

## Quiz 6 — MODEL SOLUTIONS

**1.** List five integers that are congruent to 3 modulo 7.  
3, -4, 10, 17, 24.

**2.** Write down rows 0 through 6 of Pascal's triangle.

$$\begin{array}{ccccccc}
 & & & & 1 & & \\
 & & & 1 & & 1 & \\
 & & 1 & & 2 & & 1 \\
 & 1 & & 3 & & 3 & & 1 \\
 1 & & 4 & & 6 & & 4 & & 1 \\
 & 1 & & 5 & & 10 & & 10 & & 5 & & 1 \\
 1 & & 6 & & 15 & & 20 & & 15 & & 6 & & 1
 \end{array}$$

**3.** Please compute:

$$\binom{5}{0} = 1$$

$$\binom{0}{0} = 1$$

$$\binom{12}{4} = \frac{12!}{4! \times 8!} = \frac{12 \times 11 \times 10 \times 9}{4 \times 3 \times 2 \times 1} = 495.$$

**4.** Expand  $(x - 1)^6$  using the Binomial Theorem.

$$x^6 - 6x^5 + 15x^4 - 20x^3 + 15x^2 - 6x + 1$$

**5.** A poker hand consists of 5 cards chosen from a standard deck of 52 cards.

(a) How many different poker hands are possible?  $\binom{52}{5}$

(b) A 'flush' is a poker hand in which all five cards are of the same suit. A 'straight' is a hand in which the five cards have consecutive numerical values. A 'straight flush' is a hand that is both a flush and a straight. How many different straight flushes are possible?  $4 \times 9$

(c) If a poker hand is chosen at random, what is the probability of getting a straight flush?  $\frac{4 \times 9}{\binom{52}{5}}$