3. Consider the polynomial function $f(x) = x^5 + 18x^2 + 10x + 1.$

x	y
−5	−2724
−4	−775
−3	−110
−2	21
−1	8
0	1
1	30
2	125
3	436
4	1353
5	3626

Local maximum

Local minimum
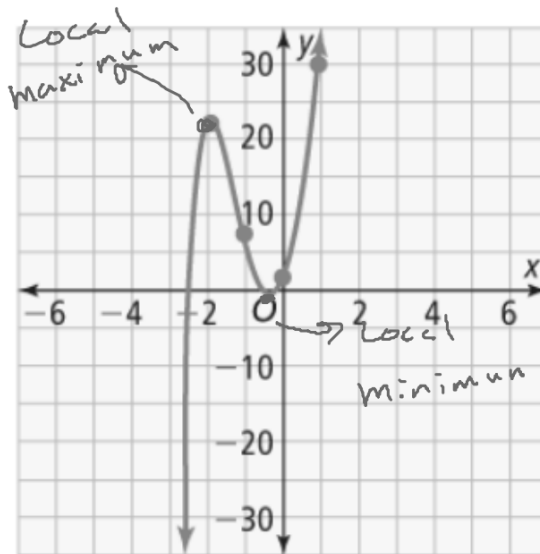
Local max/min

turning Points
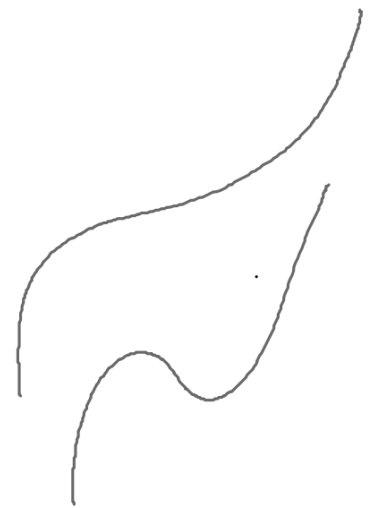
Use a table of values to estimate the intercepts
and turning points of the function. Then graph
the function. SEE EXAMPLE 3

Point (order pairs)	Interval
X-intercepts	Increasing
Y-intercepts	Decreasing
Local max	$f(x) > 0$
Local min	$f(x) < 0$

24. $f(x) = x^3 + 2x^2 - 5x - 6$

X-int $(-3,0)$ $(-1,0)$ $(2,0)$

Y-int $(0,-6)$

25. $f(x) = x^4 - x^3 - 21x^2 + x + 20$

X-inter

$(-4,0)$ $(-1,0)$ $(1,0)$ $(5,0)$
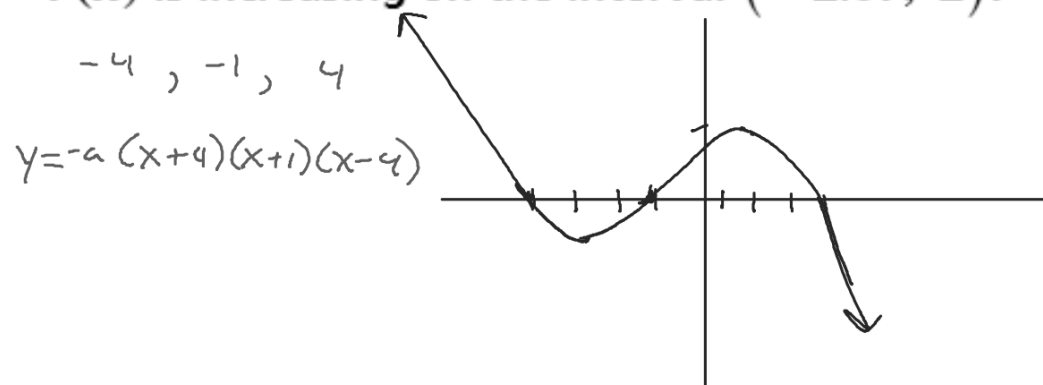
Y-int $(0,20)$

