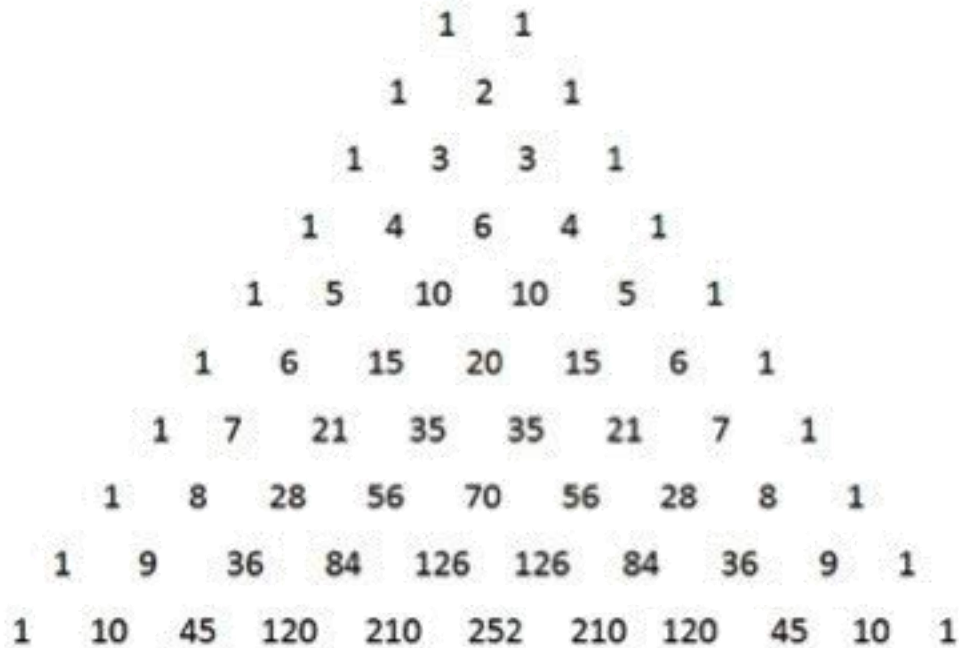PASCAL'S TRIANGLE – PRACTICE PROBLEMS

1. On the diagram below, the first ten rows of Pascal's Triangle are shown. Fill in the entries of the eleventh and twelfth rows.

```
                        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
            1   7   21  35  35  21   7   1
          1   8   28  56  70  56  28   8   1
        1   9   36  84  126 126  84  36   9   1
      1  10  45  120 210 252 210 120  45  10   1
```

2. Use Pascal's Triangle to find the value of each of the following. ALSO, use the combinations formula to check that the triangle gave you the right answer.

a) $C(7,2)$ b) $C(10,6)$ c) $C(11,4)$ d) $C(12,9)$

(Solutions on the next page...)

Solutions.

1. Just continue using the additive rule known as "Pascal's Identity" to find the 11th row (from the 10th row) and then the 12th row (from the 11th row).

```
                              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
                  1   7   21   35   35   21   7   1
 11th row       1   8   28   56   70   56   28   8   1
              1   9   36   84   126   126   84   36   9   1
 12th row   1   10   45   120   210   252   210   120   45   10   1
          (1   11   55   165   330   462   462   330   165   55   11   1)
        (1   12   66   220   495   792   924   792   495   220   66   12   1)
```

2. a) $C(7,2)$ b) $C(10,6)$ c) $C(11,4)$ d) $C(12,9)$
Answers:

```
                              1   1
                            1   2   1
                          1   3   3   1
                        1   4   6   4   1
                      1   5   10   10   5   1
       C(7,2)       1   6   15   20   15   6   1
                  1   7  [21]  35   35   21   7   1
                1   8   28   56   70   56   28   8   1
              1   9   36   84   126   126   84   36   9   1      C(10,6)
 C(11,4)    1   10   45   120   210   252  [210]  120   45   10   1
          1   11   55   165  [330]  462   462   330   165   55   11   1   C(12,9)
        1   12   66   220   495   792   924   792   495  [220]  66   12   1
```