State Polynomial Given Graph

If $a$, $b$, and $c$ are all positive real numbers, which graph could represent the sketch of the graph of $p(x) = -a(x+b)(x^2-2cx+c^2)$?

$p(x) = -a(x+b)(x^2-2cx+c^2)$

$x+b = 0$
$x = -b$

Given a graph, state a polynomial function in both factored and standard form that fits the given $x$-intercepts.

Zeros: $-3, 0, 4$

Factored form:

1) $P(x) = -1(x+3)(x-4)$
2) $P(x) = -x(x^2-4x+3x-12)$
3) $P(x) = -x(x^2-x-12)$
4) $P(x) = 3x^2 + 2x + 12x$

Standard form:
\( P(x) = (x+4)(x+1)(x-1)(x-3)(x-5) \)

\( P(x) = (x+5)(x+2)(x^2 + 7x + 10) \)

\( P(x) = (x-3)(x^3 + 6x^2 + 3x - 10) \)

\( P(x) = x^4 + 6x^3 + 3x^2 - 10x - 3x^3 - 18x^2 - 9x + 30 \)

\( P(x) = x^4 + 3x^3 + 15x^2 - 19x + 30 \)
\[ p(x) = (x+1)(x+1)(x-4)(x-4) \]

\[ y = (x+1)^3 \]

\[ \text{Roots: } -1, 4 \]
\[ \text{Multiplicity: } -1 \quad \frac{1}{4} \rightarrow 2 \]
\[ \frac{1}{2} \rightarrow 2 \]

\[ p(x) = (x+1)^2(x-4)^2 \]
11) $p(x) = -(x+4)(x-2)^2$

Roots multiplicity
-4 1
2 2

Root multiplicity
-5 1
0 3

$p(x) = -x^3(x+5)
$p(x) = -x^4 - 5x^3$

Homework: Worksheet