a) $5 + 8 = 13$

b) $5 \cdot 8 = 40$

Ex 2

i) a) $4 \cdot 12 \cdot 3 \cdot 2 = 288$

   b) $4 \cdot 1 \cdot 3 \cdot 2 = 24$

ii) a) $8 \cdot 6 \cdot (1 + 1 + 6 + 3)$ ℓ_p , ℓ_m

         $8 \cdot 6 \cdot 11 = 528$

   b) $8 \cdot 6 \cdot 8 \cdot (3 \cdot 3) \cdot (3 \cdot 6)$

      $= 46656$

   c) $8 \cdot (3 \cdot 3) \cdot 8 \cdot 3 \cdot 8 \cdot 6 \cdot 8 \cdot 6 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

      $= 322\ 486\ 272$

Ex 3 $8!$

      $= 40\ 320$

#4 a. $\dfrac{7!}{5!} = 7 \cdot 6 = 42$

b) $= \dfrac{8!}{4!} = 8 \cdot 7 \cdot 6 \cdot 5$

c) $\dfrac{10!}{7!}$

d) $\dfrac{12!}{3!}$

Ex 5 $C(10, 4) = \dfrac{10!}{4! \, 6!}$

$C(12, 7) = \dfrac{12!}{5! \, 7!}$

$C(14, 12) = \dfrac{14!}{2! \, 12!}$

$C(15, 10) = \dfrac{15!}{5! \cdot 10!}$

Ex 6 a) $7!$

b) $3! \, 4!$

c) $3! \, 5!$

d) $2 \cdot 3! \cdot 4!$

Ex.7

a) $C(20, 12) = \dfrac{20!}{12! \cdot 8!} = 125\,970$

b) $C(10, 6) \cdot C(10, 6) = \left(\dfrac{10}{6! \cdot 4!}\right)^2 = 44\,100$

c) $2\big(C(10,10) \cdot C(10,2) + C(10,8) \cdot C(10,4) + C(10,6)^2\big) + C(10,6)^2$

$= 2\left(\dfrac{10!}{8! 2!} + \dfrac{10!}{2! 8!} \cdot \dfrac{10!}{4! 6!}\right) + 2\left(\dfrac{10!}{4! 6!}\right)^2 = 63\,090$

d) $C(10, 3) \cdot C(10, 5) + C(10, 8) \tilde{C}(10, 4) + C(10, 9) \cdot C(10, 3)$
$ + C(10, 0)$

$\dfrac{10!}{3! 2!} \cdot \dfrac{10!}{5!^2} + \dfrac{10!}{8! 2!} \cdot \dfrac{10!}{6! 4!} + \dfrac{10 \cdot 10!}{7! 3!} \cdot \dfrac{10!}{2! 8!} = \cancel{40840}\ 40935$

e) $C(10, 8) \cdot C(10, 4) + C(10, 9) \cdot C(10, 3) + C(10, 2)$

$= \dfrac{10!^2}{8! 2! 4! 6!} + \dfrac{10! \cdot 10!}{2! 3! 8! 7!} + \dfrac{10!}{8! 2!} = 14895$

Ex.8 $P(6, 4) = \dfrac{6!}{2!} \cdot \dfrac{1}{2!^2} = \dfrac{6!}{2^3} = 90$

Ex.9

a) $C(12, 3) = \dfrac{12!}{3! 9!} = \dfrac{12 \cdot 11 \cdot 10}{3}$

b) $C(8, 5) = 2!$ $C(10, 4) = \dfrac{10!}{4!} \to 10 \cdot 2 = 20 \text{ for } x^2$

$C(10, 7) = \dfrac{10!}{7! 2!} = \dfrac{10 \cdot 11}{3 \cdot 2} = \cancel{120} \cdot 2^3 = 960$

b) Do solution can't achieve 12 from 10 $\Rightarrow$ often $= 0$

e) $\sim 11 \sim$ $- 11 -$