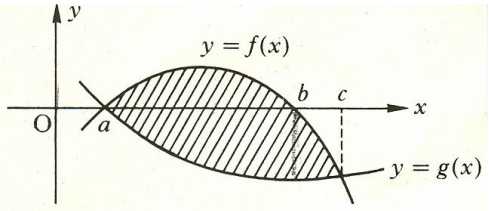
1.



The functions f and g are such that $f(a) = g(a) = 0$, $f(c) = g(c)$ and $f(b) = 0$.
The shaded area is given by

A $\int_a^c (f(x) - g(x))\,dx$

B $\int_a^c (f(x) + g(x))\,dx$

C $\int_a^b (f(x) - g(x))\,dx + \int_b^c (f(x) + g(x))\,dx$

D $\int_a^b (f(x) - g(x))\,dx - \int_b^c (f(x) + g(x))\,dx$

E $\int_a^b (f(x) - g(x))\,dx - \int_a^c (f(x) + g(x))\,dx$

2. Given that $\cos 2x = p$, then $\cos^2 x$ equals

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

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

$\int \frac{1}{x^2}\,dx$ equals

A $\frac{-1}{x} + k$

B $\frac{-1}{2x} + k$

C $\frac{-1}{x^3} + k$

D $\frac{-2}{x^3} + k$

E $\frac{-1}{3x^3} + k$

4. Which of the following is/are solutions of $\sin 2x = 1$, $x \in R$?

(1) $\frac{\pi}{6}$
(2) $\frac{\pi}{4}$
(3) $\frac{3\pi}{4}$
(4) $\frac{5\pi}{6}$

A (1) only
B (2) only
C (2) and (3) only
D (1) and (4) only
E none of (1), (2), (3) and (4)

5. Given that k is a constant of integration, then $\int (x-1)^2\,dx$ equals.

A $2(x - 1) + k$

B $\frac{1}{2}(x - 1)^2 + k$

C $\frac{1}{3}(x - 1)^3 + k$

D $\frac{1}{2}(x-1)^2\left(\frac{1}{2}x^2 - x\right) + k$

E $\frac{1}{3}(x-1)^3\left(\frac{1}{2}x^2 - x\right) + k$

6. The centre of the circle $3x^2 + 3y^2 - 6x + 9y + 1 = 0$ is the point.

A $\left(3, -\frac{9}{2}\right)$

B (-2, 3)

C (2, - 3)

D $\left(2, -\frac{3}{2}\right)$

E $\left(-1, \frac{3}{2}\right)$

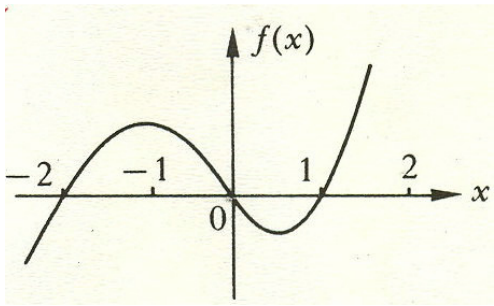
7. For the quadratic equation $x^2 + (p + 2)x + p = 0$, where $p \varepsilon R$, which of the following statements is/are true?

(1) The roots are always real.
(2) The roots are equal only if $p = -2$.
(3) The roots are rational if $p = 1$.

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

8. In which quadrant(s) can a point on the circumference of the circle
$(x - 4)^2 + (y + 3)^2 = 5$
lie?

A The second only
B The fourth only
C The first, second and third only
D The first, third and fourth only
E Any quadrant

9. 

Which of the following functions could be represented by the above graph?

(1) $f: x \to x(x + 2)(x - 1)$
(2) $f: x \to x(x - 2)(x + 1)$
(3) $f: x \to 2x(x - 2)(x + 1)$
(4) $f: x \to 2x(x + 2)(x - 1)$

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

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