1. The functions f, g, h are such that $f'(x) = g'(x) = h'(x)$, $x \varepsilon R$, the set of real numbers.
Which of the following statements must be true?

(1) $f'(0) = g'(0)$
(2) $g(x) = h(x)$
(3) $h(x) - f(x)$ = a constant

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

2. Which of the following is/are factors of $x^3 - 4x^2 + x + 6$?

(1) $x + 1$ (2) $x - 2$ (3) $x - 3$

A (1) only
B (2) only
C (3) only
D (1), (2) and (3)
E Some other combination of (1), (2) and (3).

3. A $(x - 8)^2 + (y - 6)^2 = 25$
B $(x - 4)^2 + (y - 3)^2 = 5$
C $(x - 4)^2 + (y - 3)^2 = 25$
D $x^2 + (y - 6)^2 = 36$
E $(x - 8)^2 + y^2 = 64$

4. The remainder on dividing the polynomial $5x^3 - 4x + 8$ by $x - 2$ is

A -24
B 20
C 36
D 40
E none of these

5. Given that the circle

$x^2 + y^2 - 11x - 10y + 24 = 0$

cuts the y-axis at the points P and Q, then the length of PQ is

A 2
B 5
C 10
D 11
E 14

6. Given that $\cos\theta = k$, then $\cos 2\theta$ equals

A $2k$
B $k^2 - 1$
C $2k^2 - 1$
D $1 - k^2$
E $1 - 2k^2$

7. Given that $x + 2$ is a factor of $x^3 - 2x^2 - 3x + c$, then the value of c is

A 22
B 10
C 6
D -6
E -10

8. The centre of a circle lies on the line $2x + y = 0$. The lines $y = 1$ and $y = 7$ are tangents to this circle. The equation of the circle is

A $(x - 2)^2 + (y + 4)^2 = 3$
B $(x + 2)^2 + (y - 4)^2 = 3$
C $(x - 2)^2 + (y - 4)^2 = 9$
D $(x - 2)^2 + (y + 4)^2 = 9$
E $(x + 2)^2 + (y - 4)^2 = 9$

9. Given that $f'(x) = 4x + 3$ and $f(1) = 0$, then $f(x)$ equals

   A $2x^2 + 3x$
   B $2x^2 + 3x - 5$
   C $x^2 + 3x - 4$
   D $2x^2 - 2$
   E $x^4 + 3x - 4$

10. $\sin 4x^\circ \sin 3x^\circ - \cos 4x^\circ \cos 3x^\circ$ equals

   A $\sin x^\circ$
   B $\cos (-x^\circ)$
   C $-\cos x^\circ$
   D $\cos 7x^\circ$
   E $-\cos 7x^\circ$

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