

MATHCOUNTS[®] Problem of the Week Archive

Old Faithful – July 22, 2024

Problems & Solutions

Old Faithful, a famous geyser in Yellowstone National Park, erupts approximately once every 92 minutes. (It used to erupt more frequently, but earthquakes have changed the geyser's plumbing, so it's not letting off a little steam as often as it used to.) Assuming that it spurts 8000 gallons of water each time, how many gallons will Old Faithful spurt in one year?

There are $365 \times 24 \times 60 = 525,600$ minutes in a year, so the geyser will erupt $525,600/92 = 5713$ times per year, approximately. This makes a total of $8000 \times 5713 = 45,704,000$ gallons spurted by Old Faithful per year.

Predicting when Old Faithful will spurt *next* can be done by timing the previous eruption. If an eruption lasts t minutes, the next eruption will occur in approximately $12.5t + 33$ minutes. If a 4-minute eruption begins at 11:23 a.m., at what time would you expect the next eruption to occur?

*The eruption begins at 11:23 a.m., so it ends at 11:27 a.m. The next eruption should occur in $12.5(4) + 33 = 83$ minutes (1 hour, 23 minutes). So, it will likely happen at about **12:50 p.m.***

Old Faithful is just one of hundreds of geysers in Yellowstone National Park. Yellowstone is a large park consisting of 3472 square miles of land. Of this land, 91% is in Wyoming, 7.6% is in Montana and 1.4% is in Idaho. How many square feet of Yellowstone is located in Idaho?

There are 5280^2 square feet in a square mile, so there are $5280^2 \times 3472 \times 0.014 = 1,355,113,267.2$ square feet of Yellowstone land in Idaho.

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