1) What is meant by
   (a) "addition and subtraction formulas for sine"
   (b) "addition and subtraction formulas for cosine"
   (c) "addition and subtraction formulas for tangent"
   (d) "the binomial coefficient"
   (e) "the binomial theorem"
   (f) "general term of the binomial expansion"

2) (a) Verify the following identities:
   (i) \( \frac{2\tan(x)}{1 + (\tan(x))^2} = \sin(2x) \)
   (ii) \( \sin(x + y) - \sin(x - y) = 2\cos(x) \sin(y) \)
   (iii) \( \cos(x + y) + \cos(x - y) = 2\cos(x) \cos(y) \)
(b) Use the subtraction formula for cosine \( \cos(x - y) = \cos(x) \cos(y) + \sin(x) \sin(y) \)
   together with the following identities \( \sin(x) = \cos\left(\frac{\pi}{2} - x\right) \) and \( \cos(x) = \sin\left(\frac{\pi}{2} - x\right) \)
   to prove the addition formula \( \sin(x + y) = \sin(x) \cos(y) + \cos(x) \sin(y) \).

3) (a) Use the binomial theorem to expand \((2x - 3)^4\).
   (b) In the binomial expansion of \((3x - 2)^{10}\);
      (i) find the term containing \(x^3\).
      (ii) find the fifth term.
   (c) Use the binomial theorem to show if \(n\) is a positive integer, then
      \[ \binom{n}{0} + \binom{n}{1} + \binom{n}{2} + \cdots + \binom{n}{n} = 2^n. \]