

2016

A1. (a) $x - \frac{x^2}{2} + \frac{x^3}{3} - \dots + (-1)^{n+1} \frac{x^n}{n}$; (b) $3.001\dot{6}$; (c) Based on the 2nd order term, 5×10^{-7} .

2. (a) $24/35$; (b) $B = 3, C = 5$; (c) $\frac{3}{2} \ln(2x - 3) + \frac{5}{2} \ln(2x + 1) + c$.

3. (a) concave; (b)(i) convex; (ii) neither.

4. (a) $\begin{pmatrix} 1 - C' & -I' \\ M_Y^D & M_r^D \end{pmatrix} \begin{pmatrix} dY \\ dr \end{pmatrix} = \begin{pmatrix} dG \\ dM \end{pmatrix}$; (b) $dY = (M_r^D dG + I' dM) / (M_r^D (1 - C') + I' M_Y^D)$.

B5. (a) $w(24 - L) = S + pC, C = \frac{\beta}{p}(24w - S), L = (1 - \beta) \left(24 - \frac{S}{w}\right)$;

(b) $C^* = 55, L = 11, U = 24.597, dU = -0.1118dS$;

(c) $C = 43, L = 10.75, U = 21.5$, tax take = 26.5; (d) $C = 48.375, L = 9.675, U = 21.63$.

6. (a) $P_1 = \frac{\alpha+k}{2}, P_2 = \frac{\delta+k}{2}$; (b) $P_1 = 110, P_2 = 60, Q_1 = 7, Q_2 = 8, \Pi = 610$;

(c) $Q = 50 - 0.5P$ for $0 < P \leq 80, Q = 18 - 0.1P$ for $80 \leq P \leq 180, Q = 0$ for $P \geq 180$;

(d) $Q = 7, P = 110, \Pi = 450$.

C7. (a) $\begin{pmatrix} P(X,Y) & X=1 & X=2 & X=3 \\ Y=1 & 1/12 & 1/4 & 1/6 \\ Y=2 & 1/4 & 1/12 & 1/6 \end{pmatrix}$; (b) $\begin{pmatrix} P(X|Y) & X=1 & X=2 & X=3 \\ Y=1 & 1/6 & 1/2 & 1/3 \\ Y=2 & 1/2 & 1/6 & 1/3 \end{pmatrix}$,

$\begin{pmatrix} P(Y|X) & X=1 & X=2 & X=3 \\ Y=1 & 1/4 & 3/4 & 1/2 \\ Y=2 & 3/4 & 1/4 & 1/2 \end{pmatrix}$; (c) No; (d) $3/4$.

8. -

9. (a) $E(Y_t) = t\mu, \text{var}(Y_t) = t^2 + \sigma^2$; (b) $E(\bar{Y}) = (T + 1)\mu/2$,

$\text{var}(\bar{Y}) = [(T + 1)(2T + 1) + 6\sigma^2]/6T$; (c) Sample mean gives $\text{var} = 1/T$.

10. (a) 10.

D11. (b) $Z = 0.707$, do not reject H_0 ; (c) 0.76; (d) $\Phi\left(\frac{\sqrt{n}}{3} - 1.645\right)$.

12. (a) $t = 58$, clearly significant; (c) $AAAA = 0.004278, CCCC = -0.1454, DDDD =$

$-0.01286, BBBB$ is likely to be 0.000; (d) $\hat{\delta}_0 = \hat{\beta}_0 + \hat{\beta}_1 + \hat{\beta}_2, \hat{\delta}_1 = -\hat{\beta}_1, \hat{\delta}_2 = -\hat{\beta}_2$.