Name:_____ Class:_____ Date:_____ ID: A

Mid Term Review

Completely Factor and Graph #4

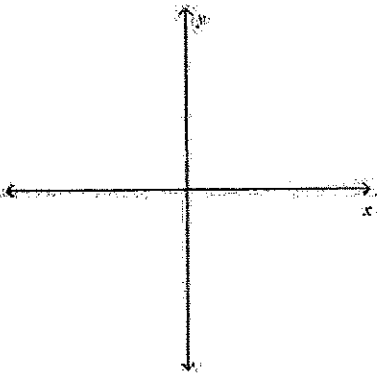
1. A)Completely Factor $x^4 - 18x^2 + 81$_____

   B) What are the zeros_____

   C)What is the Y intercept?_____ D)Degree =_____

   E) What is the end behavior $x \to -\infty$ $f(x) \to$____
   $x \to +\infty$ $f(x) \to$____

   Sketch the Graph



2. Factor $x^3 - 64$

   Answer_____

3. A rock is dropped from a bridge from a height of 576 feet. The hight of the bridge is modeled by the equation $h(t) = -16t^2 + 784$, where $h(t)$ is the height of the bridge in feet and t is the time in seconds. When will the rock hit the water. (Show your work by factoring and include proper units.

   A)Factored Form_____
   B) Answer t =_____

• What values of x make the equation true?

$$\frac{5}{x+5} = \frac{10}{x^2-25}$$

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(4) Find the Quotient.

$(x^3+2x^2-22x-45)\div(x+5)$

Show work.

(6)

$(x^3-x^2-x-2)\div(x-2)$

Answer_____

(5) Divide.

$(2x^3-14x+10)\div(x+3)$

Answer_____

Quotient_____ B) Is the divisor a factor?_____ List the Divisor

C)Why or Why Not?_____

7. **Use synthetic division to divide.**

$\left(3x^3+19x^2+30x+8\right)\div(x+4)$

Answer_____

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Factor the polynomial completely. You Must Show Work on 9-11

8. $49y^2 - 36$

Answer:_____

9. $x^5 - 5x^3 + 4x$

Answer_____

10. $8x^2 - 6x - 27$

Answer_____

11. $15x^3 + 5x^2 + 15x + 5$

Answer_____

12. A)Completely write in $5x^3 + 5x^2 - 30x$ in factored form.

A) _____

B) What are the zeros_____

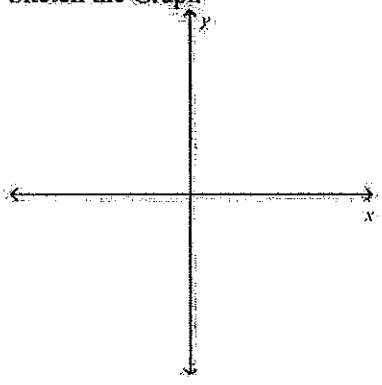
C)What is the Y intercept?_____

D) Degree =_____

E) What is the end behavior

$x \to -\infty$ $f(x) \to$____ $x \to +\infty$ $f(x) \to$____

Sketch the Graph



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13. The table shows the growth of a dandelion plant over the course of 5 days. What is the average rate of change in the growth of the Dandelion from Day 1 to Day 4? Round your answer to the nearest hundredth.

Day	1	2	3	4	5
Height of Plant (In Inches)	.20	.25	.35	.50	.70

14. What is the remainder when $f(x) = x^3 + 5x^2 - 2x - 6$ is divided by (x-2)

15. What is the x-intercept of $f(x) = (x-2)(x+3)(x+1)$?

16. Is (x+2) a factor of $x^4+10x^3+21x^2+4x-8$ your reasoning.

17. The table shows the daily account balance of a checking account.

Day	1	2	3	4	5
Account Balance (in dollars)	355.75	325.16	317.22	280.68	154.37

What is the average rate of change in the account balance from Day 1 to Day 4.

18.

19. A function h(x) is used to represent the number of items sold at a store during business hours x. The table shows some values for the function.

x	0	1	2	3	4
h(x)	0	15	23	37	?

The average rate of change of h(x) over the interval $1 \le x \le 4$ is 21.

What is the missing value in the table?

20. A polynomial, f(x), is divided by four different linear expressions, as listed in the table. The resulting remainders after the division by each linear expression are as shown in the table.

Linear Expression	Remainder
$x-1$	2
$x+1$	0
$x-3$	4
$x+3$	0

What are possible roots?

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21. Select the factors of $x^3 + 5x^2 - 5x - 25$
Mark the box of each factor

	$x-5$	$x+5$	$x-10$	$x+10$	x^2+5
$x^3+5x^2-5x-25$					

22. The difference of cubes identity will be used to determine the difference between 216 and 64.

$$a^3 - b^3 = (a-b)(a^2+ab+b^2)$$

$$216 - 64 = (2)(36+24+16)$$

What values of a and b should be used? Select the two that apply.
M. $a = 6$
P. $a = 10$
R. $a = 18$
S. $b = 4$
T. $b = 8$
V. $b = 16$

23. Given the polynomial $2x^2 + 11x - 15$, determine the values of x where the graph of the polynomial crosses the x axis.

Select one value from each box to correctly complete the following statements.

One Solution to x is

A) -2.5
B) 2.5
C) 5
D) -5

The Other Solution to x is

E) -1.5
F) 3
G) 1.5
H) -3

24. Select all expressions that are equivalent to $3x^5 - 6x^4y + 3x^3y^2$
A) $3x^3(x-y)$
B) $3x^3(x^2-2xy-y^2)$
C) $3x^3(x+y)^2$
D) $3x^3(x-y)(x+y)$
E) $3x^3(x-y)(x-y)$

25. Select all the soltuions to the equation $x^2 + 2x + 10 = 0$
A) 2
B) 5
C) $-1-3i$
D) $-1+3i$
E) $-1-i\sqrt{11}$
F) $-1+i\sqrt{11}$

Factor.

26. Which is the correct factorization of the expression $x^4 - 256$

27. Consider the expression $(x^2-9)(x-2)$
Select all the values of x for which $(x^2-9)(x-2) = 0$

A) -3	B) 3	C) 1	D) -2
E) 0	F) 2	G) -3	H) 9