NAME: _____ Class:_____

Intro to Polynomials Test Review (*problems are NON_Calculator)

#1 – 2. Classify each polynomial by degree and number of terms.

*1. $-3x^4 - 2x^3$

*2. $7x^5 - 9x^4 - 6x^2 + 8$

3 . Write $-4x^2(3x^2 + x^3)$ in standard form. Then classify it by degree and number of terms.

4. Zach is trying to build a box out of a rectangular piece of cardboard that measures 8 inches on one side and 12 inches.By cutting 4 squares from the corners of the rectangle, of length x, a box can be formed by folding the sides up.

The function $\boldsymbol{v(x) = 3x^3 - 30x^2 + 72x}$ models the different volumes with respect to the different values of x. For the function $v(x)$, what are the x-intercepts?

5. Which of the following would represent a reasonable domain for the volume of the box as a function of height, x, as expressed by the function $v(x)$ shown in #4? (Use interval notation)

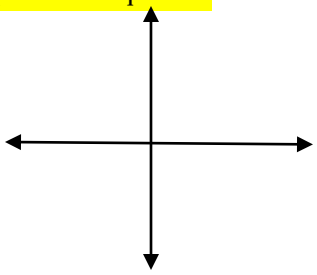
6. The table shows the number of hybrid cottonwood trees planted in tree farms in Oregon since 1995. Find a cubic function to model the data and use it to estimate the number of cottonwoods planted in 2007.

Years since 1995	1	3	5	7	9
Trees planted (in thousands)	1.3	18.3	70.5	177.1	357.3

7. Find the zeroes of $f(x) = (x + 2)^4(x - 9)^3$ and state the multiplicity.

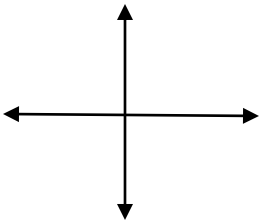
8. Write a polynomial function in standard form with zeros at 3, –5, and –2.

*9. Find the zeroes of $y = x(x + 4)(x - 3)$. Then sketch the graph of the equation.

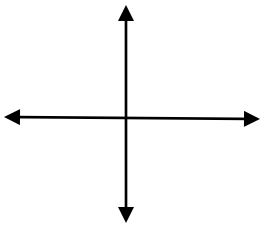


#10-11: Describe the end behavior of the functions. Sketch the graph.

*10. $f(x) = x^5 - x^3 + x - 4$



*11. $h(x) = -x^8 - 3x^4 - 9$



#12-14: Write the expression as a polynomial in standard form.

12. $(2x - 1)(x + 3)(-3x)$

13. $(x + 3)(x + 2)(x - 5)$

14. $(-2x)(x + 4)^2$

#15-18: Factor the expression completely.

15. $2x^4 - 12x^3 + 16x^2$

16. $2x^3 + x^2 + 6x + 3$

17. $x^4 - 40x^2 + 144$

18. $8x^3 + 216$

#19-22: Factor the expression completely and solve.

19. $x^3 - 5x^2 - 4x + 20 = 0$

20. $x^3 + 3x^2 - 4x = 0$

21. $x^3 - 27 = 0$

22. $x^4 - 25x^2 + 144 = 0$

#23-24: Write the factor that corresponds to each zero.

23. $x = -\frac{3}{4}$

24. $x = -8$

#25-26: Write the zero that corresponds to each factor.

25. $x - 10$

26. $2x - 5$

#27-28: Divide using long division. Determine whether the binomial is a factor of the polynomial.

27. $(x^4 + 20x^3 + 74x^2 + 31x - 36) \div (x + 4)$

28. $(x^3 + 3x^2 - 11x + 4) \div (x + 6)$

#29-30: Divide using synthetic division. Determine whether the binomial is a factor of the polynomial.

29. $x^4 - 2x^3 - x^2 - 4x - 6$ by $x + 2$

30. $x^3 + x^2 - 16x - 16 \div x + 2$

*#31-32: Graph the following

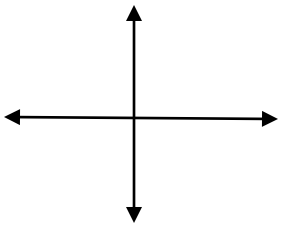
A) Identify all zeroes using factoring and/or synthetic division

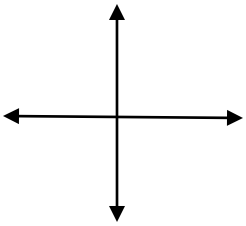
B) Identify end behavior and possible # of turns

C) Sketch the graph to ensure your graph is a close replica of the real graph.

*31. $x^3 + x^2 - 8x - 12$

* 32. $x^4 - 6x^3 - 19x^2 + 24x$





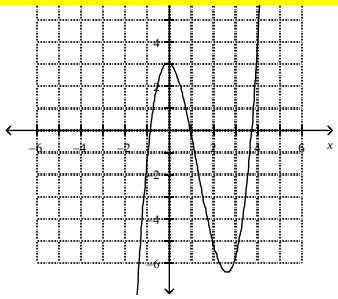
33. Use synthetic division to find $P(3)$ for $P(x) = x^4 - 8x^3 - 9x^2 + 7x - 7$.

34. Given $p(x) = x^4 - 10x^3 + 8x^2 + 106x - 105$, use synthetic division to determine $p(-2)$.

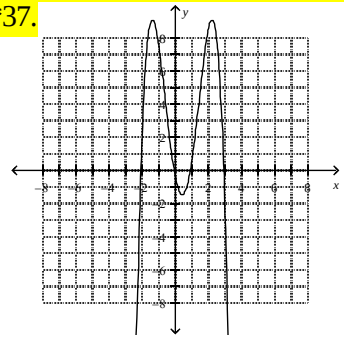
35. The volume of Link's treasure chest in cubic feet can be expressed as the polynomial $2x^3 - 19x^2 + 54x - 45$. Each dimension of the box (length, width and height) can be expressed as a linear expression with integer coefficients. If $x - 5$ is one of those dimensions, find the other two.

#36-37: Determine if the following graph has an odd or even degree and a positive or negative leading coefficient.

*36.



*37.



38. "Key Attributes"

Let $g(x) = -x^4$.

a. What is the end behavior of g(x)?
b. What is the x-intercept of the graph of $y = g(x - 3)$?
c. What is the y-intercept of g(x)?
d. What is the domain of g(x)?
e. Is g(x) an odd or even degree?

39. Transformation Review

The cubic parent function, $f(x) = x^3$, is transformed to $h(x) = (3x)^3 + 2$.

a. What is the end behavior of h(x)?
b. How is h(x) being translated?
c. What is the y-intercept of h(x)?
d. What is the domain of h(x)?
e. Is h(x) an odd or even degree?
f. How is h(x) being stretched or compressed?

40. Graph the following: $x^3 + 2x^2 + x + 2$; find all the zeroes, identify end behavior and sketch an accurate replica of the graph. STATE ALL THE ZEROES (Real and imaginary)