

- How many different remainders can result when the 100-th power of an integer n is divided by 125?
 (A) 1 (B) 2 (C) 5 (D) 25 (E) 125
- A perfectly sealed helium balloon has a mass 0.2 kg and a volume 0.5 m^3 . Air density is 1.25 kg/m^3 . The balloon is initially tied to the floor. When it's released, it rises to the ceiling 3.5 meters above the floor. Roughly how much heat is produced after the balloon becomes motionless at the ceiling?
 (A) 7 J (B) 15 J (C) 22 J (D) 14 J (E) 30 J
- Which statement must be true for a nonspontaneous gas-phase chemical reaction at constant temperature pressure?
 I. $\Delta G > 0$ II. $K_p < 1$
 (A) I only
 (B) II only
 (C) Both I and II
 (D) Neither I nor II
 (E) If I is true, II cannot be true. And vice versa.
- What's the length of the shadow of a meterstick on the day of vernal equinox for people living at 40 degrees north at local noon? Ignore atmospheric refraction and deviation due to equation of time.
 (A) 1.6 m (B) 1.3 m (C) 1.2 m (D) 0.84 m (E) 0.64 m
- What's the best case scario performance of the bubble sort algorithm to sort n number of integers? The big-O \mathcal{O} notation means on the order of.
 (A) $\mathcal{O}(1)$ (B) $\mathcal{O}(n^{\frac{1}{2}})$ (C) $\mathcal{O}(n)$ (D) $\mathcal{O}(n \log(n))$ (E) $\mathcal{O}(n^2)$
- A large square is placed next to 4 smaller squares with side length labelled in the figure. The right side of the two squares (2 and 3) lines up perfectly. Find the area of the larges square in the figure.

