

Math 105 TOPICS IN MATHEMATICS
SOLUTION FOR MOCK QUIZ – XI (04/20)

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[I] (4pts) (1) $\frac{d}{dx} x^2 = 2x.$ (2) $\frac{d}{dx} 3x^8 = 24x^7.$

[II] (4pts) (1) $\frac{d}{dx} (2x^3 + 3x - 5) = 6x^2 + 3.$

(2)
$$\frac{d}{dx} \left(1 + \frac{1}{2!}x^2 + \frac{1}{4!}x^4 + \frac{1}{6!}x^6 + \frac{1}{8!}x^8 \right)$$
$$= \frac{1}{1!}x + \frac{1}{3!}x^3 + \frac{1}{5!}x^5 + \frac{1}{7!}x^7.$$

[III] (4pts) $\int 6x^5 dx = x^6 + C$ means

“An antiderivative of $\boxed{6x^5}$ is $\boxed{x^6}$ ” .

[IV] (4pts) (1) $\int 2x dx = x^2 + C.$ (2) $\int x^4 dx = \frac{1}{5}x^5 + C.$

[V] (6pts) (1) $\int (2x + 3) dx = x^2 + 3x + C.$

(2)
$$\int (x - 2)(x + 5) dx = \int \left(\boxed{x^2 + 3x - 10} \right) dx$$
$$= \frac{1}{3}x^3 + \frac{3}{2}x^2 - 10x + C.$$

$$(3) \quad \int \left(x^5 - \frac{5}{2}x^4 + \frac{5}{3}x^3 - \frac{1}{6}x \right) dx$$
$$= \frac{1}{6}x^6 - \frac{1}{2}x^5 + \frac{5}{12}x^4 - \frac{1}{12}x^2 + C.$$