MathWalk

#9) Making Molehills into Mountains

The Mountain-Shaped Solar Panels (near Peacock Hall)

Photo credit: https://sustain.appstate.edu/initiatives/renewable/pv/
Fig 13: Solar panels near Peacock Hall

Appalachian State University is very interested in sustainability. The campus has several photovoltaic and solar thermal systems.

Photovoltaic (PV) devices (commonly known as solar cells or solar panels) convert sunlight into electrical energy. Photovoltaics can literally be translated as light-electricity. (U.S. Department of Energy).

Near Peacock Hall is a solar panel that combines sustainability with art. Its unique mountain design reflects the natural wonders of our area and is the most visible photovoltaic system on campus. The 37-panel grid-tied system's capacity is 4 kW. (https://sustain.appstate.edu/initiatives/renewable/pv/)

Tasks:
Grades 6 – 12:
a) This custom shaped solar panel is made to look like mountains. The cost of building this artistic solar panel is about $65,000.00 and is anticipated to produce about 5,782 kWh energy annually. Assuming, 1 kWh worth about $0.06, how long will it take to pay for this solar panel?

b) Assuming there are 1554 small square panels in that solar panel and each square has an area of 36 square inches, how much energy do you get from 1 square inch of panel in kWh annually?

#10) Peacock Hall's Glass Semi-Circle
The Walker College of Business is located within Kenneth E. Peacock Hall. Opened in 1990, the 130,000 square-foot, four-story building is in the middle of the Appalachian State University campus.
At the time of its completion, Peacock Hall received the 1990 Architectural Brick Award from the Brick Association of North Carolina. The building was cited for the use of different colors of brick, for a design that breaks up the mass of the building without dwarfing neighboring buildings, its curved glass block wall and its pedestrian access. (https://business.appstate.edu/about/facilities)

Fig 14: Peacock Hall

Tasks:
Grades 6 – 12:

Given that Peacock hall has 10,384 glass blocks on its curvature and each glass block plus mortar has dimensions of 8 by 8 inches:
   a) Estimate how much paint you would need to cover the glass blocks in Peacock Hall's semicircle to tint the blocks? The brand of the paint you are considering is a spray paint designed for glass which costs $6.25 per can. Each can will roughly cover 20 square feet.
   b) How much would it cost to paint the whole semicircle glass blocks with that particular spray paint?