جامعة الملك سعود
King Saud University

Name:...... Answer ...(Dr Brahem)
ID:.......................
Num of attendance:.....

Time: 30 min   **Quiz - Math 218- Semester II- 1443 H**   Marks: 10

Question	1	2	3	4	5	6	7	8	9	10
Answer	C/D	C	A	B	C	D	B	D	B	D

Choose the correct answer (write it in the table above):

1) $\ln(27)$ is equal to $\ln 27 = \ln(3^3) = \boxed{3\ln 3} = \ln(9 \times 3) = \boxed{\ln 9 + \ln 3}$

(a) $9\ln 3$	(b) $27\ln 1$	(c) $\ln 9 + \ln 3$	(d) $3\ln 3$

2) The solution of the equation $\ln(\ln x) = 0$ is

② $e^{\ln(\ln x)} = e^0 \Leftrightarrow \ln x = 1 \Leftrightarrow e^{\ln x} = e^1 \Leftrightarrow x = e$

(a) 0	(b) 1	(c) e	(d) e^2

3) The domain of the function $y = \ln(6-3x)$ is

③ $f(x) = \ln(6-3x)$
$D_f = \{x / 6-3x > 0\} = \{x / x < 2\}$

(a) $(-\infty, 2)$	(b) $(-\infty, 2]$	(c) $(2, \infty)$	(d) $[2, \infty)$

4) $\log_2(20) - \log_2(5)$ is equal to $\log_2\left(\frac{20}{5}\right) = \log_2(4) = \log_2(2^2) = 2$

(a) 1	(b) 2	(c) 4	(d) 5

5) The solution of equation $(x-3)e^{-\ln(\frac{1}{x})} = 4$ is

⑤ $e^{-\ln(1/x)} = e^{\ln x} = x$; $x > 0$

$(x-3)\,e^{-\ln(1/x)} = x(x-3) = 4$

So $x^2 - 3x - 4 = 0$

$(x-4)(x+1) = 0$

$\boxed{x = 4}$ or $x = -1$ because $x > 0$

(a) -1	(b) e	(c) 4	(d) 6

6) The solution of the equation $\ln(x^2 - 1) - \ln(2x - 1) + \ln 2 = 0$ is

(a) $\frac{1-\sqrt{3}}{2}$	(b) e	(c) $\frac{1+\sqrt{2}}{2}$	(d) $\frac{1+\sqrt{3}}{2}$

⑥ $D_E = \left\{ x / \text{ and } \begin{array}{c} x^2 - 1 > 0 \\ 2x - 1 > 0 \end{array} \right\} = (1, +\infty) \leftarrow$ Domain of equation

Let $x \in D_E$,

$\ln(x^2 - 1) - \ln(2x - 1) = -\ln 2$

$\ln\left(\frac{x^2-1}{2x-1}\right) = \ln(1/2) \Leftrightarrow \frac{x^2-1}{2x-1} = 1/2$

$2(x^2 - 1) - (2x - 1) = 0 \Leftrightarrow 2x^2 - 2x - 1 = 0$

$a = 2, \; b = -2, \; c = -1$

Discriminant $D = 4 + 8 = 12 = (2\sqrt{3})^2$

$x_1 = \frac{2 - 2\sqrt{3}}{4} = \frac{1 - \sqrt{3}}{2}$ ✗ $\boxed{x_2 = \frac{1+\sqrt{3}}{2}}$

7) Domain of inequality

$$D_{Ineq} = \left\{ x \in \mathbb{R} \mid \frac{x+1}{3x-5} > 0 \text{ and } 3x-5 \neq 0 \right\}$$

$$D_{Ineq} = (-\infty, -1) \cup (5/3, +\infty)$$

7) The solution of the inequality $\ln\left(\frac{x+1}{3x-5}\right) < 0$ is

| (a) $(-\infty, -1)$ | (b) $(-\infty, -1) \cup (3, +\infty)$ | (c) $(3, +\infty)$ | (d) $(-\infty, -1) \cup (\frac{5}{3}, +\infty)$ |

$\ln\left(\frac{x+1}{3x-5}\right) \leq 0 \Leftrightarrow$

$e^{\ln(\ )} \leq e^0$

So $\frac{x+1}{3x-5} \leq 1$

$\Leftrightarrow \frac{x+1}{3x-5} - 1 \leq 0 \Leftrightarrow \frac{6-2x}{3x-5} \leq 0$

x		$5/3$		3	
Q	$-$	ϕ	$+$	ϕ	$-$

8) The solution of equation $e^{2x} - e^x - 6 = 0$ is

| (a) 2 | (b) $\ln 2$ | (c) 3 | (d) $\ln 3$ |

(8) Put $u = e^x > 0$; $u^2 - u - 6 = 0$

$(u-3)(u+2) = 0$

$u = 3$ or $u = -2$ because $u > 0$

so $e^x = 3$

we get $x = \ln 3$

9) The solution of $3e^x - 7e^{-x} - 20 = 0$ is

| (a) $\ln 3$ | (b) $\ln 7$ | (c) $\ln 10$ | (d) $2\ln 5$ |

(9)

$3e^x - 7e^{-x} - 20 = 0$

$3(e^x)^2 - 7 - 20e^x = 0$

Put $u = e^x > 0$

$3u^2 - 20u - 7 = 0$

$a = 3; b = -20; c = -7$

discriminant

$D = 400 + 84$

$= 484 = (22)^2$

$u_1 = \frac{20 - 22}{6} = -\frac{1}{3}$

$u_2 = \frac{20 + 22}{6} = 7$

$e^x = 7$

so $x = \ln 7$

10) The solution of equation $x^{\sqrt{x}} = (\sqrt{x})^x$ is

| (a) 1 | (b) 4 | (c) 1 or e | (d) 1 or 4 |

(10) $x^{\sqrt{x}} = (\sqrt{x})^x$, $x > 0$

$\ln\left(x^{\sqrt{x}}\right) = \ln\left((\sqrt{x})^x\right)$

$\sqrt{x} \ln x = x \ln(\sqrt{x}) = x \ln(x^{1/2}) = \frac{x}{2} \ln x$

$\sqrt{x} \ln x - \frac{x}{2} \ln x = 0$

$\ln x \left(\sqrt{x} - x/2\right) = 0$

So $\ln x = 0$ or $\sqrt{x} = x/2$

$x = 1$ or $x = \frac{x^2}{4} \Leftrightarrow x\left(\frac{x}{4} - 1\right) = 0$

$x \neq 0$ so $x = 4$

End of quiz

Scanné avec CamScanner