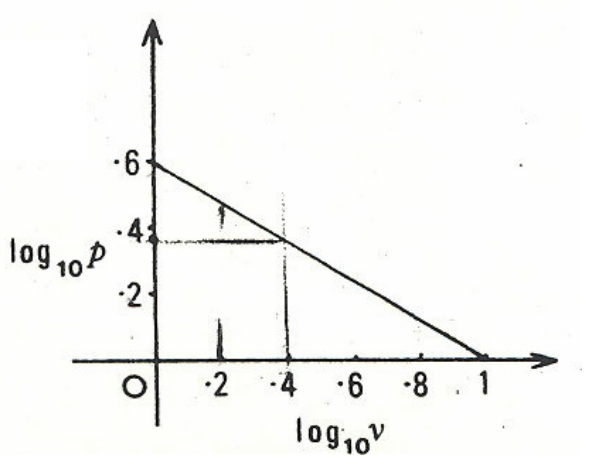
1.



The graph illustrates the law $p = av^n$. The value of n is nearest to

A -0.60
B 0.25
C 0.60
D 1.3
E 4.0

2. The tangent at the point P to the curve $y = \sin 2x$ has gradient 1. A possible value for the x coordinate of P is

A 0
B $\frac{\pi}{12}$
C $\frac{\pi}{6}$
D $\frac{\pi}{3}$
E $\frac{\pi}{2}$

3. $\int_0^{\pi} (1 + \cos x)dx$ equals

A 0
B 1
C 2
D π
E 4

4. $I = \int_0^{k\pi} \sin x\, dx$ where k is a positive integer. Which of the following statements about I is/are true.

(1) I has a greatest value of 2.
(2) I has a least value of –2.
(3) If $I = 0$ then k is even

A (1) and (2) only
B (2) and (3) only
C (1) and (3) only
D (1), (2) and (3)
E (1) only or (2) only or (3) only

5. For what value of x are the vectors $\begin{pmatrix}1\\2\\4\end{pmatrix}$ and $\begin{pmatrix}-5\\2\\x\end{pmatrix}$ perpendicular?

A -4
B $-\frac{1}{4}$
C $\frac{1}{4}$
D 4
E No value

6. If $\overrightarrow{PQ}$ represents $\begin{pmatrix}2\\-4\\0\end{pmatrix}$ and P is (0, 2, -2), then R, the mid point of PQ, is

A (1, -3, -1)
B (1, -2, 0)
C (1, -1, -1)
D (1, 0, -2)
E none of these

7. If $\sqrt{3}\cos\theta + \sin\theta = 2\cos(\theta - x)$, $0 \leq \alpha \leq 2\pi$, then α equals

   A $\pi/6$
   B $\pi/3$
   C $5\pi/6$
   D $5\pi/3$
   E $11\pi/6$

8. Given that $4x^{-\frac{1}{2}} = 1$, $x \in R$, then x equals

   A $\frac{1}{16}$
   B $\frac{1}{8}$
   C $\frac{1}{2}$
   D 8
   E 16

9. Given that $f(x) = (4x + 1)^3$, then $f'(x)$ is

   A $12(4x + 1)^2$
   B $3(4x + 1)^2$
   C $\frac{3}{4}(4x + 1)^2$
   D $192x^2$
   E $12x^2$