.7124	0.8693	71	0.9455	0.3442	2.9042
12	0.2079	0.9781	0.2126	42	0.6693	0.6945	0.9004	72	0.9511	0.3330	3.0777
13	0.2250	0.9744	0.2295	43	0.6823	0.6764	0.9325	73	0.9564	0.3224	3.2709
14	0.2419	0.9705	0.2489	44	0.6952	0.6581	0.9657	74	0.9613	0.3124	3.4874
15	0.2588	0.9664	0.2697	45	0.7079	0.6396	1.0000	75	0.9659	0.3030	3.7321
16	0.2756	0.9621	0.2927	46	0.7205	0.6209	1.0355	76	0.9703	0.2943	4.0008
17	0.2924	0.9576	0.3087	47	0.7329	0.6021	1.0724	77	0.9744	0.2862	4.2935
18	0.3090	0.9529	0.3260	48	0.7451	0.5832	1.1106	78	0.9781	0.2787	4.6146
19	0.3256	0.9480	0.3443	49	0.7571	0.5642	1.1504	79	0.9816	0.2718	4.9688
20	0.3420	0.9429	0.3640	50	0.7689	0.5451	1.1928	80	0.9848	0.2656	5.3519
21	0.3584	0.9376	0.3850	51	0.7805	0.5259	1.2380	81	0.9877	0.2600	5.7718
22	0.3746	0.9321	0.4070	52	0.7919	0.5066	1.2851	82	0.9903	0.2550	6.2354
23	0.3907	0.9264	0.4303	53	0.8031	0.4872	1.3351	83	0.9925	0.2506	6.7493
24	0.4067	0.9205	0.4549	54	0.8141	0.4677	1.3880	84	0.9945	0.2468	7.3194
25	0.4226	0.9144	0.4807	55	0.8249	0.4481	1.4439	85	0.9962	0.2436	7.9519
26	0.4384	0.9081	0.5077	56	0.8355	0.4284	1.5028	86	0.9976	0.2409	8.6527
27	0.4540	0.9016	0.5359	57	0.8459	0.4086	1.5648	87	0.9986	0.2387	9.4381
28	0.4695	0.8950	0.5653	58	0.8561	0.3887	1.6300	88	0.9994	0.2369	10.3163
29	0.4848	0.8882	0.5960	59	0.8661	0.3688	1.6984	89	0.9998	0.2355	11.2950
30	0.5000	0.8660	0.5774	60	0.8660	0.3000	1.7321	90	1.0000	0.0000	undefined

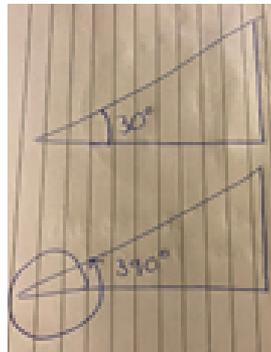
Dan Walker has an [excellent set of PowerPoint slides](#) that also contain this table for use for the students.

Sine, Cosine, Tangent functions and their graphs related to unit circle along with exact values.



Try this [interactive app](#) to demonstrate this.

By using the anticlockwise rotation on a unit circle students can also appreciate the cyclic nature of trigonometry.



Find $\tan(30)$.
Find $\tan(390)$.
Why is this the same? What does this sketch tell you?

Chris McGrane's [blog](#) contains some similar thoughts on introducing trigonometry.