

Graphing Homework # _____

The winter solstice happens around December 21st in the Northern hemisphere. This is the day that the sun is at the lowest angle at noon for the entire year. It is also the day that fewest number of daylight hours in New York. On the winter solstice Long Island experiences 9 hours of daylight and 15 hours of darkness.

The word solstice can be translated as “sun – stop”. The solstice is the day that the sun stops increasing or decreasing in angle at noon. From the summer solstice (June 21st) until the winter solstice (Dec 21st) the sun will become lower each day. The winter solstice is the day the sun reaches the lowest angle. For the next 6 months the sun will become higher each day until the maximum angle is reached on June 21st.

Shadows are affected by the angle of the sun. As the sun gets lower in the sky, shadows become longer. The longest noontime shadow will be cast on the winter solstice. As the sun gets higher the shadows will become shorter. The shortest noontime shadow will happen on June 21st.

The data below give the angle of the sun for an observer at 41°N on December 21st.

What happens to the angle of the sun at noon on the winter solstice? _____

New York has how many hours of daylight on December 21st? _____

What does the word solstice mean? _____

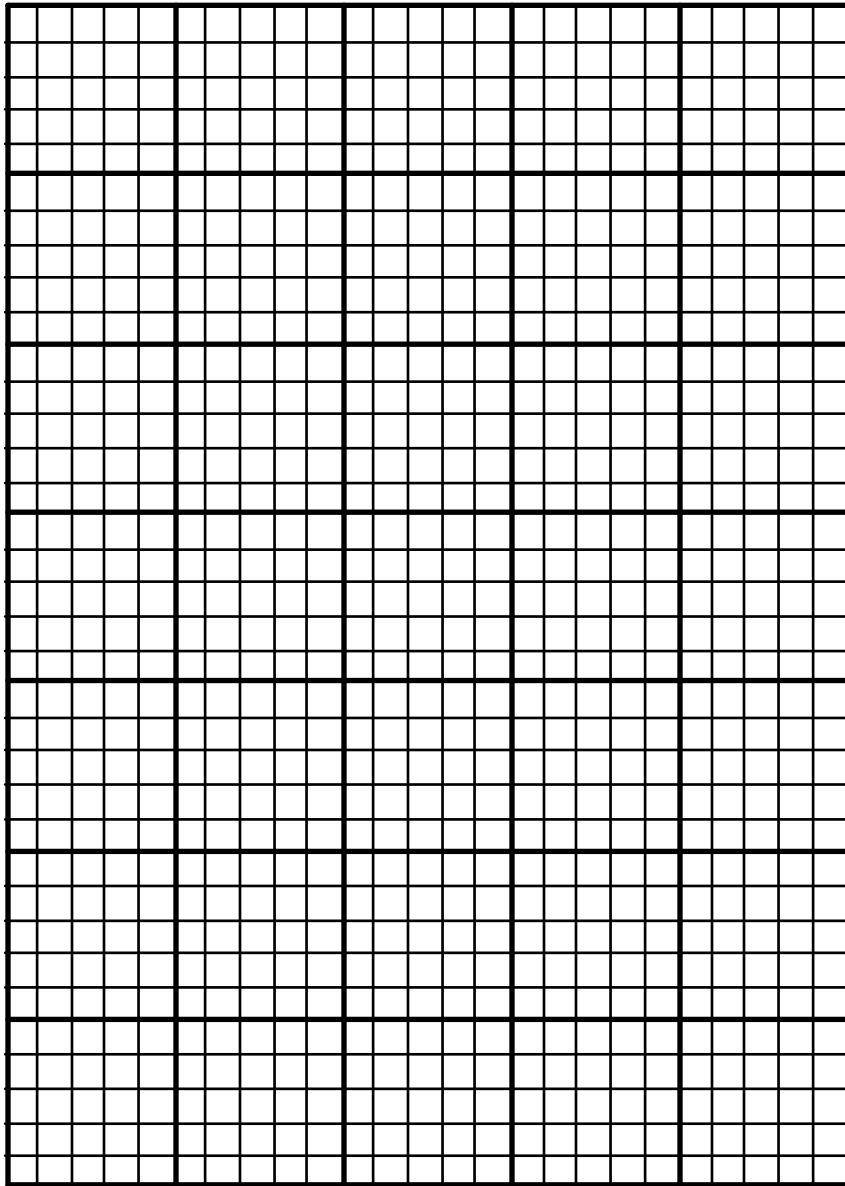
What happens to the angle of the noon sun from the summer solstice to the winter solstice? _____

When is the shortest noontime shadow cast? _____

Data for 41°N on December 21st (Winter Solstice)	
Time	Altitude of the Sun (°)
7:30 AM	0.9
8:00 AM	5.3
9:00 AM	13.5
10:00 AM	20
11:00 AM	24.2
12:00 PM	25.5
1:00 PM	24
2:00 PM	19.7
3:00 PM	13.1
4:00 PM	4.8
4:30 PM	0.5

Create a line graph from the data table on the Graph Paper on the back.

- create a uniform scale for Time of Day on the x - axis (2 points)
- label the x - axis with both a label and a unit. (2 points)
- create a uniform scale for Altitude of the Sun on the y axis. (2 points)
- label the y - axis with both a label and a unit. (2 points)
- plot all eleven points on your graph (2 points)
- connect the points to draw your line (1 point)
- put an appropriate title on top of your graph. (1 point)



(2 pts)	x- axis	y - axis
Range		
Boxes		
Divide		
Round up		

Answer the questions below in Complete Sentences (2 points each)

1) How much does the angle of the sun change between 9 am and 12 pm?

2) At what times would the sun be at an angle of 15°?

3) Estimate the angle of the sun at 1:30 pm.

4) How would the angles be different if you were located on the equator?

5) How would the length of a shadow change from 10 am till 2 pm?