

Math SL PROBLEM SET 81

Section A (Skills/Concepts Consolidation)

- (V4.1 - R) (CI)** The diagonals of a parallelogram PQRS intersect at point M. If vector $PQ = \mathbf{a}$ and vector $PS = \mathbf{b}$, express the vectors PR, QS, PM and MS in terms of \mathbf{a} and \mathbf{b} .
(Cirrito 12.3, p415)
- (A1.1 - R) (CI)** Three numbers a , b , and c (whose sum is 15) are successive terms of a geometric sequence. The same three numbers are now re-ordered as b , a and c and are now successive terms of an arithmetic sequence. Find the values of a , b and c .
(Cirrito 8.2.4, p264)
- (SP5.9 - R) (CA)** On the SL Math exam, 75.8% of students scored at most 85% on the exam while only 3.59% of the students failed to score 60% on the exam. Exam scores are normally distributed. **(Cirrito 17.2.7, p564)**

 - Determine the mean and standard deviation of the exam score.
 - Find the percentage of students who scored at least a B on the exam ($X \geq 79.5$).
 - Solve for a if $P(X > a) = 0.55$
 - Mr S decides to award an IB 7 to those students who scored over 92%. If our class has 37 students, how many 7s are awarded?
 - Mr D randomly selects 8 students. How likely is it that at most 3 of them scored a 7 on the exam?
- (V4.1 - R) (CA)** Given that $\mathbf{a} = 15\mathbf{i} - 8\mathbf{j}$ and that $|\mathbf{b}| = 12$, find the possible values of $|\mathbf{a} + \mathbf{b}|$.
(Cirrito 12.3, p415)
- (V4.1 - R) (CA)** The point A has a position vector $3\mathbf{i} + 2\mathbf{j}$ and the point B has a position vector of $\mathbf{i} + 3\mathbf{j}$. Find the position vector of the point that divides AB in the ratio 4:3. **(Cirrito 12.3, p415)**
- (T3.6 - R) (CA)** Given the triangle ABC. Indicate whether the given measurements result in no triangle, one triangle, or two triangles. Solve the resulting triangle. Round the answer to the nearest tenth. (HINT: a diagram may help) **(Cirrito 9.5.2, p298)**

 - $B = 22^\circ$, $b = 16.8$, $a = 22.42$
 - $B = 96^\circ$, $b = 3$, $a = 24$
 - $a = 7$, $b = 9$, $B = 49^\circ$

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Section B (Skills/Concepts Practice)

7. **(A1.1 - R) (CI) SKILL:** Sigma Notation.

a. Write the following expressions as a sum of terms and then evaluate each sum.

i. $\sum_{k=3}^7 \frac{k}{k+1}$ ii. $\lim_{n \rightarrow \infty} \sum_{i=1}^n (0.5^{7-i})$

b. **(CA)** Write each of the following sums using \sum notation and then evaluate.

i. $3 - 9 + 27 - 81 + 243$ ii. $\frac{1}{2} + \frac{1}{5} + \frac{1}{8} + \frac{1}{11} + \frac{1}{14} + \frac{1}{17}$

8. **(A1.2 - R) (CI) SKILL:** Laws of Logs.

a. Write the following as single logarithms:

i. $\frac{1}{2} \log_5 x + \log_5 y$ ii. $\log_3 a + \frac{1}{3} \log_3 b - 2 \log_3 c$ iii. $\log(2) \times \log(x)$

b. Expand each logarithm:

i. $\log(a^3 b)^2$ ii. $\log \frac{x}{y^5}$ iii. $\log(\sqrt[3]{xyz^4})$ iv. $\log(x + y + 100)$

9. **(A1.3 - R) (CA) SKILL:** Binomial Expansion.

a. Find the 5th term in the expansion of $(x + \frac{2}{x})^{10}$.

b. Find the coefficient of the x^{12} term in the expansion of $(x^2 - 2)^8$.

10. **(A1.3 - R) (CA) SKILL:** Binomial Expansion.

a. Find the term independent of x in the expansion of $(x^2 - \frac{2}{x})^6$.

b. In the expansion of $(px + 1)^6$, the coefficient of the x^3 term is 160. Find the value of p .

11. **(A1.2 - R) (CI) SKILL:** Laws of Logs. Solve the following equations:

a. $2 \log(x - 3) = \log 4 + \log(6 - x)$

b. $\log(x + 2) + \log(x - 1) = 1$

Section C (Skills/Concepts HW)

12. Solve log equations: Cirrito, Ex 7.4, p228, Q5cfij

13. Binomial expansions: Cirrito, Ex 4.1.2, p102, Q2abde