

PATENT PENDING
INFOSAFE®

PULL & TEAR

FOR ADMINISTRATIVE USE ONLY, CAREFULLY REMOVE PERFORATED STRIP

7) i) $P(\text{connection}) = 0.75 \times 0.82 = 0.615$ ✓

ii) $P(\text{NO CONNECTION}) = 0.25 \times 0.18 = 0.045$

$= 1 - 0.045 = 0.955$ ✓

8

6) TIME	5	15	25	35	45
FREQ	2	10	17	8	3
$T \times F$	10	150	425	280	135
$F(x - \bar{x})^2$	49.203	2238.016	1059.107	977.613	606.4205

4

$$\frac{T \times F}{T} = \frac{40}{1000} = 0.04$$

error carried into

$$SD = \sqrt{\frac{28720.0638}{40 - 1}} = 27.137 \text{ all other workings correct}$$

3

4) $\frac{5x - 6}{4x(x-2)} = \frac{A}{4x} + \frac{B}{x-2} \rightarrow A(x-2) + B(4x)$

$5x - 6 = A(x-2) + B(4x)$ ✓

$x=2 \quad S(2) - 6 = B(4(2))$

$4 = 8B$

$\frac{4}{8} = B \rightarrow B = \frac{1}{2}$ ✓

$x=0 \quad S(0) - 6 = A(0-2)$

$-6 = -2A$

$\frac{-6}{-2} = A \rightarrow A=3$ ✓

$$\frac{A}{4x} + \frac{B}{x-2} \rightarrow \frac{3}{4x} + \frac{1}{2(x-2)} \checkmark$$

EVALUATE THE INTEGRAL

$$\int_3^4 \frac{3}{4x} + \frac{1}{2(x-2)} dx = \int_3^4 \frac{3}{4x} + \frac{1}{2x-4} dx \checkmark$$

$$\left[3 \ln 4x + \ln(2x-4) \right]_3^4 \times$$

(12)

$$\left[(3 \ln 4(4) + \ln(2(4)-4)) - (3 \ln 4(3) + \ln(2(3)-4)) \right]$$

$$= 9.70406 - 8.14787 \times$$

$$= 1.5562$$

$$5) \frac{4-3}{4} = 0.25 \checkmark$$

3	3.25	3.5	3.75	4
0.75	$4\frac{1}{65}$	$2\frac{3}{42}$	$1\frac{7}{35}$	$7\frac{1}{16}$
$\frac{3}{4}$				

$$\frac{1}{3} \times 0.25 \left[\left(\frac{3}{4} + \frac{7}{16} \right) + 4 \left(\frac{4\frac{1}{65}}{65} + \frac{1\frac{7}{35}}{35} \right) + 2 \left(\frac{2\frac{3}{42}}{42} \right) \right]$$

$$= 0.5624 \checkmark$$

$$\% \text{ diff} = \frac{1.5562 - 0.5624}{1.5562} \times 100 = 63.9\% \checkmark$$

using error carried forward

(14)

$$3) i) \int_1^3 (5 - 4x + 4x^3) dx$$

$$\int_1^3 \left[5x - \frac{4x^2}{2} + \frac{4x^4}{4} \right] = \left[\frac{5(3) - \frac{4(3)^2}{2} + \frac{4(3)^4}{4}}{2} \right]$$

$$- \left[\frac{5(1) - \frac{4(1)^2}{2} + \frac{4(1)^4}{4}}{2} \right] = 78 - 4 = \underline{74} \checkmark$$

⑧

$$ii) \int_{-\pi}^{\pi} (3\sin x + 6\cos \frac{1}{2}x) dx$$

$$\int_{-\pi}^{\pi} \left[\frac{-3\cos x}{1} + \frac{1}{\frac{1}{2}} \sin \frac{1}{2}x \right]$$

$$= \left[\frac{-3\cos(\pi)}{1} + \frac{1}{\frac{1}{2}} \sin \frac{1}{2}(\pi) \right] - \left[\frac{-3\cos(-\pi)}{1} + \frac{1}{\frac{1}{2}} \sin \frac{1}{2}(-\pi) \right]$$

$$= -3.0503 + -2.9407 + 2.9407 = 0 \checkmark$$

①

$$2) i = 2(7 - 3e^{-0.5t})$$

$$\frac{di}{dt} = 3e^{-0.5t}$$

$$\frac{di}{dt} = 3e^{-0.5t}$$

t=0 initial growth

$$3e^{-0.5(0)} = \underline{3 \text{ v/s}} \checkmark$$

⑧

Math
Missing
SDP

$$1) i) y = 5x^2 + \frac{5}{x^2} - 8 \rightarrow 5x^2 + 5x^{-2} - 8$$

$$\frac{dy}{dx} = 10x - 10x^{-3} = 10x - \frac{10}{x^3} \checkmark$$

(4)

$$ii) y = x^3 \cos 5x \quad u = x^3 \quad v = \cos 5x$$

$$\frac{du}{dx} = 3x^2 \checkmark \quad \frac{dv}{dx} = -5 \sin 5x \checkmark$$

$$= [x^3 (-5 \sin 5x) + \cos 5x (3x^2)] \checkmark$$

$$= -5x^3 \sin 5x + 3x^2 \cos 5x$$

$$= x^2 (-5x \sin 5x + 3 \cos 5x) \checkmark$$

(6)

$$iii) y = 4 \sin(2x-3) \quad u = 2x-3 \checkmark$$

$$y = 4 \sin u \checkmark$$

$$\frac{dy}{dx} = 4 \cos u \cdot \frac{du}{dx} \rightarrow 4(2x-3) \cos(2x-3)$$

$$8x - 12 \cos(2x-3) \checkmark$$

(2)

$$iv) y = \frac{2 \sin 3x}{x^3}$$

$$u = 2 \sin 3x$$

$$v = x^3$$

$$\frac{du}{dx} = 6 \cos 3x \checkmark$$

$$\frac{dv}{dx} = 3x^2 \checkmark$$

$$\frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$$

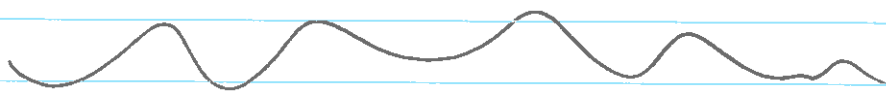
$$= \frac{(x^3(6\cos 3x) - 2\sin 3x(3x^2))}{(x^3)^2} \quad \checkmark$$

$$= \frac{6x^3\cos 3x - 6x^2\sin 3x}{x^5} \quad \checkmark$$

$$= \frac{6x^2(x\cos 3x - \sin 3x)}{x^5}$$

(5)

$$= \frac{6(x\cos 3x - \sin 3x)}{x^3}$$



$$4) \frac{5x-6}{4x(x-2)} = \frac{A}{4x} + \frac{B}{x-2} = A(x-2) + B(4x)$$

$$5x-6 = A(x-2) + B(4x)$$

$$x=2 = 5(2)-6 = B(4(2))$$

$$\frac{4}{8} = B = B = \frac{1}{2}$$

$$x=0 \quad -6 = A(-2)$$

$$3 = A$$

$$\frac{3}{4x} + \frac{1}{2(x-2)} = \frac{3}{4x} + \frac{1}{2x-4}$$

$$\int_2^4 \rightarrow (3\ln(4x) + \ln(2x-4))$$

$$= \left[(3 \ln 4(4) + \ln(2(4) - 4)) \right] - \left[(3 \ln 4(3) + \ln(2(3) - 4)) \right]$$

$$= 18.0218 - 13.1697$$