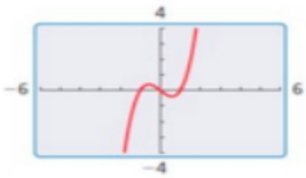
Sketching Polynomial Functions

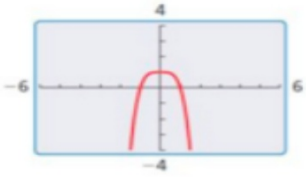
State the degree, y-intercept, and end behavior. Then match each polynomial to its graph.

1. $y = x^4 - x^2$	2. $y = x^3 - x$	3. $y = -x^4 + 1$	4. $y = -x^3 + x$
deg: 4 l.c. + y-int: 0 ↑↑ C $x \to -\infty$ $y \to \infty$ $x \to \infty$ $y \to \infty$	degree: 3 l.c. + y-int: 0 ↓↑ $x \to -\infty$ $y \to -\infty$ $x \to \infty$ $y \to \infty$ A	degree: 4; l.c. (−) y-int: 1 ↓↓ $x \to -\infty$ $y \to -\infty$ $x \to \infty$ $y \to -\infty$ B	degree: 3 l.c. (−) y-int: 0 ↑↓ $x \to -\infty$ $y \to \infty$ $x \to \infty$ $y \to -\infty$ D

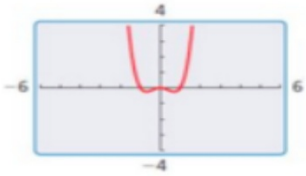
A.



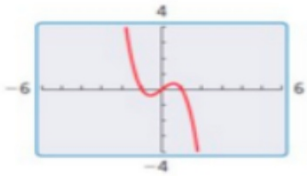
B.



C.



D.



To sketch a polynomial function you will need the...

a. x-intercepts (real zeros; determine whether the graph will cross or bounce at each zero)

b. y-intercept

c. degree and maximum number of turning points

d. end behavior

e. table of values

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

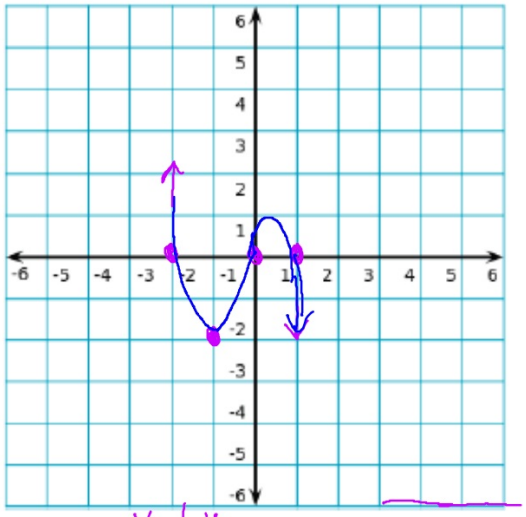
1. Sketch: f(x) = -x(x + 2)(x - 1)

a. $x = 0$, -2, 1
cross, cross, cross

b. y int: 0
(0,0)

c. 3 ; 2

d. degree: odd ↑↓
l.c. (←)



e.

x	y
0	0
-2	0
1	0
-1	-2

-2 1

2. Sketch: $g(x) = x^4 - 5x^2 + 4$

$0 = (x^2-4)(x^2-1)$

$0 = (x+2)(x-2)(x+1)(x-1)$

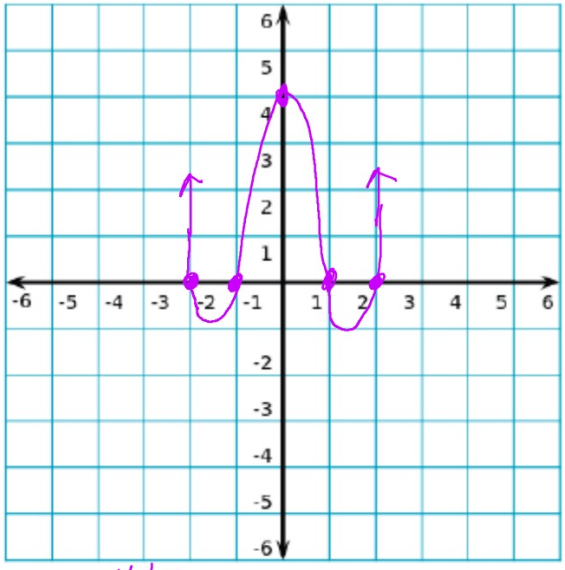
a. $-2, 2, -1, 1$

cross cross cross cross

b. $(0, 4)$

c. 4 ; 3

d. $\uparrow \uparrow$



e.

