

Curriculum Progression

Example

Resource

A dot moving around a circle.

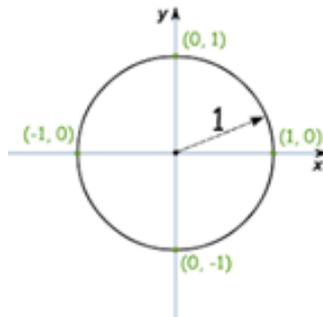


“When is the dot highest? Once this point is agreed, I state that the height of the dot at this

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.

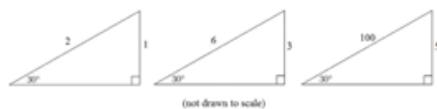
Introduce the unit circle during a geometry unit looking at circumference and area of circles. Also, when labelling of parts of a circle to include the unit circle as a special case. (no reference to Sin, Cos or Tan)



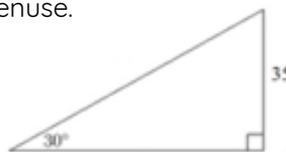
What is the area of this circle?

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

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

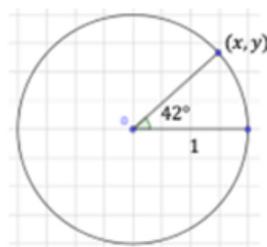


Then show them something like this one and see if they can find the hypotenuse.



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

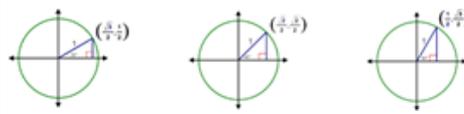
Using Sine and Cosine to find coordinates on the unit circle.



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.



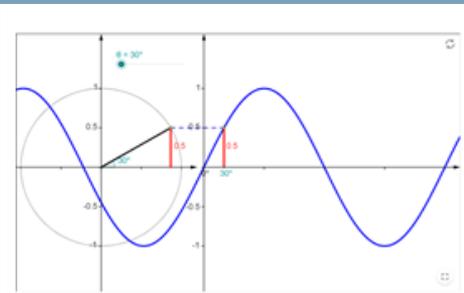
Without calculators developing a sense of the ratios using a table.

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	0.0349	32	0.5299	0.8480	0.6249	62	0.8829	0.4695	1.8807
3	0.0523	0.9986	0.0524	33	0.5446	0.8377	0.6494	63	0.8933	0.4540	1.9613
4	0.0698	0.9976	0.0699	34	0.5592	0.8260	0.6745	64	0.9000	0.4384	2.0501
5	0.0872	0.9963	0.0875	35	0.5736	0.8131	0.7002	65	0.9033	0.4236	2.1465
6	0.1045	0.9945	0.1051	36	0.5878	0.8000	0.7265	66	0.9135	0.4087	2.2480
7	0.1219	0.9925	0.1228	37	0.6018	0.7868	0.7536	67	0.9205	0.3957	2.3559
8	0.1392	0.9903	0.1403	38	0.6157	0.7735	0.7813	68	0.9272	0.3836	2.4715
9	0.1564	0.9877	0.1584	39	0.6293	0.7591	0.8096	69	0.9316	0.3724	2.6051
10	0.1736	0.9848	0.1763	40	0.6428	0.7436	0.8385	70	0.9337	0.3620	2.7476
11	0.1908	0.9816	0.1944	41	0.6561	0.7271	0.8689	71	0.9435	0.3524	2.9042
12	0.2079	0.9781	0.2126	42	0.6693	0.7098	0.9008	72	0.9511	0.3436	3.0777
13	0.2250	0.9744	0.2299	43	0.6823	0.6918	0.9343	73	0.9563	0.3354	3.2709
14	0.2419	0.9705	0.2493	44	0.6951	0.6733	0.9697	74	0.9613	0.3276	3.4874
15	0.2588	0.9665	0.2679	45	0.7077	0.6543	1.0080	75	0.9659	0.3202	3.7321
16	0.2756	0.9623	0.2867	46	0.7201	0.6347	1.0495	76	0.9703	0.3131	4.0008
17	0.2924	0.9580	0.3057	47	0.7324	0.6146	1.0944	77	0.9744	0.3063	4.2976
18	0.3090	0.9535	0.3250	48	0.7445	0.5941	1.1428	78	0.9783	0.3000	4.6246
19	0.3256	0.9488	0.3446	49	0.7564	0.5733	1.1948	79	0.9819	0.2940	4.9846
20	0.3420	0.9440	0.3645	50	0.7681	0.5522	1.2504	80	0.9852	0.2882	5.3815
21	0.3584	0.9390	0.3846	51	0.7797	0.5309	1.3098	81	0.9882	0.2826	5.8198
22	0.3746	0.9338	0.4049	52	0.7911	0.5094	1.3730	82	0.9909	0.2772	6.3154
23	0.3907	0.9285	0.4254	53	0.8023	0.4877	1.4392	83	0.9933	0.2720	6.8643
24	0.4067	0.9231	0.4462	54	0.8133	0.4659	1.5094	84	0.9954	0.2670	7.4714
25	0.4226	0.9176	0.4673	55	0.8241	0.4440	1.5838	85	0.9972	0.2622	8.1405
26	0.4384	0.9120	0.4887	56	0.8347	0.4220	1.6624	86	0.9987	0.2576	8.8767
27	0.4540	0.9063	0.5105	57	0.8451	0.3999	1.7454	87	0.9998	0.2532	9.6851
28	0.4695	0.9005	0.5327	58	0.8553	0.3777	1.8328	88	0.9999	0.2490	10.5715
29	0.4848	0.8946	0.5554	59	0.8653	0.3555	1.9248	89	0.9999	0.2450	11.5415
30	0.5000	0.8660	0.5774	60	0.8660	0.3000	1.7321	90	1.0000	0.0000	undefined

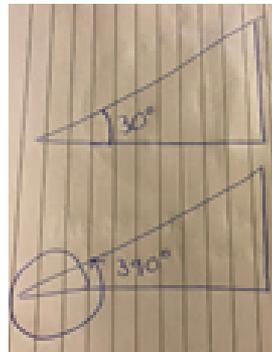
Dan Walker has an [excellent set of PowerPoint slides](#) that also contain this table for use for the students.

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.