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- 1) The expression $6a - 5a + 4a - 3a + 2a - a$ is equal to
 (A) $3a$ (B) $3a^6$ (C) 3 (D) $-21a$ (E) $-21a^6$
- 2) The expression $a + 1 + a - 2 + a + 3 + a - 4$ is equal to
 (A) $10a$ (B) 0 (C) $4a - 2$ (D) $4a + 2$ (E) $-2a$
- 3) If $x = 2$, then $(x + 2 - x)(2 - x - 2)$ equals
 (A) -12 (B) 4 (C) 0 (D) 12 (E) -4
- 4) In the addition shown, each of P , Q and R is a digit.

$$\begin{array}{r} PQR \\ + \quad QR \\ \hline 1012 \end{array}$$

The value of $P + Q + R$ is

- (A) 12 (B) 15 (C) 13 (D) 22 (E) 20
- 5) The list p, q, r, s consists of four consecutive integers listed in increasing order. If $p + s = 109$, the value of $q + r$ is
 (A) 108 (B) 109 (C) 110 (D) 117 (E) 111

- 6) In the addition shown, each of X , Y and Z represents a digit. What is the value of $X + Y + Z$?

- (A) 10 (B) 15 (C) 22
 (D) 20 (E) 8

$$\begin{array}{r} X \ Y \ Z \\ X \ Y \ Z \\ + \quad \quad Y \ Z \\ \hline 1 \ 6 \ 7 \ 5 \end{array}$$

- 7) In the addition problem shown, m , n , p , and q represent positive digits. When the problem is completed correctly, the value of $m + n + p + q$ is
 (A) 23 (B) 24 (C) 21
 (D) 22 (E) 20

$$\begin{array}{r} n \ 6 \ 3 \\ 7 \ p \ 2 \\ + \quad 5 \ 8 \ q \\ \hline m \ 0 \ 4 \ 2 \end{array}$$

- 8) If $x = 2y$ and $y \neq 0$, then $(x - y)(2x + y)$ equals
 (A) $5y^2$ (B) y^2 (C) $3y^2$ (D) $6y^2$ (E) $4y^2$

ANSWERS AND SOURCES

- 1) A, 2005 Pascal (Grade 9), #2
- 2) C, 2005 Cayley (Grade 10), #1
- 3) E, 2014 Fermat (Grade 11), #3
- 4) E, 2020 Gauss (Grade 8), #12
- 5) B, 2019 Pascal (Grade 9), #13
- 6) B, 2017 Cayley (Grade 10), #13
- 7) B, 2019 Cayley (Grade 10), #13
- 8) A, 2014 Cayley (Grade 10), #12