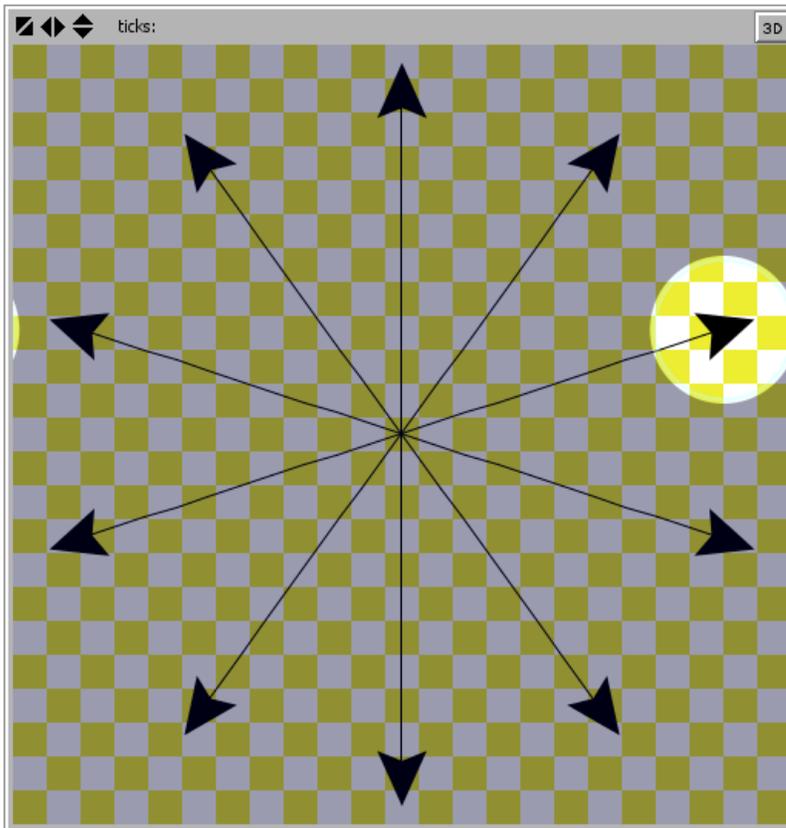


TRIG



1. What is the **heading** of the turtle with WHO number 2? Look at the NetLOGO code or count the turtles to determine what the relevant angle (heading) would be.

360 divided by 10 turtles gives 36 degrees for each turtle. Turtle #2 thus has a heading of 72 degrees.

*(Turtle #0 has heading of 0 degrees, turtle #1 has heading of 36, turtle #3 has heading of 2 * 36 or 72 degrees).*

2. What is the **xcor** of the turtle #2 that is highlighted above? You may use the Windows Calculator. You MUST show all your work and process of arriving at the answer.

CAH the cosine is the adjacent over the hypotenuse. $\text{Cosine}(18) = 0.951 = (\text{adjacent} / 10)$ since 10 is the hypotenuse length of the line that turtle who #2 drew. $\text{ADJ} = (0.951) * 10 = 9.51 = \text{the xcor of the turtle who \#2.}$

$$\cos 18 = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{\text{xcor}}{\text{hyp}} = \frac{\text{xcor}}{10} = 0.309 \text{ and with algebra we have } \text{xcor} = (10)(0.309) = 3.09$$

