Math 105 TOPICS IN MATHEMATICS

SOLUTION FOR QUIZ – XI (04/22)

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Instructor: Yasuyuki Kachi

Line #: 52920.

[I] (4pts) (1) $\dfrac{d}{dx}\,x^3 \;=\; 3x^2.$ (2) $\dfrac{d}{dx}\,6x^5 \;=\; 30x^4.$

[II] (4pts) (1) $\dfrac{d}{dx}\Big(4x^4 \,-\, 3x^2 \,-\, 8\Big) \;=\; 16x^3 \,-\, 6x.$

(2) $$\frac{d}{dx}\Big(\frac{1}{1!}x \,+\, \frac{1}{3!}x^3 \,+\, \frac{1}{5!}x^5 \,+\, \frac{1}{7!}x^7\Big)$$
$$= \; 1 \,+\, \frac{1}{2!}x^2 \,+\, \frac{1}{4!}x^4 \,+\, \frac{1}{6!}x^6.$$

[III] (4pts) $\displaystyle\int 8x^7\,dx \;=\; x^8 \,+\, C$ means

"An antiderivative of $\boxed{\;8x^7\;}$ is $\boxed{\;x^8\;}$ " .

[IV] (4pts) (1) $\displaystyle\int 3x^2\,dx \;=\; x^3 \,+\, C.$ (2) $\displaystyle\int x^6\,dx \;=\; \frac{1}{7}x^7 \,+\, C.$

[V] (6pts) (1) $\displaystyle\int \Big(9x \,+\, 6\Big)\,dx \;=\; \frac{9}{2}x^2 \,+\, 6x \,+\, C.$

(2) $$\int \Big(x-4\Big)\Big(x+1\Big)\,dx \;=\; \int \Big(\boxed{\;x^2 \,-\, 3\,x \,-\, 4\;}\Big)\,dx$$
$$= \; \frac{1}{3}x^3 \,-\, \frac{3}{2}x^2 \,-\, 4x \,+\, C.$$

(3) $$\int \left(x^6 - 3x^5 + \frac{5}{2}x^4 - \frac{1}{2}x^2 + \frac{1}{42}\right) dx$$

$$= \frac{1}{7}x^7 - \frac{1}{2}x^6 + \frac{1}{2}x^5 - \frac{1}{6}x^3 + \frac{1}{42}x + C.$$