BA PRE-SESSION 2019

MATHEMATICS

Problem 1.1) $\frac{x^{32+7}}{x^{9+2+2}} = \frac{x^{39}}{x^{13}} = x^{26}$

Problem 1.2) $8^2 \times 8^x = 8^4$

$8^{2+x} = 8^4$

$2+x = 4$

$x = 2$

Problem 1.3) $\frac{y}{x} = \frac{1}{3}$ $\frac{y^4}{x^4} = \left(\frac{1}{3}\right)^4 = \frac{1}{81}$

Problem 1.4) $\frac{\sqrt{4^{15}}}{\sqrt{4^{14}}} = 2^{15-14} = 2$

Problem 1.5) a. TRUE c. FALSE

b. TRUE d. FALSE

Problem 1.6) $x \geq e^e$ $[e^e, \infty]$

Problem 2.1) $F = a + bC$ $C=0,\ F=32$ $C=100,\ F=212$

$32 = a+b(0)$ $212 = a+b(100)$

$a = 32$ $212 = 32 + 100b$

$b = 1.8$

$F = 32 + 1.8C$

$C = \frac{F-32}{1.8}$

$C = 32 + 1.8C$

$C = -40$

Problem 2.2) $f(y) = 3y - 12$

$0 = 3y - 12$

$y = 4$.

Problem 2.3) $x^2 - 6x + 2 = 2$

$x^2 = 6x$

$x = 6$

Problem 2.4) $\ln(1.03)^x = \ln(3)$

$x = \ln(3)/\ln(1.03) = 37$ years

Problem 2.5) $\pi^{\log_\pi(\frac{1}{\pi^5})} = \pi^{-5}$

$\log_\pi\left(\frac{1}{\pi^5}\right) = -5$

Problem 3.1) Sum of infinite geometric series

$= 2.67$

Problem 3.2) $\lim_{x \to 5} \frac{x^2 - 5^2}{(x-5)} = \frac{(x-5)(x+5)}{(x-5)} = 10.$

Problem 3.3) $f'(x) = 3x^2$

At $(-2, -12) = 12.$

Problem 3.4) $f'(x) = \frac{(x^2-1)(5x^4) - (x^5+3)(2x)}{(x^2-1)^2}$

$= \frac{3x^6 - 5x^4 - 6x}{(x^2-1)^2}$

Problem 3.5) $f'(x) = 9x^8$

$f''(x) = 72x^7$

Problem 3.6) No. $1/x$ is continuous at all x except 0. It is undefined at $x = 0$.

Problem 3.7) $\frac{d}{dx} = 12x^2 - 12$

$0 = 12x^2 - 12$

$x = \pm 1$

$\frac{d^2}{dx_2} = 24x$ At $x = 1 \rightarrow$ local minimum

At $x = -1 \rightarrow$ local maximum

Problem 3.8) $f(2,3) = 8 - 9$

$= -1$

Problem 3.9) $x - 3y > 0$

$x > 3y$, x is +ive

& y is +ive

Problem 3.10) $\frac{d}{dx} = 5y^7x^4 + \frac{2x}{y^3}$

Problem 3.11) $\sqrt{xy} - x - y$

No local maxima

No local minima.

Problem 3.12)

Problem 4.1) B.A $\begin{bmatrix} 1 & 0 & 1 \\ 9 & 1 & 5 \end{bmatrix} \begin{bmatrix} 2 & 5 \\ 2 & 1 \\ 7 & 6 \end{bmatrix} = \begin{bmatrix} 2+0+7 \\ 18+2+35 \end{bmatrix} \begin{bmatrix} 5+0+6 \\ 45+1+30 \end{bmatrix} = \begin{bmatrix} 9 & 11 \\ 55 & 76 \end{bmatrix}$

Problem 4.2) A.B $\begin{bmatrix} 5 & 3 \\ 0 & 1 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} 8 & 4 & 0 \\ 2 & 1 & 2 \end{bmatrix} = \begin{bmatrix} 46+6 & 20+3 & 0+6 \\ 0+2 & 0+1 & 0+2 \\ 8+4 & 4+2 & 0+4 \end{bmatrix} = \begin{bmatrix} 46 & 23 & 6 \\ 2 & 1 & 2 \\ 12 & 6 & 4 \end{bmatrix}$

Problem 4.3) Transpose $= \begin{bmatrix} e & 2 & 4 \\ 93 & 6.1 & \pi \\ 4.7 & 4.22 & 0 \end{bmatrix}$

Problem 4.4) det $= 16 - 12$

$= 4$.

Problem 5.1) Sample space is total no. of possible outcomes. $6^2 = 36$.

Problem 5.2) Probability that ⊕ive drug test is drug user $= 24.6\%$

Problem 5.3) $P(5) = 1/6$

$RV = 1/6 \times 20 = 3.3$