

1. **(T1.9 - N) (CA)** For the following binomial distributions find, (Cirrito 4.1, p95)
 - a. The coefficient of the x^6 term in the expansion of $(2x - 3)^9$.
 - b. The coefficient of the x^3 term in the expansion of $(3x - 1)^7$.
 - c. The coefficient of the term independent of x in $(4x^3 - \frac{2}{x^2})^5$.

 2. **(T4.6 - R) (CI)** Given two events, A and B where $P(A|B) = 0.30$, $P(B|A) = 0.60$ and $P(A \cap B) = 0.18$ (Cirrito 15.2, p508)
 - a. Find $P(A)$
 - b. Are events A and B independent? Why/why not?
 - c. Find $P(B \cap A')$

 3. **(T3.7 - R) (CA)** The depth, d meters, of water in a harbour varies with the tides each day. The first high tide occurs at 05:00 am with a depth of 5.8 m. The first low tide occurs at 10:30 am with a depth of 2.6 meters. (Cirrito 10.5, p361)
 - a. Find a trigonometric function that models, d , the depth of the water t hours after midnight.
 - b. Find the depth of the water at 12 noon.
 - c. A large boat needs at least 3.5 m of water to dock in the harbour. During what times after 12 noon can the boat dock safely?

 4. **(T4.6 - R) (CI)** A and B are two events such that $p(A) = 0.30$, $p(B) = 0.5$ and $p(A \cup B) = 0.55$. (Cirrito 15.3.2, p512)
 - a. Draw a Venn diagram for this problem, given this information (you may have to calculate a few things first however
 - b. Hence or otherwise, find the probability of the following events:
 - i. $A \cap B$
 - ii. $B \cap A$
 - iii. $A \cap B'$
 - iv. $A' \cap B'$
 - c. Are the events A and B dependent or independent? Explain why/why not.

 5. **(T1.3, T1.8 - R) (CA)** Given the sequence 45, -30, 20, $-\frac{40}{3}$, (Cirrito 8.2.4, p263)
 - a. Find the 8th term
 - b. Find the sum of the first 8 terms
 - c. Find the sum of an infinite number of terms of this sequence
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6. **(T2.3, T2.4, T2.9, T2.11 - R) (CI)** Determine the equation(s) of the asymptotes as well as the x- and y-intercept(s) and then sketch the functions. State the transformations that have been applied to the “parent” function for each question.

(Cirrito 5.3.3, p131; Cirrito 5.3.4, p138)

a. $y(x) = -\ln(x + 4)$ b. $y(x) = -e^{-x} + 2$

7. **(T2.2, T2.5 - R) (CI)** For each pair of functions, state their domains and ranges and then determine the equation for $(f \circ g)(x)$ and also the equation for $(g \circ f)(x)$.

(Cirrito 2.4.2 p44; 5.3.3, p131; C5.3.4, p138)

a. $f(x) = \sqrt{x-1}$ and $g(x) = 1 + 2x^2$ b. $f(x) = e^x - 1$ and $g(x) = 2\ln(x+1)$

8. **(T1.2, T1.3 - E) (CA)** Omar and Mostafa begin a training program. In the first week, Mostafa will run 10 km, in the second week, he will run 11.5 km and in the third week 13 km and so on, in an arithmetic progression. Omar will run 5 km in the first week and will increase his distance by 20% in each succeeding week.

(Cirrito 8.2.3, p261)

- a. In which week does Omar’s weekly distance first exceed Mostafa’s?
b. In which week does Omar’s total distance first exceed Mostafa’s?