

Math SL PROBLEM SET 72

Section A (Short Answer)

- (T3.5 - R) (CI)** Solve the following trigonometric equations. (HINT: identities??)
(Cirrito 10.4, p359)
 - $\sin(x) \cos(x) = \frac{1}{2}$ on the domain of $-\pi \leq x \leq \pi$.
 - $\cos^2(x) - \sin^2(x) = -\frac{1}{2}$ on the domain of $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$.
- (SP5.6 - R) (CA)** Events A and B are such that $P(A) = x$, $P(B) = 2x$ and $P(A \cup B) = \frac{3}{4}$.
(Cirrito 15.2, p510)
 - Solve for x if the events A and B are mutually exclusive.
 - Solve for x if the events are such that $A \subseteq B$ (NOTE: A is a subset of B)
 - Solve for x if the events are independent.
- (V4.3 - R) (CA)** Given one vector as $x = -1 + 2\lambda$, $y = 1 + 3\lambda$, $z = 2 - \lambda$ and the second vector as $x = 7 + 5\mu$, $y = -8 - 3\mu$, $z = -2 + \mu$, find the cosine ratio of the acute angle between these vectors and hence determine the sine ratio of the same angle.
(Cirrito 12.7, p444)
- (C6.6 - E) (CI)** Jana is on a bus is traveling along a straight road and its velocity-time function for the trip is described by by the function $v(t) = 2t(5 - t)$, where t is time in minutes and distance is measured in hundreds of meters.
(Cirrito 22.6, p764)
 - The domain of the function is $0 < t < 8$. Sketch a graph of the function.
 - Find the maximum velocity and at what time the bus attains this velocity.
 - Evaluate $\int_0^8 v(t) dt$ and explain what your answer means.
 - Determine the total distance travelled by the bus.
- (SP5.8 - R) (CA)** When not busy doing test corrections, Yousef is a darts player in his spare time. The probability that he hits the bullseye with one dart is 0.4.
(Cirrito 16.3, p548)
 - Find the probability that Yousef hits at most 2 bullseyes with three darts.
 - If the probability of scoring at least one bullseye with n darts is greater than 0.9, find the least possible value of n .

Math SL PROBLEM SET 72

6. **(F2.6 - R) (CI)** For the function $g(x) = \frac{1}{2} \ln(x + e)$, determine the (i) intercept(s) and (ii) the asymptote(s) and (iii) hence, sketch g . Then, find and sketch $g^{-1}(x)$

(Cirrito 73, p220)

Section B (Extended Response/Investigation)

7. **(CA6.5 - N) (CI)** For the function defined by $y = 12x^2(1 - x)$; **(Oxford 9.6, p318)**
- Find the area of the region enclosed by the function and the x -axis.
 - This enclosed region is now rotated about the x -axis to form a solid of revolution. Find the volume of this solid.

8. **(CA6.3 - R) (CI)** For the function $f(x) = \sin(x) + \frac{1}{2} \sin(2x)$ on the domain of $0 \leq x \leq \pi$, find: **(Cirrito 20.2, p649)**
- the x coordinates of the stationary point(s).
 - Use the second derivative to confirm what type of stationary points of the function.
 - Find the x coordinates of the inflection point(s)
 - Sketch the graph based upon your information from Q8a, 8b and 8c.