



HADHRAMOUT UNIVERSITY
COLLEGE OF ENGINEERING & PETROLEUM



Department: all ...
Academic Year: 2021 – 2022
Exam Semester: second
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Date: 1 / 9 / 2022
Subject: integral calculus
Level: the first level...
Time Allowed: 2 Hours & 30 Minutes

Question 1: (35 marks) (20 +15)

1(a) stat true or fouds and justify your answer

- (1) If $\int_0^2 f(x)dx = 4$ then $\int_2^0 (2f(x) + 5)dx = 10$ ()
(2) $\int \tan x dx = \ln|\sec(x)| + c$ ()
(3) $\sum_{i=1}^7 i = 21$ ()
(4) $f(x) = 2x^4$ is an antiderivative of the function $g(x) = 8x^3$ ()

1(b) Evaluate the following integrals

(1) $\int (4x^2 + 2x - 3)dx$ (2) $\int_0^1 x\sqrt{4 - 3x^2} dx$ (3) $\int \frac{dx}{16+4x^2}$

Question 2: (35 marks)(16+10+9)

(a) Choose the correct answer in the following

- (1) $\int (3 - 5x)^3 dx = \dots$ [(a) $\frac{(3-5x)^4}{4} + c$, (b) $\frac{(3-5x)^4}{-20} + c$, (c) $\frac{(3-5x)^4}{-12} + c$]
(2) $\int \frac{x}{4-9x^2} dx = \dots$
[(a) $-\frac{1}{18} \ln|4 - 9x^2| + c$, (b) $-18 \ln|4 - 9x^2| + c$, (c) $\frac{1}{6} \tanh^{-1} \frac{3}{2}(x^2)$]
(3) if $\int_2^b 6dx = 12$ then $b = \dots$ [(a) 3 , (b) 4 , (c) 5]
(4) $\int (\cos(x) + 2)e^{\sin x + 2x} dx = \dots$ [(a) $xe^{\cos(x)+2x}$, (b) $e^{\cos^2(x)+2x}$, (c) $e^{\sin(x)+2x}$]

(b) Use the definition of definite integral to find $\int_0^3 (4x^2 - 3)dx$

(c) find the lower bound and upper bound of the following integral $\int_{-3}^2 (2x^2 - 9)dx$

Question 3: (30 marks)(9+21)

(a) Solve the initial value problem $\frac{dy}{dx} = (3x - 1)^2$, $f(0) = 1$

(b) Evaluate the following integrals

(1) $\int xe^{3x} dx$ (2) $\int \frac{x^2 - x + 4}{x^3 - 3x^2 + 2x} dx$ (3) $\int \operatorname{sech}^2(\sqrt{x}) dx$

Good luck