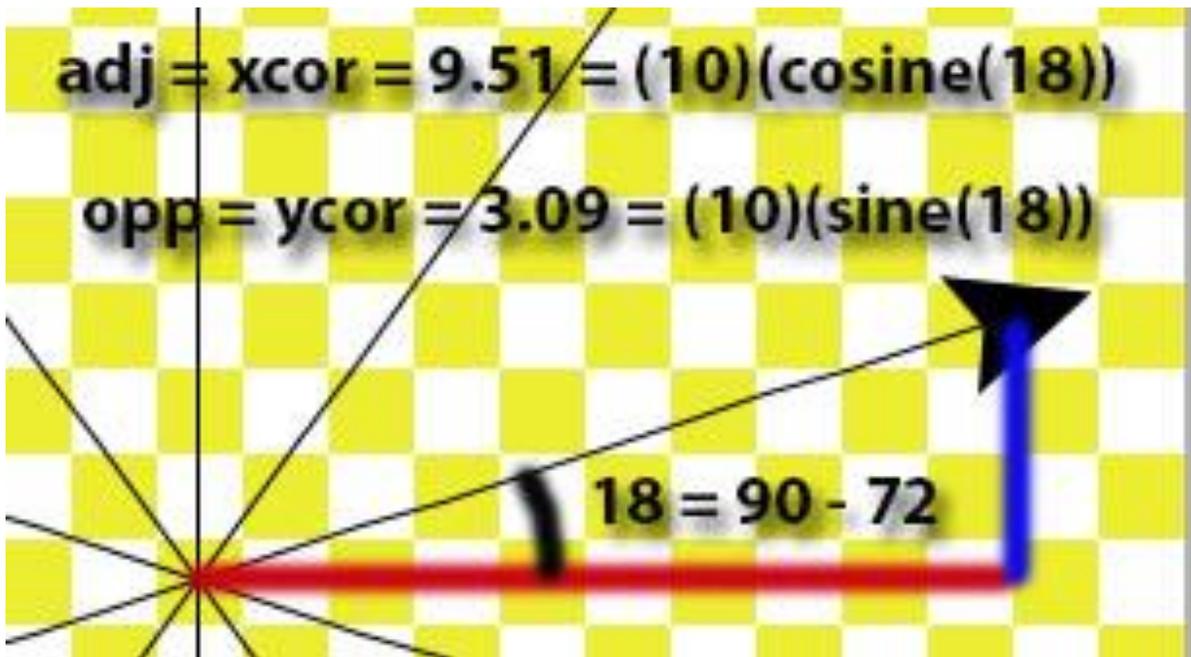
$$\text{adj} = \text{xcor} = 9.51 = (10)(\text{cosine}(18))$$

3. What is the **ycor** of the turtle #2 (turtle with WHO number 2)? Show all your work.

SOH the Sine is the OPPOSITE over the HYPOTENUSE. $\text{SINE}(18) = 0.309$. This SOH for SINE. SOH what, sew what?

$$\text{Sine}(18) = 0.309 = \frac{\text{Opposite}}{\text{Hypotenuse}} = \frac{\text{ycor}}{10} \text{ so } \text{ycor} = 10 \text{ times } 0.309 = 3.09$$

$$\text{opp} = \text{ycor} = 3.09 = (10)(\text{sine}(18))$$



$$\text{adj} = \text{xcor} = 9.51 = (10)(\text{cosine}(18))$$

Think CROW to remember CAH. COS or COSINE is the Adjacent over the Hypotenuse.

$$\text{opp} = \text{ycor} = 3.09 = (10)(\text{sine}(18))$$

SOH the Sine is the OPPOSITE over the HYPOTENUSE. This SOH for SINE. SOH what, sew what?

Think stubbed your TOE to remember **TOA** (Tangent = OPP/HYP = slope).

TANGENT. TANGENT is the SLOPE. The SLOPE is the RISE over the RUN. Think of your car being TOAed or perhaps towed. It is lifted up by the wrecker, which is the RISE above the ground. The length of the car is the hypotenuse. The RUN is the road beneath the car, and that RUN is of course shorter than the length of the car when it is lifted up and being towed (or TOAed). See the right triangle.

$Y = mX + b$ is the equation for a line (Data Flyer).

