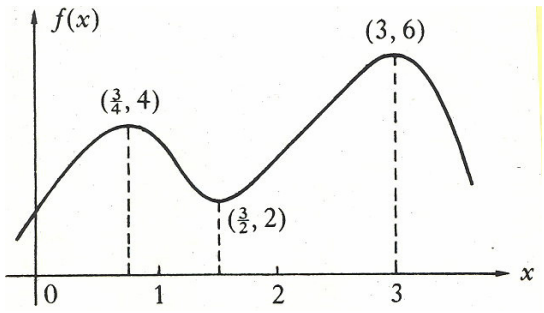
1.



Which of the following is/are true for the function f whose graph is given above ?

(1) $f'(0) < 0$
(2) $f'(1) < 0$
(3) $f'(2) < 0$
(4) $f'(3) < 0$

A (1) and (2) only
B (30 and (4) only
C (1) and (3)
D (2) only
E (4) only

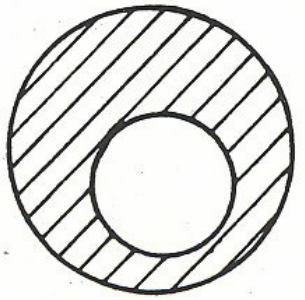
2. Which one of the following vectors is perpendicular to $\begin{pmatrix} 3 \\ -2 \\ -1 \end{pmatrix}$?

A $\begin{pmatrix} 1 \\ -1 \\ -1 \end{pmatrix}$
B $\begin{pmatrix} -1 \\ 1 \\ 1 \end{pmatrix}$
C $\begin{pmatrix} 1 \\ -1 \\ 1 \end{pmatrix}$
D $\begin{pmatrix} 1 \\ 1 \\ -1 \end{pmatrix}$
E $\begin{pmatrix} -1 \\ -1 \\ -1 \end{pmatrix}$

3. The angle between the vectors $\begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}$ and $\begin{pmatrix} 1 \\ 3 \\ \sqrt{6} \end{pmatrix}$ is

A $\frac{\pi}{6}$
B $\frac{\pi}{4}$
C $\frac{\pi}{3}$
D $\frac{\pi}{2}$
D $\frac{\pi}{2}$
E π

4.



The figure shows two circles whose radii are in the ratio 2 : 3. The ratio of the shaded area to the area of the larger circle is

A 1 : 3
B 4 : 9
C 5 : 9
D 2 : 3
E dependent on the positions of the centres of the circles

5. The maximum value of $\sin x + \cos x$, $x \in R$, is

A $\frac{1}{2}$
B 1
C $\sqrt{2}$
D 2
E none of these

6. Given that p, q and r are positive real numbers, then $\log_r p \div \log_r q$ equals

A $\log_r p - \log_r q$
B $\log_r (p - q)$
C $\log_r \left(\frac{P}{q} \right)$
D $\log_q p$
E $\log_p q$

7. Given that k is a constant of integration, then

$\int (4x + 1)^{-\frac{1}{2}} \, dx$ equals

A $(4x + 1)^{\frac{1}{2}} + k$
B $\frac{1}{2} (4x + 1)^{\frac{1}{2}} + k$
C $\frac{1}{4} (4x + 1)^{\frac{1}{2}} + k$
D $\frac{1}{4} (4x + 1)^{-\frac{1}{2}} + k$
E $\frac{1}{2} (4x + 1)^{-\frac{1}{2}} + k$

8. Given that $f(x) = \cos\left(\frac{\pi}{6} - x\right)$, then

$f'\left(\frac{\pi}{6}\right)$ equals

A $-\frac{\sqrt{3}}{2}$
B $-\frac{1}{2}$
C 0
D $\frac{1}{2}$
E $\frac{\sqrt{3}}{2}$

9. Given that $\log_a 64 = \frac{3}{2}$, the value of a is

A 8
B 16
C $42\frac{2}{3}$
D 96
E 512

10. If $4 \sin\theta - 3 \cos\theta$ is expressed in the form $r \cos(\theta - \alpha)$ where $r > 0$ and $0 \leq \alpha < 2\pi$ then α lies between

A 0 and $\frac{\pi}{2}$
B $\frac{\pi}{2}$ and π
C π and $\frac{3\pi}{2}$
D $\frac{3\pi}{2}$ and 2π