

***** **Mathematical Weekly** *****
(week sixteen)

Squares and {1,2,3,4,5,6,7,8,9}

$$\begin{aligned}123456789 &= 3^2 \times 3607 \times 3803 \\&= 61728395^2 - 61728394^2 \\&= 20576133^2 - 20576130^2 \\&= 6858715^2 - 6858706^2 \\&= 18917^2 - 15310^2 \\&= 18133^2 - 14330^2 \\&= 11115^2 - 294^2\end{aligned}$$

$$\begin{aligned}987654321 &= 3^2 \times 17^2 \times 379721 \\&= 493827161^2 - 493827160^2 \\&= 164609055^2 - 164609052^2 \\&= 54869689^2 - 54869680^2 \\&= 29048665^2 - 29048648^2 \\&= 9682911^2 - 9682860^2 \\&= 3227705^2 - 3227552^2 \\&= 1708889^2 - 1708600^2 \\&= 570015^2 - 569148^2 \\&= 191161^2 - 188560^2\end{aligned}$$

$$\begin{aligned}123458769 &= 11113^2 - 200^2 = 11313 \times 10913 \\967854321 &= 31111^2 - 200^2 = 31311 \times 30911 \\123547689 &= 11117^2 - 200^2 = 11317 \times 10917 \\124958736 &= 11356^2 - 2000^2 = 13356 \times 9356 \\142958736 &= 12695^2 - 6017^2 = 18712 \times 6678 \\124958736 &= 16260^2 - 11808^2 = 28068 \times 4452 \\152976384 &= 12372^2 - 300^2 = 12672 \times 12072\end{aligned}$$

$$\begin{aligned}139854276 &= 11826^2 \\152843769 &= 12363^2 \\157326849 &= 12543^2 \\215384976 &= 14676^2 \\245893761 &= 15681^2 \\254817369 &= 15963^2 \\326597184 &= 18072^2\end{aligned}$$

361874529 = 19023²
375468129 = 19377²
382945761 = 19569²
385297641 = 19629²
412739856 = 20316²
523814769 = 22887²
529874361 = 23019²
537219684 = 23178²
549386721 = 23439²
587436129 = 24237²
589324716 = 24276²
597362481 = 24441²
615387249 = 24807²
627953481 = 25059²
653927184 = 25572²
672935481 = 25941²
697435281 = 26409²
714653289 = 26733²
735982641 = 27129²
743816529 = 27273²
842973156 = 29034²
847159236 = 29106²
923187456 = 30384²

Squares and {0,1,2,3,4,5,6,7,8,9}

1026753849 = 32043²
1042385796 = 32286²
1098524736 = 33144²
1237069584 = 35172²
1532487609 = 39147²
2081549376 = 45624²
3074258916 = 55446²
4728350169 = 68763²
7042398561 = 83919²
9814072356 = 99066²