Math 105 TOPICS IN MATHEMATICS

SOLUTION FOR MOCK QUIZ – XII (04/29)

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Instructor: Yasuyuki Kachi

Line #: 52920.

[I] (8pts)

(1) $\cos 0 = 1.$

(2) $\sin \dfrac{\pi}{4} = \dfrac{\sqrt{2}}{2} \left(= \dfrac{1}{\sqrt{2}} \right).$

(3) $\cos \dfrac{\pi}{3} = \dfrac{1}{2}.$

(4) $\sin \dfrac{\pi}{2} = 1.$

(5) $\cos \dfrac{2\pi}{3} = -\dfrac{1}{2}.$

(6) $\cos \dfrac{5\pi}{6} = -\dfrac{\sqrt{3}}{2}.$

(7) $\sin \pi = 0.$

(8) $\sin \Big(2\,\pi \Big) = 0.$

[II] (2pts) $\Big(\cos x \Big)^2 + \Big(\sin x \Big)^2 = 1.$

[III] (4pts)

(1) $\sin \Big(x + y \Big) = \Big(\sin x \Big) \Big(\cos y \Big) + \Big(\cos x \Big) \Big(\sin y \Big).$

(2) $\cos \Big(x + y \Big) = \Big(\cos x \Big) \Big(\cos y \Big) - \Big(\sin x \Big) \Big(\sin y \Big).$

[IV] (4pts)

(1) $\displaystyle\int \cos x \, dx = \sin x + C.$

(2) $\displaystyle\int \sin x \, dx = -\cos x + C.$

[V] (4pts)

$$\cos x = 1 - \frac{1}{\boxed{2!}}x^2 + \frac{1}{\boxed{4!}}x^4 - \frac{1}{\boxed{6!}}x^6 + \frac{1}{\boxed{8!}}x^8 - \cdots,$$

$$\sin x = \frac{1}{\boxed{1!}}x - \frac{1}{\boxed{3!}}x^3 + \frac{1}{\boxed{5!}}x^5 - \frac{1}{\boxed{7!}}x^7 + \cdots.$$