Honors Math II

Unit 5 day 1

Name Key

Period_____ Date_____

Decide whether the function is a polynomial function. If so, write in in standard form and state its degree, type, and leading coefficient.

1. $f(x) = 8 - x^2$

$f(x) = -x^2 + 8$

degree 2 quadratic L.C.: -1

2. $f(x) = 6x + 8x^4 - 3$

$f(x) = 8x^4 + 6x - 3$

degree 4 quartic L.C.: 8

3. $g(x) = \pi x^4 + \sqrt{6}$

$g(x) = \pi x^4 + \sqrt{6}$

degree 4 quartic L.C.: π

4. $h(x) = x^3\sqrt{10} + 5x^{-2} + 1$

Not polynomial

(neg. exponent on variable)

5. $h(x) = -\frac{5}{2}x^3 + 3x - 10$

degree 3 cubic

L.C.: $-5/2$

6. $8x^3 - 4x^2 + \frac{2}{x}$

Not polynomial

(variable in denominator)

Use direct substitution to evaluate the polynomial function for the given value of x.

7. $5x^3 - 2x^2 + 10x - 15\,;\, x = -1$

$5(-1)^3 - 2(-1)^2 + 10(-1) - 15 = -32$

8. $g(x) = 4x^3 - 2x^5\,;\; x = -3$

$4(-3)^3 - 2(-3)^5 = 378$

9. $h(x) = x + \frac{1}{2}x^4 - \frac{3}{4}x^3 + 10\,;\, x = -4$

$(-4) + \frac{1}{2}(-4)^4 - \frac{3}{4}(-4)^3 + 10 = 182$

Use synthetic substitution to evaluate the polynomial function for the given value of x.

10. $f(x) = 5x^3 - 2x^2 - 8x + 16\,;\, x = 3$

3	5	-2	-8	16
	↓	15	39	93
	5	13	31	109

11. $g(x) = x^3 + 8x^2 - 7x + 35\,;\, x = -6$

-6	1	8	-7	35
	↓	-6	-12	114
	1	2	-19	149

12. $f(x) = -2x^4 + 3x^3 - 8x + 13\,;\, x = 2$

2	-2	3	0	-8	13
	↓	-4	-2	-4	-24
	-2	-1	-2	-12	-11

13. $h(x) = -7x^3 + 11x^2 + 4x\,;\, x = 3$

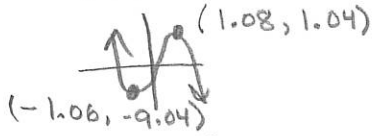
3	-7	11	4	0
	↓	-21	-30	-78
	-7	-10	-26	-78

14. $h(x) = -8x^3 + 14x - 35\,;\, x = 4$

4	-8	0	14	-35
		-32	-128	-456
	-8	-32	-114	-491

Describe the end behavior and the intervals where the graph is increasing and decreasing. Graphing calculator is suggested or desmos.com

15. $f(x) = -2x^3 + 7x - 4$



$x \to -\infty \; f(x) \to \infty$
$x \to \infty \; f(x) \to -\infty$

decrease $(-\infty, -1.05) \cup (1.08, \infty)$
increase $(-1.06, 1.08)$

16. $f(x) = x^3$

$x \to -\infty \; f(x) \to -\infty$
$x \to \infty \; f(x) \to \infty$

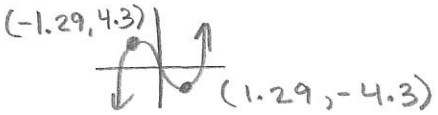
increase $(-\infty, \infty)$

17. $f(x) = -x^4$

$x \to -\infty \; f(x) \to -\infty$
$x \to \infty \; f(x) \to -\infty$

increase $(-\infty, 0)$
decrease $(0, \infty)$

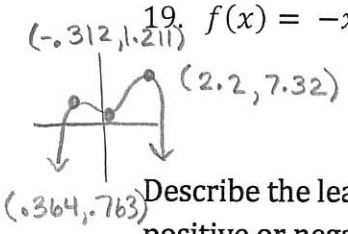
18. $f(x) = x^3 - 5x$



$x \to -\infty \; f(x) \to -\infty$
$x \to \infty \; f(x) \to \infty$

increase $(-\infty, -1.29) \cup (1.29, \infty)$
decrease $(-1.29, 1.29)$

19. $f(x) = -x^4 + 3x^3 - x + 1$

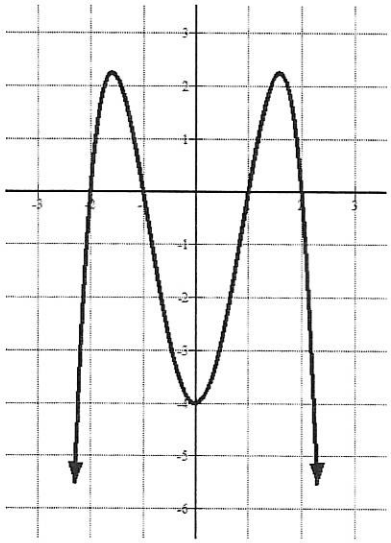


$x \to -\infty \; f(x) \to -\infty$
$x \to \infty \; f(x) \to -\infty$

increase $(-\infty, -.312) \cup (.364, 2.2)$
decrease $(-.312, .364) \cup (2.2, \infty)$

