Question 16

The minimum distance from the parabola $y = c - x^2$ to the origin is equal to the magnitude of c when

A. $c > \frac{1}{2}$

B. $c \leq \frac{1}{2}$

C. $c > -\frac{1}{2}$

D. $c > \frac{\sqrt{2}}{2}$

E. $c \in R^+$

Question 17

X is a normally distributed random variable with a mean of 0 and $\Pr(X > 1.5) = 0.1$.

The variance of X is closest to

A. 1.17

B. 1.28

C. 1.37

D. 1.92

E. 3.67

Question 18

For $y = \sqrt{\frac{1}{f(x)}}$, $\frac{dy}{dx}$ is equal to

A. $\frac{-f'(x)}{2\sqrt{f(x)}}$

B. $\frac{-f'(x)}{\left[\sqrt{f(x)}\right]^3}$

C. $-\frac{1}{2}\left[\frac{1}{\sqrt{f(x)}}\right]^3$

D. $\frac{-f'(x)}{2\left[\sqrt{f(x)}\right]^3}$

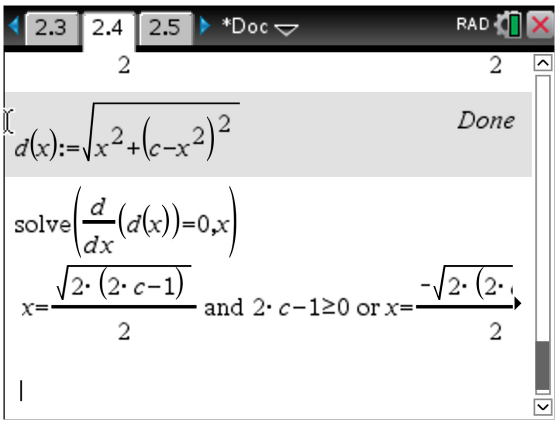
E. $\frac{-1}{2\sqrt{f'(x)}}$

Question 16 B

Differentiating the distance formula from the origin to a point $P\left(x, c-x^2\right)$ reveals that the magnitude of the minimum (or maximum) distance occurs at an x-value of $x=\frac{\pm\sqrt{2(2c-1)}}{2}$ if $2c-1 \geq 0$ or $c \geq \frac{1}{2}$.

If $c \leq \frac{1}{2}$, however, the magnitude of the minimum distance will always be found at the y-intercept, which has a value of c.

Note: A sketch graph could also be used.



Note: $x=0$ *gives the magnitude of the minimum distance when* $c \geq \frac{1}{2}$, *but the derivative indicates a local maximum when* $c > \frac{1}{2}$.

Question 17 C

$z=\frac{x-\mu}{\sigma}$

$\mu=0$

$\sigma=\frac{x}{z}$

$Var(X)=\sigma^2$