Name: _____ Date:_____ Period: _____ **ID: 2**

Unit 5 Corrective Assignment – Polynomials

Pre-Calculus

1. $f(k) = 10k - 7k^4 - 10k^3$

Degree: _____

Leading Coefficient: _____

2. $h(t) = t - 6 + 9t^3$

Degree: _____

Leading Coefficient: _____

3. $(6x^3 + 8x) - (3x^3 + 5x + 7x^4)$

4. $(5w^2 - 7)^2 - (2w^4 - 3)$

Factor each completely:

5. $27r^2 - 75$

6. $9x^6 - 3x^3 - 90$

7. $13n^3 + 4n^2 - 13n - 4$

Solve each of the equations. Give exact answers and find ALL solutions (real and imaginary).

8. $x^3 + 13x = 4x^2$

9. $x^4 - 12x^2 = -32$

10. $x^3 + x = 2x^2 + 2$

11. List all the real zeros of $f(x) = x^5 + 3x^4 - x^3 - 3x^2 - 2x - 6$ given that $f(-3) = 0$

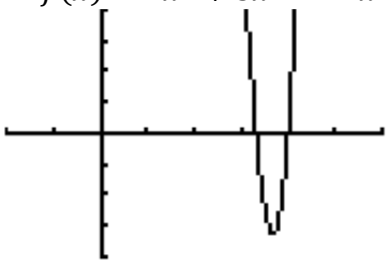
12. Use long division to divide $(15k^3 - 54k^2 + 39k - 33)$ by $(3k - 9)$.

13. Use synthetic division to divide $(5x^4 + 43x^3 - 18x^2 + 6)$ by $(x + 9)$.

14. Is $(4x - 1)$ a factor of $(4x^3 + 3x^2 - 5x + 1)$? Show any work that leads you to your conclusion.

15. A portion of the graph of $f(x)$ is shown below. Use the graph to determine one zero, then find the exact values of all the zeros using the Factor Theorem.

$f(x) = 2x^4 + 5x^3 - 74x^2 - 55x + 572.$



WINDOW
Xmin=-2
Xmax=6
Xscl=1
Ymin=-20
Ymax=20
Yscl=5
↓Xres=1

For 16-19, one zero is given of $f(x)$. List one other zero.

16. $13 + 62i$

17. $31i$

18. $5i - 13$

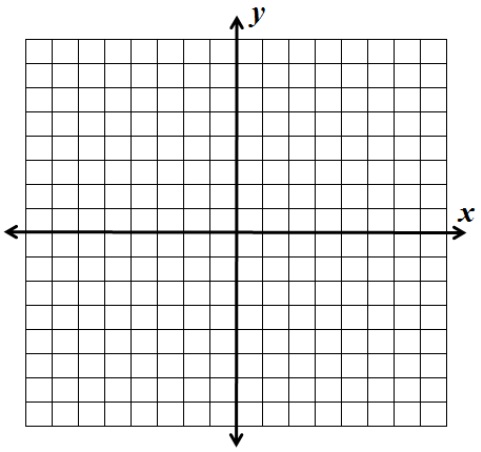
19. $\sqrt{17} - 12i$

For 20-21, list the possible numbers of positive real zeros and negative real zeros.

20. $f(x) = x^6 + 2x^3 - x^2 + 1$

21. $h(x) = 7x^3 + 12x - 1$

22. Factor the function $f(x) = 3x^4 + 14x^3 - 80x^2 - 350x + 125$ and sketch the graph if $f(-5) = 0$. (zeros and end behavior are vital)



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23. $f(x) = x^2(4 - x)(x - 6)^2(x + 5)^3$

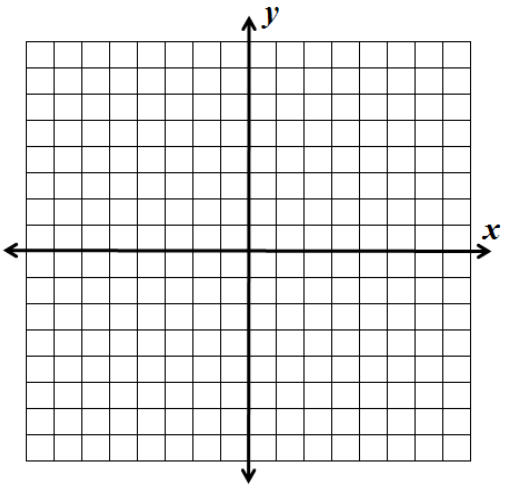
a. How does the graph behave with relation to the x-axis at $x = 0$?

b. What are the real zeros of the function?

c. What is the degree of the function?

d. What is the sign of the leading coefficient?

e. Describe the end behavior using limit notation.



f. Sketch a possible graph.

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24. Given the graph of $g(x)$, identify the following:

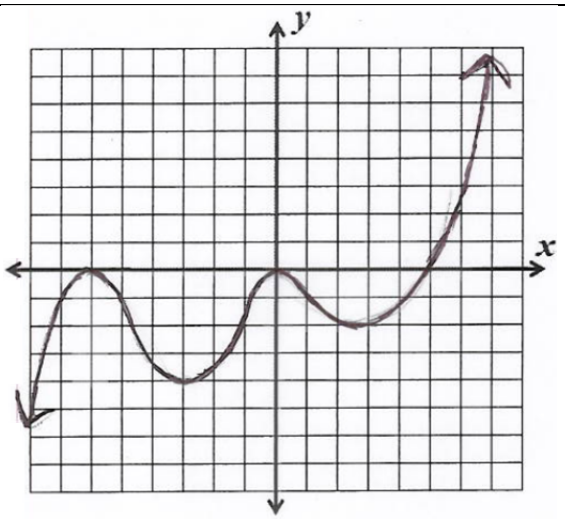
a. Local minimum value(s)

b. Local maximum value(s)

c. Minimum Degree

d. Sign of leading coefficient.

e. Write out a possible function for the graph. Leave it in factored form.