x	y
-2	0
-1	0
0	4
1	0
2	0

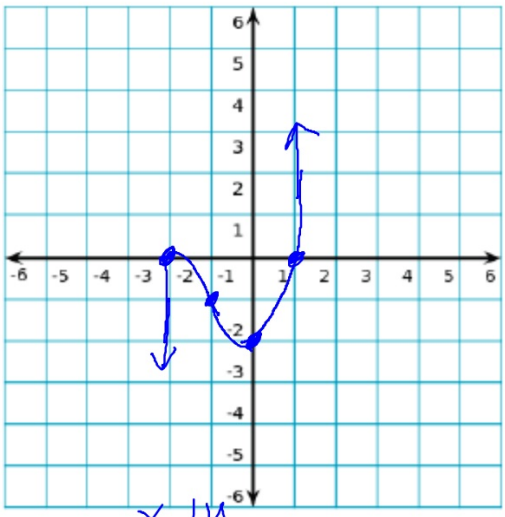
3. Sketch: $h(x) = \frac{1}{2}(x - 1)^{1}(x + 2)^{2}$ degree: 3

a. $x = 1$, -2
cross bounce

b. $(0, -2)$ $\frac{1}{2}(0-1)(0+2)^2$
$-\frac{1}{2}(4)$

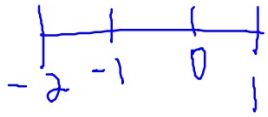
c. 3; 2

d. ↓↑



e.

x	y
-2	0
-1	-1
0	-2
1	0



4. Sketch: $m(x) = x^3 - x^2 - 4x + 4$

a.

$x^2(x-1) - 4(x-1)$

$(x^2 - 4)(x-1)$

$(x-2)(x+2)(x-1) = 0$

2, cross; −2, cross; 1, cross

b.

$(0, 4)$

x	y
−2	0
−1	6
0	4
1	0
2	0

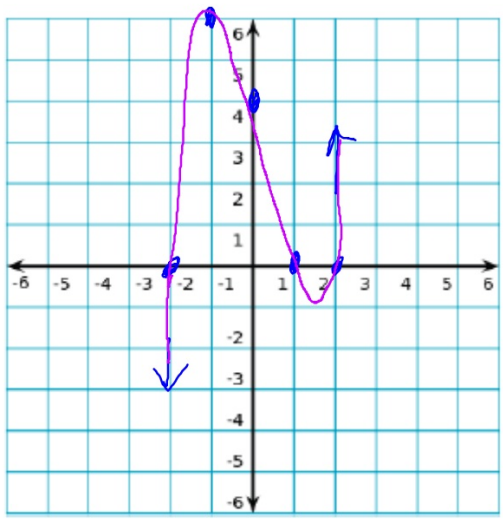
c.

deg : 3

max : 2

d.

↓ ↑



e.

5. Sketch: $p(x) = 4x^2 - 4x^3$

a. $0 = 4x^2(1-x)$

$x = 0$ bounce

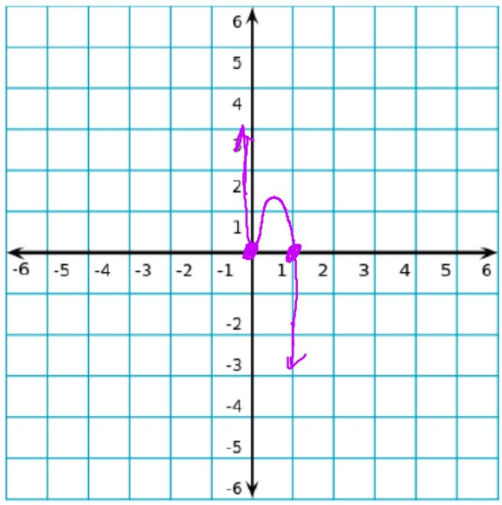
$x = 1$ cross

b. y int $(0,0)$

x	y
0	0
1	0

c. 3; 2

d. ↑ ↓



e.

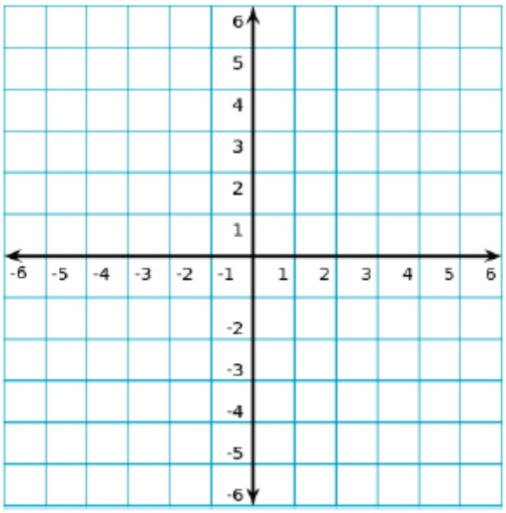
6. Sketch: $y = -x^4 + x^2$

a.

b.

c.

d.



e.