Trigonometry test

Maths 3c

Non-calculator section.

Name:_____

1. Complete these sentences.

   a) In any right-angled triangle the sine of an angle is (1 0 0)_____

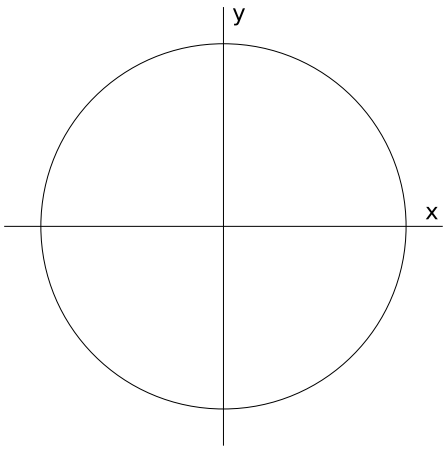
   b) In any right-angled triangle the cosine of an angle is (1 0 0)_____

   c) In the unit circle the sine of an angle is (1 0 0)_____

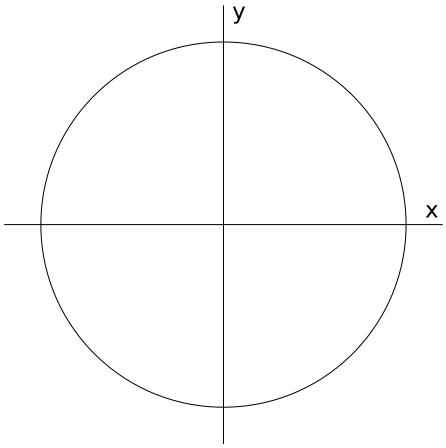
   d) In the unit circle the cosine of an angle is (1 0 0)_____

2. Use these unit circles to draw:

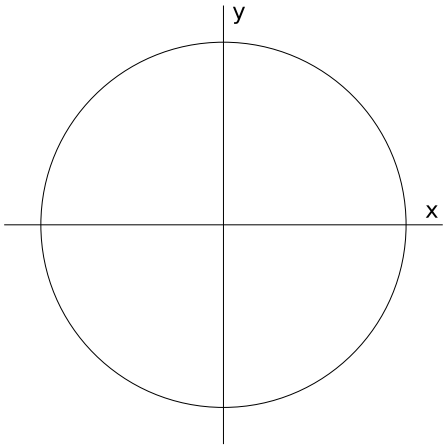
   a) The angle of 30 degrees, marking its sine with an *a* (1 0 0)



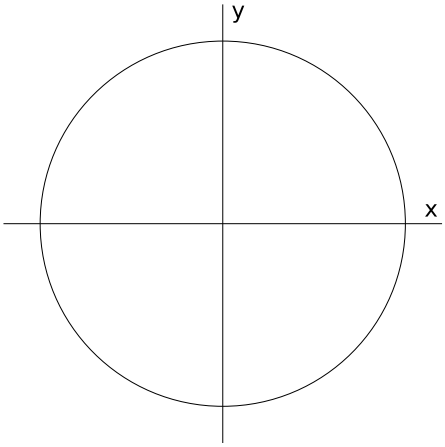
b) The angle of 150 degrees, marking its cosine with a $b(1\ 0\ 0)$



c) The angle of 240 degrees, marking its sine with a $c\ (1\ 0\ 0)$



3. State the exact value of the following sines and cosines (the unit circle is only to help you. You can use it but I won't evaluate what you draw in it)



a) Cosine of 120 (0 1/3 0)

b) Sine of 135 (0 1/3 0)

c) Sine of 180 (0 1/3 0)

d) Cosine of 210 (0 1/3 0)

e) Sine of 225 (0 1/3 0)

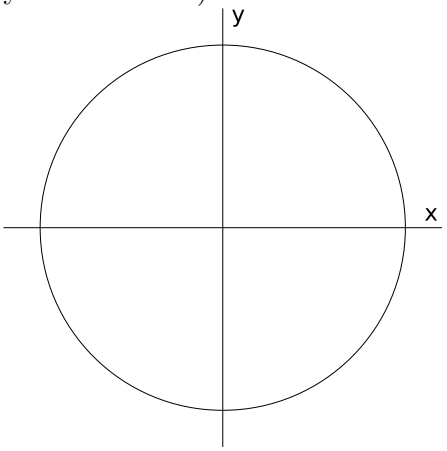
f) Cosine of 240 (0 1/3 0)

g) Cosine of 270 (0 1/3 0)

h) Sine of 315 (0 1/3 0)

i) Cosine of 330 (0 1/3 0)

