

Math SL PROBLEM SET 37

Section A (Skills/Concepts Consolidation)

1. **(T3.6, F2.3, C6.3 - R,E) (CI)** Given $g(x) = -3\cos(2x) + 1$ on the domain $0^\circ \leq x \leq 360^\circ$, **(Cirrito 10.3, p337)**
- Determine the amplitude, the period and the equation of the axis of the curve.
 - Determine where the maximum and minimum points are.
 - Hence, sketch g .
 - On what interval is g increasing? On what interval is g decreasing?
2. **(V4.3 - N) (CI)** A line passes through the following pairs of points. For each line, write the equation of the line in (i) vector form, (ii) in parametric form and (iii) in Cartesian form: **(Oxford 12J, p432)**
- The line goes through the points $A(3, -2)$ and $B(5, 1)$
 - The line goes through the points $A(-1, 4, 2)$ and $B(7, 5, -2)$
3. **(C6.1 - N) (CI & CA)** For the function $f(x) = x^2 + x - 2$, **(Cirrito 18.3, p592)**
- (CI)** Find the zeroes and the vertex of $f(x)$ and hence, prepare a sketch for $y = f(x)$.
 - (CI)** Hence, determine the interval in which the function values are decreasing.
 - (CI)** Determine the value of $f(2)$ as well as determining an expression for $f(2 + h)$, then determine the value of the difference quotient $\frac{f(2+h)-f(2)}{(2+h)-2}$.
 - (CA)** Now let h take on the following values, evaluate the difference quotient and then explain what is happening to the difference quotient and also what is happening on the graph given the two points:
i. $h = 1$ ii. $h = 0.5$ iii. $h = 0.1$ iv. $h = 0.01$ v. $h = 0.001$
4. **(V4.3 - N) (CA)** The following equations represent paths of cars after starting at time, $t_0 = 0$, where distances are measured in kilometers and time in hours. For each car, determine the (i) starting position, (ii) the speed and (iii) the position after 5 hours of travel. **(Oxford 12J, p432)**
- $r = (3, -4) + t(7, 24)$
 - $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 5 \\ -2 \end{pmatrix} + t \begin{pmatrix} -12 \\ 5 \end{pmatrix}$
5. **(SP5.6 - R) (CA)** For events A and B, $P(A) = 0.7$, $P(A \cup B) = 0.9$, $P(A \cap B) = 0.3$. Find: **(Oxford 3.4, p85)**
- $P(B)$
 - $P(B' \cap A')$
 - $P(B \cap A')$
 - $P(B' \cup A')$
 - $P(B|A')$

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Section B (Skills/Concepts Practice)

6. **(T3.3 - E) (CI)** SKILL: Trig Identities. Given that $\tan(x) = \frac{a}{b}$ and $0^\circ \leq x \leq 90^\circ$, find each of the following values in terms of a and b :

a. $\sin(x)$ b. $\cos(x)$ c. $\sin(2x)$ d. $\cos(2x)$ e. $\sin^2 x + \cos^2 x$

7. **(T3.3 - E) (CI)** SKILL: Trig Identities. Given that $\sin(2x) = -\frac{24}{25}$ and $\pi \leq x \leq \frac{3\pi}{2}$, find:

a. $\cos(2x)$ b. $\tan(2x)$ c. $\sin(4x)$ d. $\cos(4x)$ e. $\cos(x)$

8. **(T3.5 - R) (CI)** SKILL: Quadratic Trig Equations. Factor the following expressions:

a. $\sin^2 x - \sin x$
b. $\cos^2 x - 2 \cos x + 1$
c. $3 \sin^2 x - \sin x - 2$
d. $4 \cos^2 x - 1$

9. **(T3.5 - R) (CI)** SKILL: Quadratic Trig Equations. Solve each of the following factored equations on the domain of $0^\circ \leq x \leq 360^\circ$.

a. $\tan x (\tan x + 1) = 0$ b. $(\sin x + 1)(2 \sin x - 1) = 0$

10. **(T3.5 - E) (CI)** SKILL: Quadratic Trig Equations. Solve each of the following equations on the domain of $0^\circ \leq x \leq 360^\circ$.

a. $\cos x - \cos^2 x = 0$ b. $2 \sin x \cos x - \cos x = 0$

Section C (Skills/Concepts HW)

11. **(V4.3 - N) (CI)** Vector Equations of Lines. Oxford, 12J, p432, Q1ab,2ab,3ab,4ab,5

12. **(T3.5 - R) (CI)** Linear Trig Equations: Cirrito, Ex 10.4, p359, Q6cg,7a