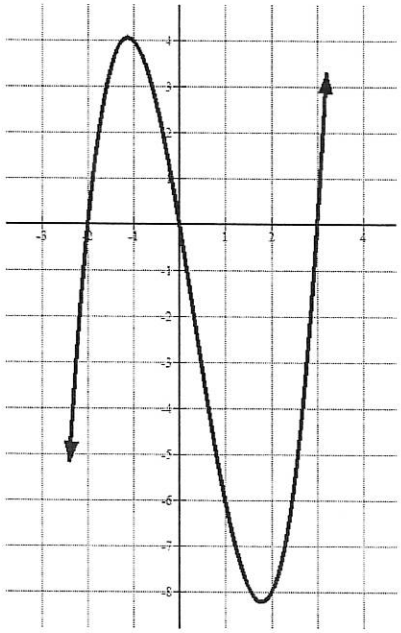
Describe the least degree of the polynomial function and state whether the leading coefficient is positive or negative for the given graphs.

20.



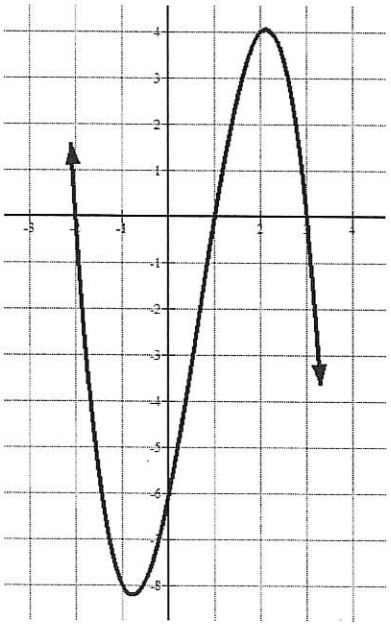
Degree 4
L.C. (−)

21.



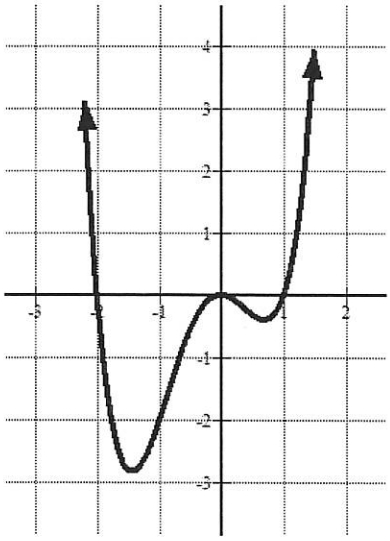
Degree 3
L.C. (+)

22.



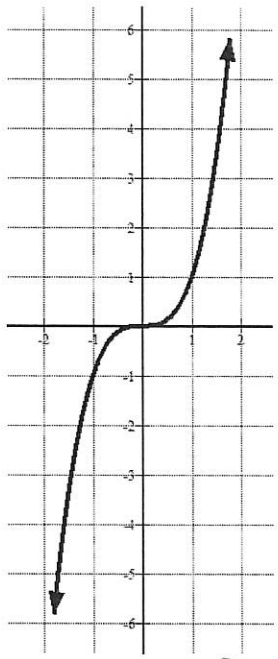
Degree 3
L.C. (−)

23.



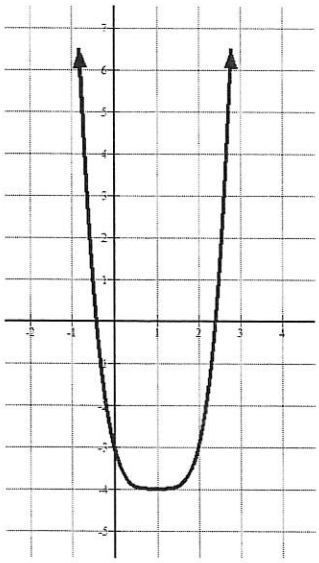
Degree 4
L.C. (+)

24.



Degree 3
L.C. (+)

25.



Degree 4
L.C. (+)

Factor the following polynomials completely.

26. $x^3 - 16x$

$x(x^2-16)$

$x(x+4)(x-4)$

27. $4x^3 + 12x^2 + 8x$

$4x(x^2+3x+2)$

$4x(x+2)(x+1)$

28. $8x^2 - 2x - 3$

$(4x-3)(2x+1)$

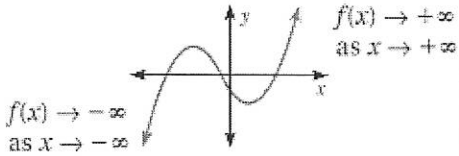
29. $9 - x^2$

$(3-x)(3+x)$

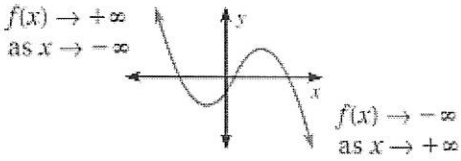
KEY CONCEPT *For Your Notebook*

End Behavior of Polynomial Functions

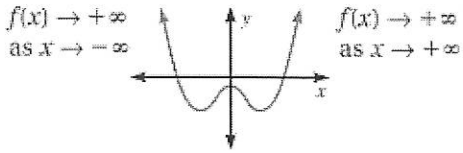
Degree: odd
Leading coefficient: positive



Degree: odd
Leading coefficient: negative



Degree: even
Leading coefficient: positive



Degree: even
Leading coefficient: negative