

Math SL PROBLEM SET 92

1. **(CA6.4 - R) (CI)** Evaluate the following integrals:

(Cirrito 22.4, p740)

a. $\int_2^6 e^{\frac{x}{2}+2} dx$

b. $\int_e^{e^2} \frac{2}{3x} dx$

c. $\int_{\frac{3\pi}{4}}^{\pi} (1 - \sin(2x)) dx$

2. **(A1.1 - R) (CA)** Write the following expressions as a sum of terms and then evaluate each sum.

(Cirrito 8.1.3, p252)

a. $\sum_{i=1}^6 (2i + 3)$

b. $\sum_{i=4}^9 (3 \times 2^{7-i})$

c. $\sum_{i=3}^7 (i^2 - 3)$

d. $\sum_{i=2}^7 (\ln(e^{i+1}))$

3. **(T3.5 - R) (CI)** Solve $2\sin^2(x) + 5\cos(x) + 1 = 0$ on the domain of $0 \leq x \leq 2\pi$.

(Cirrito 10.4, p351)

4. **(T3.3) (CI)** Given that $\tan(x) = -3$ where $\frac{\pi}{2} \leq x \leq \pi$, evaluate:

(Cirrito 10.22, p332)

a. $\sin(2x)$

b. $\tan(2x)$

- c. Use the appropriate trig identity to find the exact values:

i. $\cos(15^\circ)$

ii. $\sin(75^\circ)$

5. **(CA6.5 - N) (CI)** For the function defined by $y = 12x^2(1 - x)$;

(Oxford 9.6, p318)

- a. Find the area of the region enclosed by the function and the x -axis.
b. This enclosed region is now rotated about the x -axis to form a solid of revolution. Find the volume of this solid.

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6. **(V4.2, V4.3 - R) (CI)** A line, L_1 , passes through the points A(2,1,-1) and B(5,-5,-4).

(Cirrito 12.7, p444)

- a. Show that $\overrightarrow{AB} = 3i - 6j - 3k$.
- b. Write down a vector equation for L_1 in the form of $r = a + tb$.

$$r = \begin{pmatrix} 5 \\ 5 \\ 1 \end{pmatrix} + s \begin{pmatrix} -3 \\ 4 \\ 2 \end{pmatrix}$$

The line L_2 has the vector equation

- c. Determine the intersection point of L_1 and L_2 .

7. **(CA6.6 - R) (CI)** The velocity, v , in ms^{-1} of a particle moving in a straight line is given by the function $v(t) = t^2 - 11t + 24$, where t is time in seconds.

(Cirrito 22.6, p762)

- a. If $s(0) = 2$, find the equation for the position function, $s(t)$.
- b. Find the displacement of the particle in the first six seconds of travel.
- c. Find the total distance travelled in the first six seconds of travel.

8. **(SP5.9 - R) (CA)** The weights, W , of tea bags are normally distributed. If 7% of the bags weigh less than 3.75 g and 12% of the bags weigh more than 4.05 grams, find how many weigh more than 3.95 g.

(Cirrito 17.2, p568)