



22. If $x^2 - px - q = 0$, where p and q are positive integers, which of the following could not equal x^3 ?
- A $4x + 3$ B $8x + 5$ C $8x + 7$ D $10x + 3$ E $26x + 5$



- 22. B** Since $x^2 - px - q = 0$, it follows that $x^3 = px^2 + qx$.
But $x^2 = px + q$ and so $x^3 = p(px + q) + qx$, ie $x^3 = (p^2 + q)x + pq$.
The three possible values shown for pq are 3, 5 and 7.
If $pq = 3$, $p^2 + q = 1^2 + 3 = 4$ or $p^2 + q = 3^2 + 1 = 10$. Hence $4x + 3$ and $10x + 3$ could equal x^3 .
If $pq = 7$, we may take $p = 1, q = 7$ to get $p^2 + q = 1^2 + 7 = 8$. Hence $8x + 7$ could equal x^3 .
If $pq = 5$, we may take $p = 5, q = 1$ to get $p^2 + q = 5^2 + 1 = 26$. Hence $26x + 5$ could equal x^3 .
However, the only other possibility, $p = 1, q = 5$ gives $p^2 + q = 6 \neq 8$. Therefore $8x + 5 \neq x^3$.