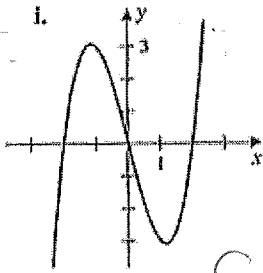## Graphing Polynomials

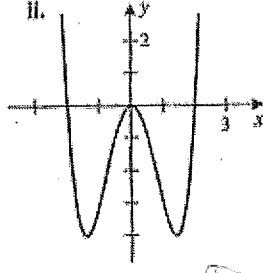**Name:** *Key*

1. Match the equation with the graph.
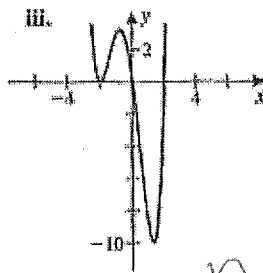
a. $y = x(x+2)^2(x-2)$ b. $y = x(x+2)(x-2)^2$ c. $y = x(x+2)(x-2)$ d. $y = x^2(x+2)(x-2)$
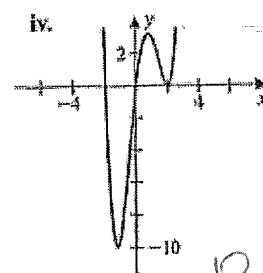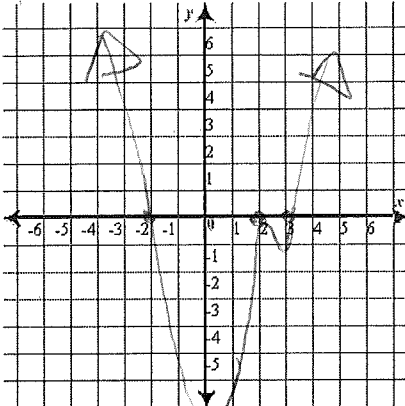
i.   ii.   iii.   iv.

C   D   A   B

Use the zeros and the end behavior of the polynomial function to roughly sketch the graph.
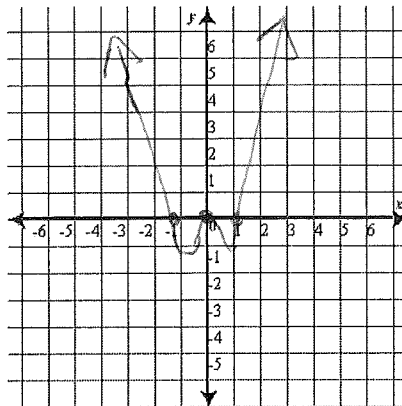
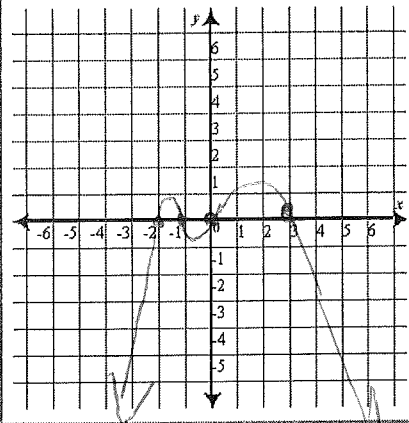**13.** $f(x) = (x-2)^2(x+2)(x-3)$

y-int: -24
EB: ↑↑

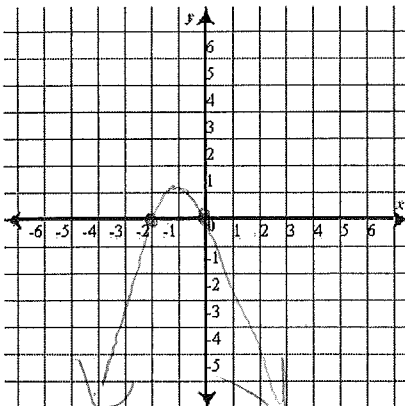**15.** $f(x) = x^2(x+1)(x-1)^3$

EB: ↑↑
y-int: 0

16. $f(x) = -x(x+1)(x+2)(x-3)$
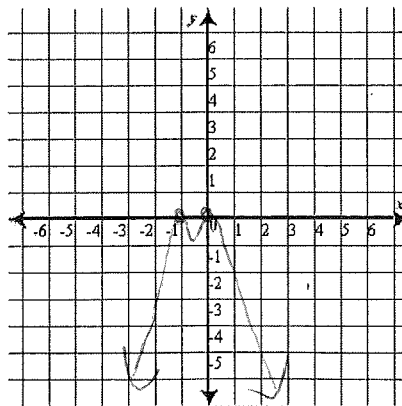
EB: ↓↓
y-int: 0

17. $f(x) = -x^3(x+2)$
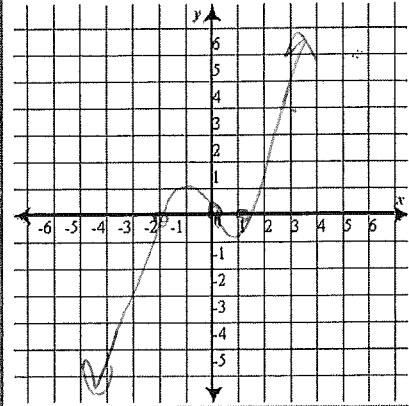
EB: ↓↓
y-int: 0

19. $f(x) = -x^2(x+1)^2$

EB: ↓↓

21. $f(x) = x^3 + x^2 - 2x$
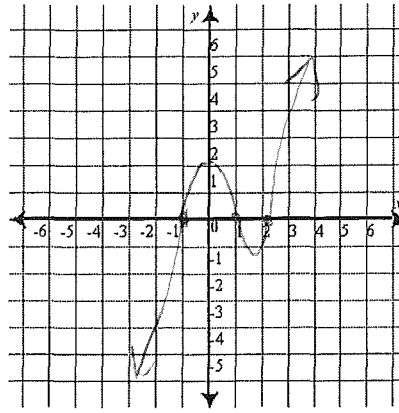
$x(x^2 + x - 2)$
$x(x+2)(x-1)$
EB ↓↑

31.

a. Write the equation and sketch the graph of a polynomial $P(x)$ that has zeros of multiplicity 1 at $x = 1$, $x = -1$ and $x = 2$

$(x-1)(x+1)(x-2)$

y-int: 2   EB: ↓↑

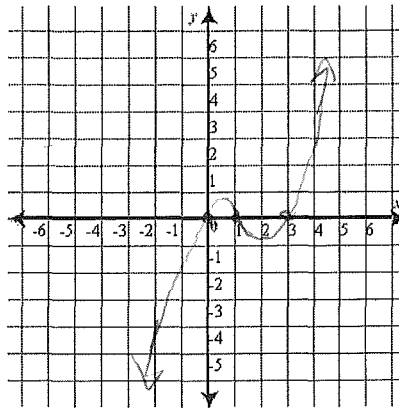b. What is the least possible degree of this polynomial?

3rd degree

32.

a. Write the equation and sketch the graph of a polynomial $P(x)$ that has zeros of multiplicity 1 at $x = 0$, $x = 1$, has a zero of multiplicity 3 at $x = 3$

$x(x-1)(x-3)^3$

EB: ↓↑   y-int: 0

b. What is the least possible degree of this polynomial?

5th degree

37. Determine the polynomial of degree 4 whose graph is shown in the figure.
(Write the equation after you find the zeros and multiplicity)

zeros

-2 m 1
2   m 1
0   m 2

$x^2(x-2)(x+2)$

or

$x^2(x^2-4)$

$x^4 - 4x^2$