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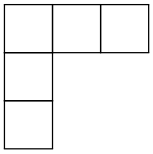

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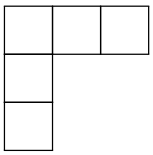

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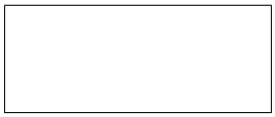
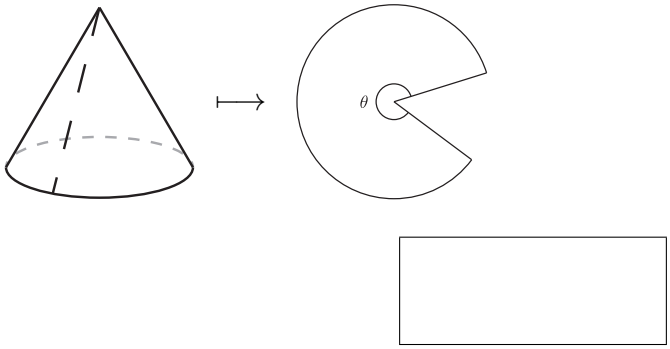


Problem 5. Begin with a cone whose radius equals its height. Cut it open and roll it flat to form a pacman shape. What is the measure of the angle θ in radians?



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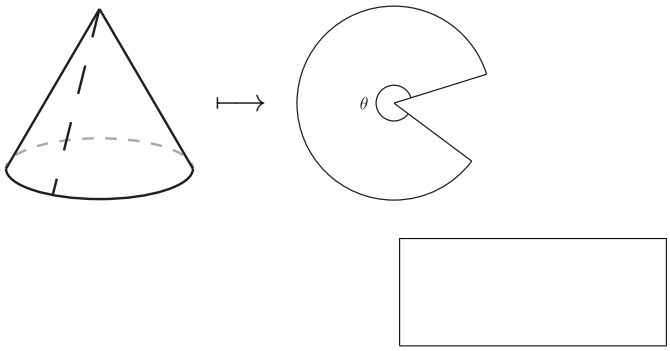

Problem 6. The digital root of a positive integer is obtained by summing its decimal digits, then the decimal digits of the result, and repeating the process until one is left with a single digit number. What is the digital root of 2^{2014}?

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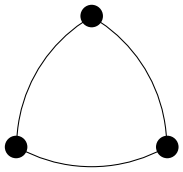
Problem 7. Amber wants to decorate a necklace with 3 colored beads: She has 3 red beads, 3 black beads, and 3 silver beads. How many different ways can she decorate the necklace?



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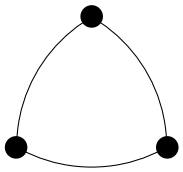

Problem 8. Erect a pole of length 1 perpendicular to the surface of a sphere of radius 1, then shine a light so that the shadow of the pole on the sphere is as long as possible. How long is the shadow?

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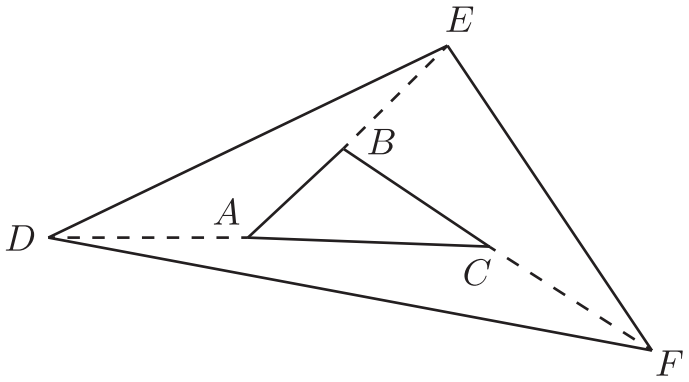
Problem 10. Start with a triangle ΔABC. Extend AB (in the B direction) until its length doubles. Do the same with BC (in the C direction) and CA (in the A direction). Connect the new endpoints of the extended sides to form a new triangle ΔDEF. If the area of ΔABC is 1, what is the area of ΔDEF?



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