

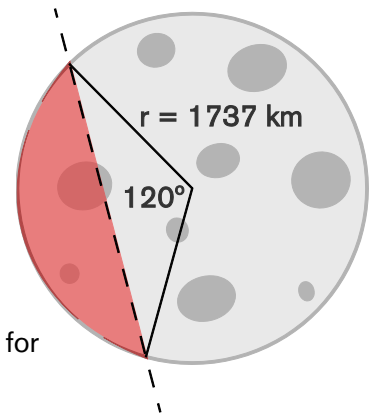
MATHCOUNTS® Problem of the Week Archive

Lunar Eclipse – September 21, 2015

Problems

On Sunday, September 27th a total lunar eclipse will occur. A total lunar eclipse is sometimes referred to as a blood moon because the moon will turn red in color. The moon is considered to be in a partial eclipse state when it is partly red in color and is considered to be in a total eclipse state when it is entirely red in color. The partial eclipse will begin at 9:07 PM, Eastern Time. At 10:11 PM the moon will be in a total eclipse and will remain in total eclipse until 11:23 PM. The moon will then be in a state of partial eclipse until 12:27 AM, September 28th. What percentage of the time of the eclipse is the moon completely red in color?

A lunar eclipse is caused by the earth blocking the sun's light from reaching the surface of the moon. This shadow created on the moon by the earth is what appears red in color. This 2D drawing shows a point in the progression of this shadow across the surface during the partial eclipse, as seen from Earth. What is the visible area of the part of the moon that is now in the earth's shadow? Express your answer in square kilometers to nearest whole number. (Note: The actual shadow of the earth has a slight curvature, but this is negligible for purposes of this problem.)



A lunar month is the time between identical moon phases. A lunar month takes approximately 29.5 days. The next lunar eclipse, after September 27th, will occur on March 23, 2016. How many lunar months are there between these two lunar eclipses? Express your answer to the nearest tenth.