Example 1. The area around Mount St. Helens averages about 17 earthquakes per month.

a) $P(x=15)$ = poissonpdf(17, 15)
= 0.091

b) $P(x \le 10)$ = poissoncdf(17,10)
= 0.049

c) $P(x \ge 20)$ = 1 − poissoncdf(17,19)
= 0.264

d) Getting exactly 80 earthquakes is most likely 0, so let's rephrase it as 80 or more.
$P(x \ge 80)$ = 1 − poissoncdf(17,79) = 0, still 0%, so either that was very rare or something was changing with Mt. Saint Helens!

Example 2 The average number of horse fatalities at each of the four major horse tracks is 17.4. Santa Anita Park in Arcadia had 41 deaths last year.

a) $P(x \le 10)$ = poissoncdf(17.4,10)
= 0.041

b) $P(x=41)$ = poissonpdf(17.4,41)
= 6.04×10^{-7}
= 0.000000604
or = 0+ VERY UNLIKELY!

c) $P(x \ge 41)$ = 1 − poissoncdf(17.4,41) should be 40
≈ 0.000001
≈ 0+ Still very close to 0% so something is very different at Santa Anita because that many deaths can't occur by random chance alone!

Example 3 A single bank teller can help approximately 20 customers an hour. The mean number of customers a particular bank sees is 47.8 per hour.

a) $P(x < 25) = P(x \leq 24)$
$= \text{poissoncdf}(47.8, 24)$
≈ 0.00011

b) $P(x = 60) = \text{poissonpdf}(47.8, 60)$
≈ 0.012 Not very likely.

c) $P(x \geq 60) = 1 - \text{poissoncdf}(47.8, 60)$ should be 59 ∴
≈ 0.049 not extremely unusual