1. Given that log 2 = *p*, log 3 = *q* and log 5 = *r*, log 1500 can be expressed in terms of *p, q* and *r* as

   A $p + q + r$

   B $p + 2q + 3r$

   C $2p + q + r$

   D $2p + q + 3r$

   E $3p + q + 2r$

2. $\log (xy^2)$ equals

   A $2 (\log x + \log y)$

   B $\log x + \log y + \log 2$

   C $\log x (2 + \log y)$

   D $\log x + 2 \log y$

   E $\log x (2 \log y)$

3. Given that $f (x) = \dfrac{1}{(2x - 5)^3}$ then $f^1 (x)$ equals

   A $\dfrac{6x}{(2x - 5)2}$

   B $\dfrac{-6}{(2x - 5)^2}$

   C $\dfrac{1}{6(2x - 5)^4}$

   D $\dfrac{-6}{(2x - 5)^4}$

   E $\dfrac{-3}{(2x - 5)^4}$

4. $\{x : x^2 + x - 12 < 0, x \varepsilon R\}$ is

   A $\{x : x < -4 \text{ or } x > 3\}$
   B $\{x : x < -3 \text{ or } x > 4\}$
   C $\{x : -4 < x < 3\}$
   D $\{x : -3 < x < 4\}$
   E none of these.

5. Given that $\sin \theta + \cos \theta = k$, then $\sin\left(\theta + \dfrac{\pi}{4}\right)$ equals

   A $\dfrac{1}{\sqrt{2}} + k$

   B $\dfrac{1}{\sqrt{2}} + k + \sqrt{(1 - k}$

   C $\dfrac{k}{\sqrt{2}}$

   D $k\sqrt{2}$

   E $2k$

6. Given that $f(x) = \dfrac{1}{(2x + 1)^2}$, then $f^1(x) = \dfrac{k}{(2x + 1)^3}$ where *k* is

   A -4

   B -2

   C -1

   D $^1/_2$

   E 1

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

   A 0 and $\dfrac{\pi}{2}$

   B $\dfrac{\pi}{2}$ and π

   C π and $\dfrac{3\pi}{2}$

   D $\dfrac{3\pi}{2}$ and 2π

8. $\log_{10}xy = 0$ implies that

A $\log_{10}x = 0$ or $\log_{10}y = 0$ or $y = 0$

B $x = 0$

C $x + y = 1$

D $x = y = 1$

E $xy = 1$

9. If the points (p, q), (3, -2) and (-1, 4) are collinear, then the relationship connecting p and q could be

A $2p + 3q = 0$

B $3p – 2q = 5$

C $3p + 2q = 5$

D $3p – 2q = 13$

E $3p + 2q = 13$

10. The tangent to the curve $y = 3x^2$ at (1, 3) has gradient

A 1

B 2

C 3

D 6

E 18