Question 17

It is known that 96% of train travellers on a certain route had a valid ticket.

A sample of 500 travellers is taken. For samples of 500 travellers, $\hat{P}$ is the random variable of the distribution of sample proportions of travellers **without** a valid ticket.

$\Pr\left(\hat{P} \leq \frac{3}{100}\right)$, when approximated by a normal distribution, is closest to

A. 0.1269
B. 0.1333
C. 0.1513
D. 0.4991
E. 0.8731

Question 18

Let $f(x) = x^2$ and $g(x) = \log_e(2 - 4x)$.

The maximal domain of f for the composite function $g(f(x))$ to exist is

A. $x \in \left(-\infty, -\frac{1}{2}\right)$

B. $x \in \left(-\infty, -\frac{\sqrt{2}}{2}\right] \cup \left[\frac{\sqrt{2}}{2}, \infty\right)$

C. $x \in \left(-\infty, -\frac{\sqrt{2}}{2}\right) \cup \left(\frac{\sqrt{2}}{2}, \infty\right)$

D. $x \in \left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

E. $x \in \left[-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right]$

Question 19

The equation $\sin(kx) = 1$ where $x \in [0, 2\pi]$ has **no solutions** when

A. $k \in R$

B. $k \in \pi$

C. $k \in \left[\frac{1}{4}, \infty\right)$

D. $k \in \left[0, \frac{1}{4}\right]$

E. $k \in \left(-\frac{3}{4}, 0\right]$

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