The slope is m, which is the RISE over the RUN, which is the OPPOSITE over the ADJACENT, which is the

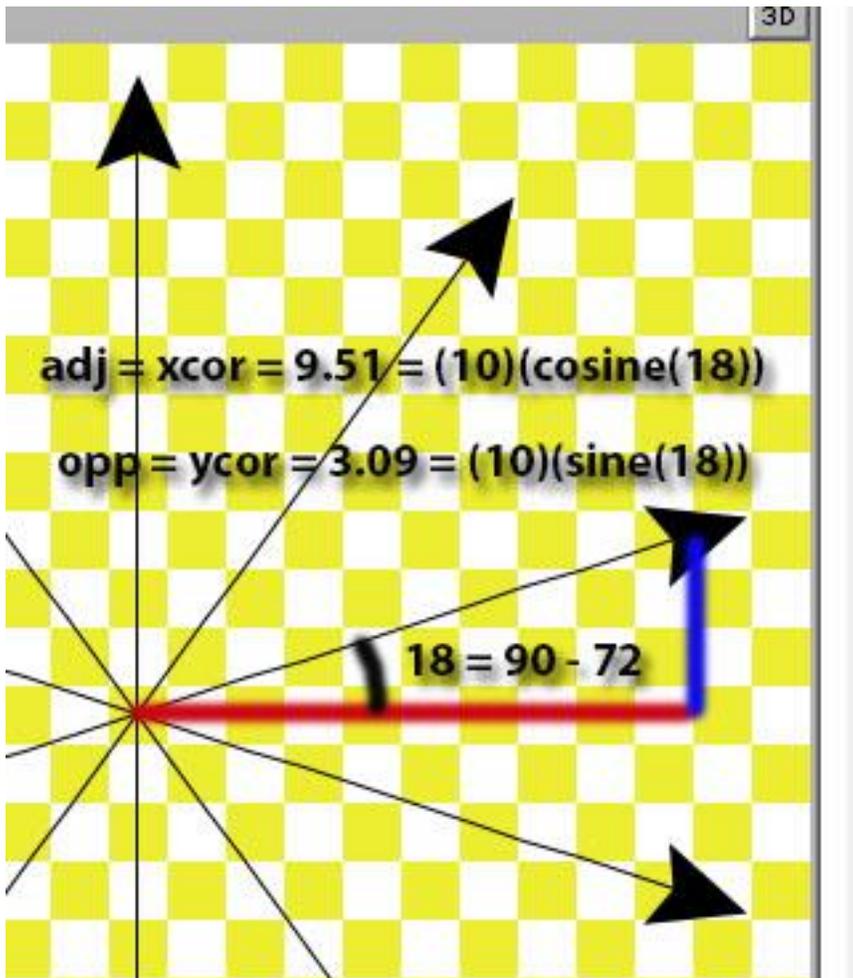
TANGENT or the SLOPE of the HYPOTENUSE of the right triangle.



```
File Edit Tools Zoom Tabs Help
Interface Info Code
Find... Check Procedures Indent automatically
TO TRIG
  ca
  ask patches
  [
    set pcolor white
    if (remainder (pxcor + pycor) 2 = 0)
    [
      set pcolor yellow
    ]
  ]
  cro 10
  ask turtles
  [
    pd
    set size 2
    set color black
    fd 10
  ]
END
```

adj = xcor = 9.51 = (10)(cosine(18))

opp = ycor = 3.09 = (10)(sine(18))



The RED line is the ADJACENT side of the RIGHT triangle.

$$\text{adj} = \text{xcor} = 9.51 = (10)(\text{cosine}(18))$$

The BLUE line is the OPPOSITE side of the RIGHT triangle.

$$\text{opp} = \text{ycor} = 3.09 = (10)(\text{sine}(18))$$

<http://www.shodor.org/interactivate/activities/DataFlyer/>

Finding the slope of a line. Data Flyer tool.

The RISE is the difference between the y's.

The RUN is the difference between the x's.

The SLOPE of a line from point (x_1, y_1) to point (x_2, y_2) is $(y_2 - y_1)/(x_2 - x_1)$, is the RISE/RUN, is the TANGENT. Do not stub your TOE (TOA) on this issue.

What is the **distance** of turtle #2 from the origin point $(0, 0)$? $9.51^2 + 3.09^2 = 90.44 + 9.56 = 100$. $\text{Sqrt}(100) = 10$.