Name: _____ CC Algebra 2 Midterm Review #1

1) Use any method to find the product.

a) $(2x^2 - 3x + 5)(x - 2)$

b) $(xy - 3)^3$

2) a. Use long division to divide: $(-x^3 + 3x^2 + x) \div (x - 2)$

b. Is $(x - 2)$ a factor of the polynomial ?

3) Simplify the expression using only positive exponents

$$\frac{7x^{-3}y^9}{(2x^4y^{-6})^{-2}}$$

4) Express the following with a rational denominator:

$$\frac{4}{3+\sqrt{2}}$$

5) Express in simplest radical form: $\sqrt{245x^3y^7}$

6) Factor each expression completely:

a) $3m^4 - 75$ b) $72 + 18x - 2x^2$ c) $20x^2 - 14x - 24$

d) $x^4 + 3x^3 - 4x^2 - 12x$ e) $4x^2y^4 - 25x^4z^6$ f) $9x^2y^2 - 18xy + 8$

i) $3y^4 + 9y^2 - 6y^3 - 18y$

7) Find the product of the following, in simplest a + bi form.

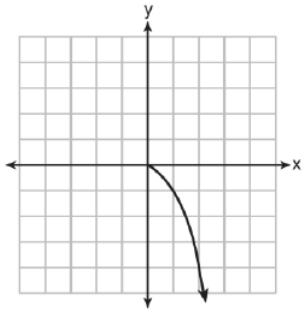
$-6 + \sqrt{-49}$ and $2 - \sqrt{-81}$

8) Simplify the expression: $i^{100} + i^{101} + i^{102}$

9) Find the product in simplest a + bi form: $(6+2i)(4-3i)$

10) If $g(x) = x^2 - 4x + 3$, find the value(s) of x if $g(x) = 0$.

11) Determine the domain and range of the given graph.



12) If $f(x) = x^2$ and $g(x) = 2x + 1$, then determine $f(g(3x))$.

13) Given function tables on the right, find each:

a) f(g(3)) b) g(g(4))

x	1	2	3	4	5
f(x)	3	4	5	6	7

x	3	4	5	6	7
g(x)	4	6	8	10	12

14) Find the domain of each given function below:

a) $f(x) = \frac{-3}{x^2 - 1}$ b) $g(x) = \sqrt{2x + 8}$ c) $h(x) = \frac{1}{\sqrt{5 - x}}$

15) Find the inverse of the following functions:

a. $f(x) = \sqrt{x - 4}$ b. $g(x) = \frac{x}{x+1}$

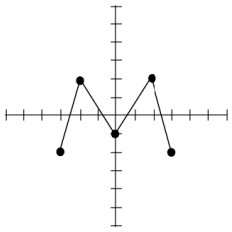
16) Using the tables on the grid, find the average rate of change on the interval [9, 12].

x	1	3.8	4.7	9	13.8	12
y	3	5.1	8.7	15.8	25.1	30.86

17) Find the average rate of change for each function below:

$f(x) = x^2 - 4x - 12$ on $[-1, 7]$

18) Determine if each is even, odd, or neither. Justify your reasoning.

a) 

b) $y = |x| - 3$

c) $y = x^2 - 3$

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

19) Find the sum in simplest radical form: $\sqrt{5x} + 7\sqrt{80x} + 2\sqrt{180x}$

20) Solve the equation using any method, and show in simplest radical form.

$x^2 + 4 = -12x$

21) Solve the equation and express the roots in simplest a + bi form:

$$x(x - 8) = -17$$

22) Find the solution set, algebraically: $2x^2 = y - 2x - 7$

$$10 = y - x$$

23) Find the solution set, algebraically: $x + y = 1$

$$x^2 + y^2 = 61$$

25) Find the solution set: $\sqrt{x+4} + 2 = x$

26) Write the equation of the quadratic given that one root is 4 - 3i.

27) Write the equation of the quadratic given that one root is 5 + 2i.

28) Solve the polynomial equation for all zeros: $2x^3 + 14x^2 + 20x = 0$

29) Determine the nature of the roots of the quadratic $-3x^2 + 4x - 2 = 0$.

30) Consider the polynomial function: $f(x) = x^3 + 2x^2 - 13x + 10$

a) Show that $x = 4$ is not a zero of the function.

b) Given $x = 1$ is a zero, what must be a factor of $f(x)$?

c) Find the remaining zeros.

d) Express the polynomial in terms of linear factors.