9. a) How many different poker hands are a 'full house' (five cards dealt from a deck of 52, a full house is three of one kind together with a pair)?

\[ \binom{13}{1} \binom{4}{3} \binom{12}{1} \binom{4}{2} \]
give expression ____________

b) How many different poker hands are a 'flush' (all of the same suit)? Include straight flushes in your answer if you want.

\[ \binom{4}{1} \binom{13}{5} \]
give expression ____________

1. choose suit
2. choose cards from suit

c) Give an expression using combinatorial symbols for the probability of getting a flush when five cards are randomly dealt to you. Use your answer from part b.

\[ \frac{\binom{4}{1} \binom{13}{5}}{\binom{52}{5}} \]
give expression ____________

10. A public opinion polltaker reports that out of a national sample of 1200 adults, 675 are married, 682 are from 20 to 30 years old, 730 are female, 195 are married and are from 20 to 30 years old, 467 are married females, 318 are females from 20 to 30 years old and 165 are married females from 20 to 30 years old.

How many females are between 20 and 30 but are not married? ________

How many females in the sample are over 30 and not married? ________

Fill out the diagram below in order to help you figure out your answer.
11. How many different permutations can be formed with the letters from the words GOOLAGONG?
   a) 9!
   b) 3!3!1!1!1!
   c) \( \binom{9}{3} \binom{6}{3} \binom{3}{1} \binom{2}{1} \)
   d) \( \binom{9}{6} \binom{6}{3} \)
   e) none of the above

12. What is the number of 3-permutations of \{ e, f, g, h \}? \( 4! \)

13. Five people are to be seated around a circular table. Two seatings are considered the same if one is a rotation of the other.
   How many seatings are possible? \( 4! \)

   How many are possible if John and Mary always insist on sitting next to each other? \( 2 \cdot 3! \)