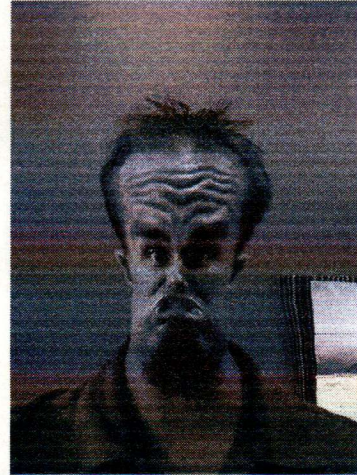


9.4 Wow, That's Weird!

A Practice Understanding Task

Each of the stories below are based upon normal distributions. Rank order these stories from most unusual to most average. (1 is the most unusual, 8 is the most average.) In each case, explain your ranking.



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A. The number of red loops in a box of Tutti-Frutti-O's is normally distributed with mean of 800 loops and standard deviation 120. Tony bought a new box, opened it, and counted 1243 red loops. (It didn't really matter because all the colors are the same flavor anyway.)

Rank 3 Explanation: z-score of 3.69, lots of red loops.
outlier

B. The weight of house cats is normally distributed with a mean of 10 pounds and standard deviation 2.1 pounds. My cat, Big Boy, weighs 6 pounds.

Rank 5 Explanation: z-score of -1.90, he is only bigger than
2.87% of cats.

C. The lifetime of a battery is normally distributed with a mean life of 40 hours and a standard deviation of 1.2 hours. I just bought a battery and it died after just 20 hours

Rank 1 Explanation: z-score was -16.67, the battery was
outlier defective.

D. The amount that a human fingernail grows in a year is normally distributed with a mean length of 3.5 cm and a standard deviation of 0.63 cm. My neighbor's thumbnail grew all year without breaking and it is 4.6 cm long with stars and stripes painted on it.

Rank 6 Explanation: z-score of 1.75, it's long but still within
2 SD of the mean.

E. My little brother was digging in the garden and found a giant earthworm that was 35 cm long. The length of earthworms is normally distributed with a mean length of 14 cm and a standard deviation of 5.3 cm.

Rank 2 Explanation: z-score was 3.96, almost 4 SD above the mean.
outlier

F. The mean length of a human pregnancy is 268 days with a standard deviation of 16 days. My aunt just had a premature baby delivered after only 245 days.

Rank 7 Explanation: z-score of -1.44, closer to -1SD than to -2SD from the mean.

G. IQ scores for young adults on a famous IQ test are distributed normally with a mean of 110 and a standard deviation of 25. I'm pretty smart and my IQ is 135.

Rank 8 Explanation: z-score of 1.0, or one SD above the mean.

H. The army measured head sizes among male soldiers and found that the distribution is pretty close to normal with a mean of 22.8 inches and standard deviation of 1.1 inches. Little Joe was almost too small to get into the army because his head size was only 20.6 inches.

Rank 4 Explanation: z-score of -2.0, just barely in the normal range.

3. A. $\frac{1243-800}{120} = \frac{443}{120} = 3.69$ basically 100%

5 B. $\frac{6-10}{2.1} = \frac{-4}{2.1} = -1.90$.0287 2.87%

1 C. $\frac{20-40}{1.2} = \frac{-20}{1.2} = -16.67$ basically 0%

6. D. $\frac{4.6-3.5}{.63} = \frac{1.1}{.63} = 1.75$.9599 95.99%

2. E. $\frac{35-14}{5.3} = \frac{21}{5.3} = 3.96$

7. F. $\frac{245-268}{16} = \frac{-23}{16} = -1.44$.0749 7.49%

G. $\frac{135-110}{25} = \frac{25}{25} = 1.0$.8413 84.13%

4 H. $\frac{20.6-22.8}{1.1} = \frac{-2.2}{1.1} = -2.0$.0228 2.28%