1. R is the point $(1,2,4)$ and S the point $(3,0,5)$. Given that P divides RS in the ratio 3:1, then the co-ordinates of P are

   A $\left(\dfrac{5}{2}, \dfrac{1}{2} \cdot \dfrac{19}{4} \right)$

   B $\left(\dfrac{3}{2}, \dfrac{3}{2}, \dfrac{17}{4} \right)$

   C $(10, 2, 19)$

   D $(6, 6, 17)$

   E None of these

2. $f(x) = (2x - 1)^3$; $f^1(x)$ equals

   A $3(2x - 1)^2$

   B $6x(2x - 1)^2$

   C $6(2x - 1)^2$

   D $\dfrac{1}{8}(2x - 1)^4$

   E None of these

3. The equation of the tangent to the curve, $y = \sin x$, at the point where $x = a$ is

   A $y - a = (x - \sin a)\cos a$

   B $y - \sin a = (x - a)\cos a$

   C $y = \cos a$

   D $y = -\cos a$

   E $y = x \cos a + a$

4. $\log_4 \left(\dfrac{1}{\sqrt{2}} \right)$ equals

   A $-\dfrac{1}{2}$

   B $-\dfrac{1}{4}$

   C $-\dfrac{1}{8}$

   D $\dfrac{1}{4}$

   E $\dfrac{1}{2}$

5. P and Q have position vectors

   $\begin{pmatrix} 1 \\ 2 \\ 0 \end{pmatrix}$ and $\begin{pmatrix} 2 \\ -2 \\ -3 \end{pmatrix}$ respectively

   The length of PQ is

   A $\sqrt{9}$

   B $\sqrt{22}$

   C $\sqrt{24}$

   D $\sqrt{26}$

   E $\sqrt{35}$

6. Given that $(x^{1/2} + 1)^{1/3} = 2$, then $x^{1/2} - 1$ equals

   A 48

   B 7

   C 6

   D 5

   E 3

7. Given that $f(x) = (5x + 2)^3$, then $f^1(x)$ equals

   A $3(5x + 2)^3$

   B $15(5x + 2)^2$

   C $15x(5x + 2)^2$

   D $\dfrac{1}{20}(5x + 2)^4$

   E None of these

8. The minimum value of $3 \cos \theta + 4 \sin \theta$ is

   A -5

   B $\sqrt{12}$

   C $\dfrac{-4}{3}$

   D -1

   E $\dfrac{-3}{4}$

9. The angle between the vectors

$$\begin{pmatrix} 1 \\ 1 \\ -1 \end{pmatrix} \text{ and } \begin{pmatrix} 0 \\ 1 \\ 1 \end{pmatrix} \text{ is}$$

    A $\pi/6$
    B $\pi/4$
    C $\pi/3$
    D $\pi/2$
    E π

10. The centre of the rotation which maps
    (9 , 4) onto (9 , 0) and (3 , 4) onto
    (9 , 6) is the point

    A   (6 , 0)
    B   (6 , 5)
    C   (7 , 2)
    D   (8 , 3)
    E   (9 , 4)