4. Find an angle that: (the unit circle is only to help you. You can use it but I won't evaluate what you draw in it)



   a) Has the same sine as 8 (0 1 0)

   b) Has the same cosine as 80 (0 1 0)

   c) Has a sine like the cosine of 100 (0 1 0)

   d) Has a cosine like the sine of 170 but negative (0 1 0)

5. Bonus question: What is the sine that appears in only one angle and which angle has it?.(1 0 0)

6. Write the equation of the circle that is centered in the origin and has a radius of 6 (1 0 0)

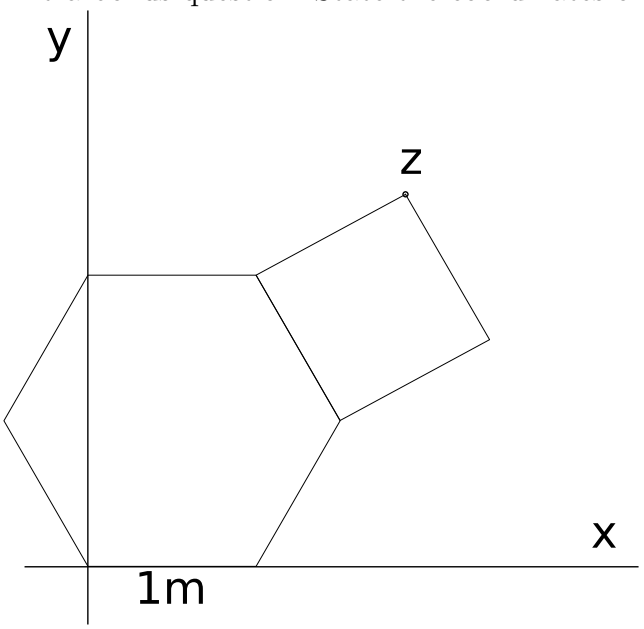
7. Write the equation of the circle that is centered in (5,-8) and has a radius of $\sqrt{3}$ (0 1 0)

8. State the radius and the coordinates of the center of the circles defined by these equations:

a) $5 = \sqrt{(x-2)^2 + (y-3)^2}$ (0 1 0)

b) $x = 7 + \sqrt{9^2 - (y+2)^2}$ (0 0 1)

9. Extra bonus question. State the coordinates of the point Z. (0 0 1)



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Calculator section.

10. Solve the triangle given that A=13, B=10 and C=6 (0 0 1)

11. Solve the triangle given B=15, C=5 and $\alpha = 100$ (0 1 0)

12. The ship Near Home is somewhere near the coast of Portugal (which, for the intends of this exercise we'll consider is a straight line) and can detect two radio beacons. The radio can determine the direction in which the beacons are and the distance too, and it says that the beacon 1, located in the village of Furadouro is 10 Km away and the beacon 2, located in the village of Torreira is 17 Km away. The captain of the Near Home knows that those two villages are 8 Km away from each other. How far from the coast is the Near Home? (0 0 2)

13. The lake Bisar has two communication towers by its shore, one on each side of the lake.
Tower A is 380m high and tower b is 120m high, separated by half a kilometer of lake and both towers have a red pilot light on top.
On calm nights the surface of the lake is so still that two lights can be seen from the top of each tower: the actual pilot light and its reflection in the lake.
Calculate the angle between the visuals of tower B's pilot light and its reflection as seen from the top of tower A. (0 0 1)

14. The French barquentine Harmoni is being pursued by the Spanish frigate Espada. Captain Norimoto (a long-established well-respected French family) of the Harmoni wants to estimate the distance to see if it's gaining or falling behind.
    Captain Norimoto being an experienced navigator, he carries an octant that allows him to measure visual angles, and determines that the Espada occupies 1.5 degrees of his visual.
    If the height above water of the Espada is 39m , at what distance is the Espada of the Harmoni?
    (0 0 1)

15. Find the equation of the circle that contains the points (3,1), (1,-1) and (5,-1) (0 0 1)

16. Bonus question. State the coordinates of point Z. (0 0 1)