24)
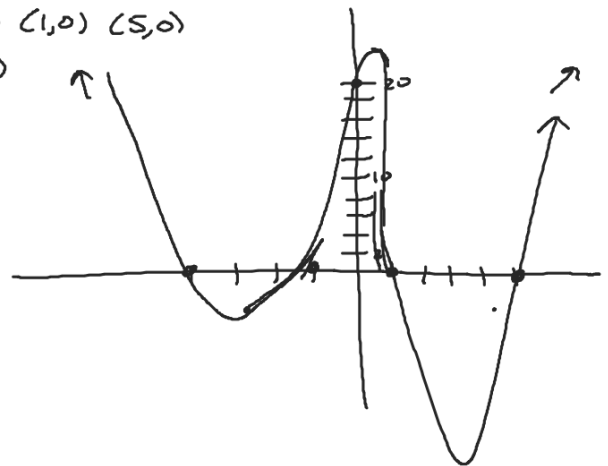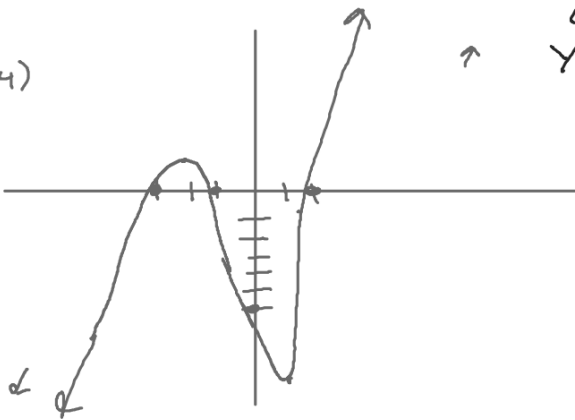
How can you sketch a graph of the polynomial function f from a verbal description?
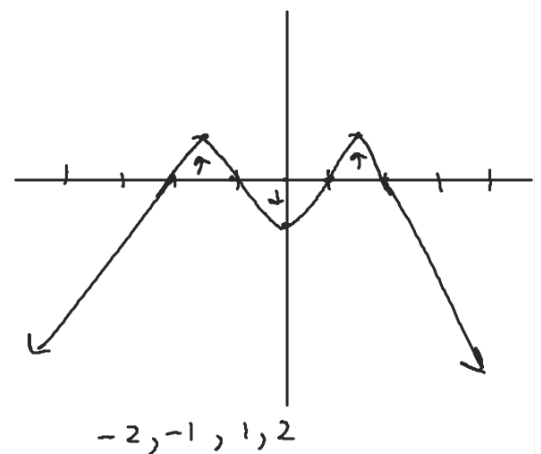
- $f(x)$ is positive on the intervals $(-\infty, -4)$ and $(-1, 4)$.

- $f(x)$ is negative on the intervals $(-4, -1)$ and $(4, \infty)$.

- $f(x)$ is decreasing on the intervals $(\underline{-\infty, -2.67})$ and $(2, \infty)$.

- $f(x)$ is increasing on the interval $(-2.67, 2)$.

$-4 \,,\, -1 \,,\, 4$

$y = -a (x+4)(x+1)(x-4)$

Try It!

4. Use the information below to sketch a graph of the polynomial function $y = f(x)$.

- $f(x)$ is positive on the intervals $(-2, -1)$ and $(1, 2)$.

- $f(x)$ is negative on the intervals $(-\infty, -2)$, $(-1, 1)$, and $(2, \infty)$.

- $f(x)$ is increasing on the intervals $(-\infty, -1.5)$ and $(0, 1.5)$.

- $f(x)$ is decreasing on the intervals $(-1.5, 0)$ and $(1.5, \infty)$.

$-2, -1, 1, 2$

$y = -a(x+2)(x+1)(x-1)(x-2)$

26. Use the information below to sketch a graph of the polynomial function $y = f(x)$. SEE EXAMPLE 4

- $f(x)$ is positive on the intervals $(-\infty, -3)$, $(-2, 0)$, and $(2, 3)$.

- $f(x)$ is negative on the intervals $(-3, -2)$, $(0, 2)$, and $(3, \infty)$.

- $f(x)$ is increasing on the interval $(-2.67, -1)$ and $(1, 2.5)$.

- $f(x)$ is decreasing on the intervals $(-\infty, -2.67)$, $(-1, 1)$, and $(2.5, \infty)$.