2) if a polynomial function is in factored form, then ignore all + and − constants from factors and then multiply all variables remaining to obtain the degree of the function.

---

4) the relationship between the degree of a polynomial and the maximum number of turning points in its graph is that the maximum number of turning points is one less than the degree of a polynomial.

for example: linear function: $y = mx + b$

degree 1 $\rightarrow$ max. turning point 0 (none)

quadratic function: $y = a(x-h)^2 + k$

degree 2 $\rightarrow$ max. turning point 1 (vertex)

cubic function: $y = ax^3 + bx^2 + cx + d$

degree 3 $\rightarrow$ max. turning points 2

$\vdots$

in general polynomial: $y = a_n x^n + a_{n-1} x^{n-1} + \dots + a_2 x^2 + a_1 x^1 + a_0$

degree n $\rightarrow$ max. turning points $(n-1)$

6) $f(x) = x^5$ polynomial

---

8) $f(x) = x - x^4$ polynomial

---

10) $f(x) = 2x(x+2)(x-1)^2$ polynomial $\boxed{\text{of degree 4 (see ex 2)}}$

---

12) $-3x^4$ degree: 4 leading coefficient L.C.: -3

---

14) $-2x^2 - 3x^5 + x - 6$ degree: 5 L.C.: -3

$= -3x^5 - 2x^2 + x - 6$

---

16) $x^2(2x-3)^2$ degree: 4 L.C.: 2

---

18) $f(x) = x^3$ to the left: down, to the right: up } overall Increasing

---

20) $f(x) = -x^9$ to the left: up, to the right: down } overall decreasing

22) $f(x) = 3x^2 + x - 2$

to the left: up
to the right: up } overall cup shape

---

24) $f(x) = (2-x)^7$

leading term: $-x^7$

to the left: up
to the right: down } overall decreasing

---

26) $g(n) = -2(3n-1)(2n+1)$

y-int: $g(0) = -2(3(0)-1)(2(0)+1) = 2$

n-int: $0 = g(n) = -2(3n-1)(2n+1)$

$3n-1=0$	$2n+1=0$
$3n=1$	$2n=-1$
$\underline{\underline{n=\frac{1}{3}}}$	$\underline{\underline{n=\frac{-1}{2}}}$

28) $f(x) = x^3 + 27$

$= x^3 + (3)^3$

$= (x+3)(\underbrace{x^2 + 3x + (3)^2}_{\text{not factorable}})$

y-int: $f(0) = (0)^3 + 27 = 27$

x-int: $0 = f(x) = (x+3)(x^2+3x+9)$

$x+3=0$

$\underline{\underline{x=-3}}$

---

30) $f(x) = (x+3)(4x^2-1)$

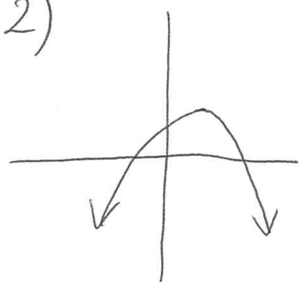
y-int: $f(0) = ((0)+3)(4(0)^2-1) = -3$

x-int: $0 = f(x) = (x+3)(4x^2-1)$

$0 = (x+3)(2x+1)(2x-1)$

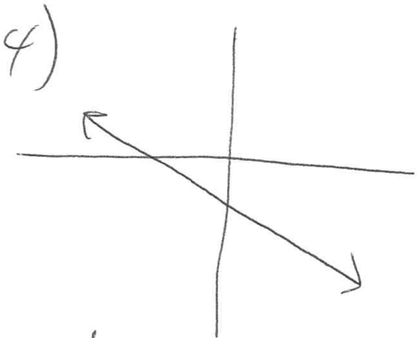
$x+3=0$	$2x+1=0$	$2x-1=0$
$\underline{\underline{x=-3}}$	$2x=-1$	$2x=1$
	$\underline{\underline{x=\frac{-1}{2}}}$	$\underline{\underline{x=\frac{1}{2}}}$

32)



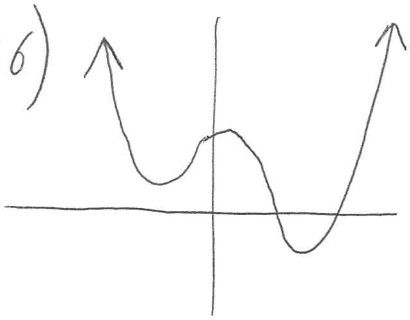
degree: 2

34)



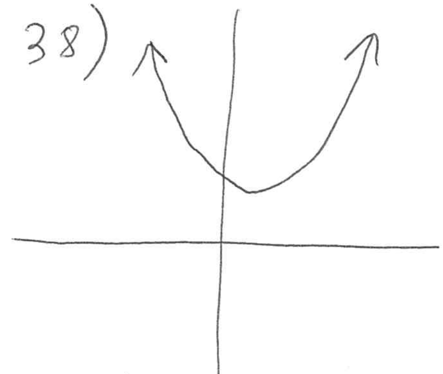
degree: 1

36)



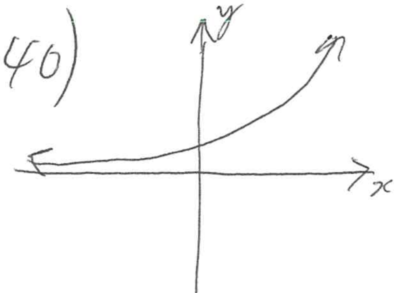
degree: 4

38)



degree: 2

40)

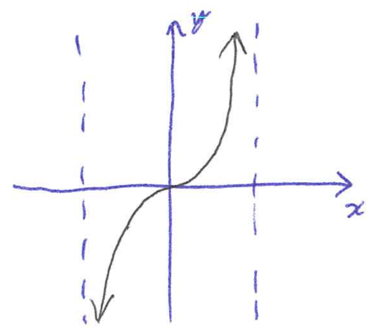


not a polynomial

this is power function

i.e. $y = b^x$

42)

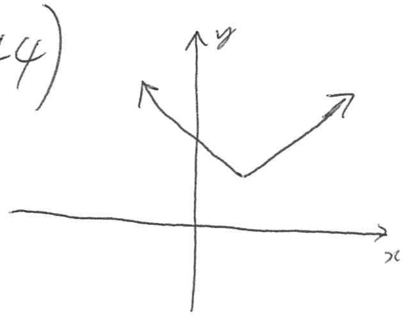


not a polynomial

this is trigonometric function

i.e. $y = \tan x$

44)



not a polynomial

this is absolute value function

i.e. $y = a|x-h| + k$

for exercises 46 - 50 use the leading term to determine the degree and end behavior of the function.

46) $f(x) = -x^3$ degree: 3 , $a<0$

to the left: up
to the right: down   } overall decreasing

---

48) $f(x) = x^2(1-x)^2 \rightarrow$ leading term: $+x^4 \rightarrow$ degree: 4 , $a>0$

to the left: up
to the right: up   } overall cup shape

---

50) $f(x) = \frac{x^5}{10} - x^4$ degree: 5 , $a>0$

to the left: down
to the right: up   } overall Increasing