25. A projectile is fired upwards from the ground. The height of the projectile above the ground is shown in the table to the right.

Time (seconds)	Height (feet)
0	0
0.5	20.5
1	31.36
1.5	36.25
2	30.41
2.5	28.23

a. Find a *cubic* regression model to represent the height of the projectile.

b. Use the model to estimate the height after 3 seconds. Round to three decimal places.

c. According to the model, how many seconds after launch would the object be 10 feet in the air?

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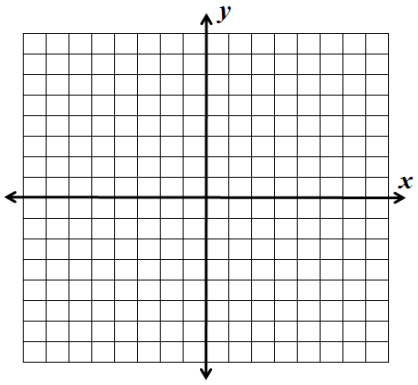
26. Sketch (freehand) a graph of a function f that satisfies all of the following conditions:
   a. $f(0) = 0$
   b. $(x + 3)$ is a factor of f and has a multiplicity of 4.
   c. The leading coefficient is negative.
   d. $f(-4) = 5$
   e. $f(x) < 0$ only when $x > 2$.



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27. A rectangular container measuring 7 feet by 5 feet by 2 feet is coated with a protective coating of plastic of uniform thickness.
   a) Find the volume of plastic V as a function of the thickness x (in feet) of the coating.

   b) Find the volume of the plastic coating to four decimal places if the thickness of the shielding is 0.005 feet.

Skillz Review: Find the x- and y-intercepts for each function. SHOW ALL WORK!

1. $7x + 11y = 55$

x-int:

y-int:

2. $f(x) = \frac{x^2-x-12}{4x^2-36}$

x-int:

y-int:

Answers to Unit 5 Corrective Assignment

1. Deg: 4
LC: -7

2. Deg: 3
LC: 9

3. $-7x^4 + 3x^3 + 3x$

4. $23w^4 - 70w^2 + 52$

5. $3(3r - 5)(3r + 5)$

6. $3(x^3 + 9)(3x^3 - 10)$

7. $(13n + 4)(n - 1)(n + 1)$

8. $x = 0,\ 2 \pm 3i$

9. $x = \pm 2,\ \pm 2\sqrt{2}$

10. $x = 2,\ \pm i$

11. $-3,\ \pm i,\ \pm\sqrt{2}$

12. $5k^2 - 3k + 4 + \frac{3}{3k-9}$

13. $5x^3 - 2x^2 + \frac{6}{x+9}$

14. Yes

15. $x = 4,\ -\frac{13}{2},\ \pm\sqrt{11}$

16. $13 - 62i$

17. $-31i$

18. $-5i - 13$

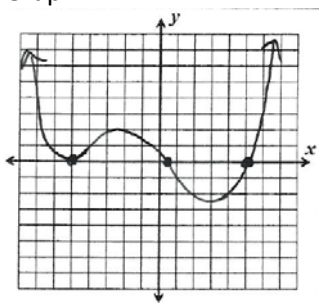
19. $\sqrt{17} + 12i$

20.
Pos. zeros: 2 or 0
Neg. zeros: 2 or 0

21.
Pos. zeros: 1 or 0
Neg. zeros: 0

22. Factored form:
$(3x - 1)(x - 5)(x + 5)(x + 5)$

Graph:

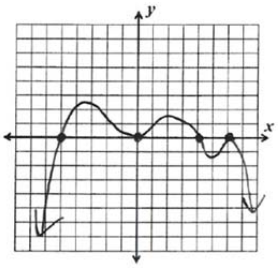


23.
a. tangent
b. 0, 4, 6, -5
c. 8
d. negative

e.
$\lim_{x \to -\infty} f(x) = -\infty$

$\lim_{x \to \infty} f(x) = -\infty$

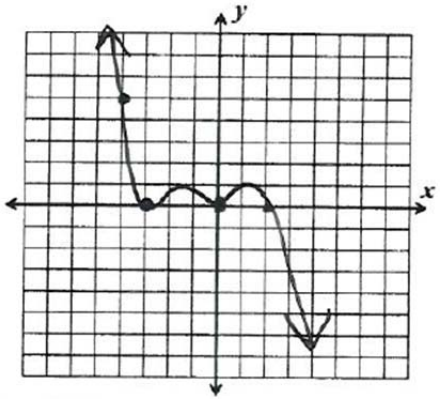
f.



24.
a. -4 and -2
b. 0
c. 5
d. positive
e. $f(x) = x^2(x + 6)^2(2 - 5)$

25.
a. $y = 3.868x^3 - 2.377x^2 + 55.471x - 0.273$
b. $y(3) = 24.187$ feet
c. 0.205 seconds

26.



27.
a. $V(x) = (7 + 2x)(5 + 2x)(2 + 2x) - 70$
b. $V(0.005) = 0.591$ cubic feet

Skillz Review

1.
x-int: $\frac{55}{7}$ y-int: 5

2.
x-int: 4 y-int: $\frac{1}{3}$