Test Run

CEM – Yr 12 – Area under the curve, Simpsons rule and Trapezoidal rule, and Volumes of solids of revolution – MC – Paper 1

1) Evaluate $\int_{\frac{1}{6}}^{\frac{1}{2}} \cos \pi x \, dx$

a) $\frac{3}{2\pi}$ b) $\sin\frac{\pi}{3}$

c) $\frac{1}{2\pi}$ d) $\frac{1}{\pi}$

2) Find $\int_0^3 \frac{dx}{3x+2} \, dx$

a) $\frac{1}{3}\log_e(\frac{11}{2})$ b) $\frac{1}{9}\log_e(\frac{11}{4})$

c) $3\log_e(\frac{2}{11})$ d) $-3\log_e(\frac{11}{2})$

3. Find the volume of revolution when the area bounded by the curve $y = 2\sec x$ and the x-axis between $x = \frac{\pi}{6}$ and $x = \frac{\pi}{3}$ is rotated about the x-axis.

a) $\frac{\pi}{2}$ b) $\frac{8\pi}{\sqrt{3}}$

c) $\frac{4\pi}{3}$ d) $\frac{\sqrt{3}\,\pi}{2}$

4) Find $\int e^{\frac{x}{3}} \, dx$

a) $3e^{\frac{x}{3}} + c$ b) $e^{\frac{x^2}{3}} + x + c$

c) $e^{\frac{x^2}{9}} + c$ d) $9e^{\frac{x}{3}} + c$

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5) Find the area of the region enclosed by the curve $y = \log_e(x+1)$, the y-axis, and the line $y = 3$

a) $e^3 - 3$ b) e^4

c) $e^3 - 2$ d) $e^3 - 4$

6) The table shows the values of a function $f(x)$ for five values of x:

x	1	1.5	2	2.5	3
$f(x)$	5	1	-2	3	7

Use Simpson's rule with these five values to estimate $\int_1^3 f(x)dx$

a) $\frac{7}{3}$ b) 4

c) 5 d) $\frac{8}{3}$

7) Calculate the area enclosed between the curves $y = (x-3)^2$ and $y = 9+8x-x^2$

a) $88\,u^2$ b) $108\frac{1}{2}\,u^2$

c) $64\frac{3}{4}\,u^2$ d) $114\frac{1}{3}\,u^2$

8) Find the volume V, formed when the area enclosed by the arc $y = x^3$, the line $x = 3$ and $y = 0$ is rotated about the y-axis

a) $729\pi\,u^3$ b) $688\pi\,u^3$

c) $435\pi\,u^3$ d) $270\pi\,u^3$

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9) Find the volume V, formed when the area enclosed by the arc $y = x^4$, the line $y = 16$, and the line $x = 0$ is rotated about the y-axis

a) $\frac{128}{5}\pi u^3$

b) $72\pi u^3$

c) $42\frac{2}{3}\pi u^3$

d) $64\frac{1}{3}\pi u^3$

10) Use Simpson's rule with five function values (correct to three decimal places where necessary) to find an approximation to $\int_0^2 x\cos(\frac{x}{2})\,dx$

a) 2.3724

b) 1.8264

c) 1.0287

d) 1.5275

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Answers
1. c)
2. a)
3. b)
4. a)
5. d)
6. b)
7. d)
8. a)
9. c)
10. d)