Name: _____ CC Algebra 2R Midterm Review #2

1) Given i is the imaginary unit, $(2-yi)^2$ in simplest form is

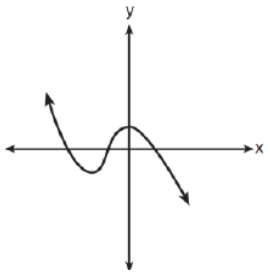
1) $y^2 - 4yi + 4$
2) $-y^2 - 4yi + 4$
3) $-y^2 + 4$
4) $y^2 + 4$

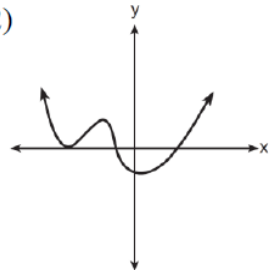
2) Which factorization is *incorrect*?

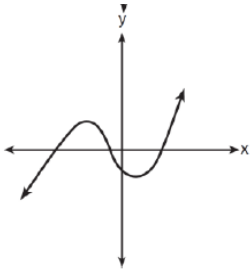
1) $4k^2 - 49 = (2k + 7)(2k - 7)$
2) $a^3 - 8b^3 = (a - 2b)(a^2 + 2ab + 4b^2)$
3) $m^3 + 3m^2 - 4m + 12 = (m - 2)^2(m + 3)$
4) $t^3 + 5t^2 + 6t + t^2 + 5t + 6 = (t + 1)(t + 2)(t + 3)$

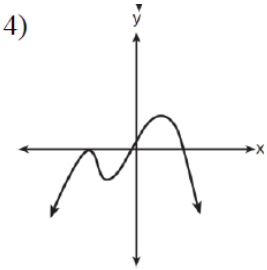
3) Which graph has the following characteristics?

- three real zeros
- $as\ x \to -\infty, f(x) \to -\infty$
- $as\ x \to \infty, f(x) \to -\infty$

1) 

2) 

3) 

4) 

4) The solution set for the equation $\sqrt{56 - x} = x$ is

1) $\{-8, 7\}$
2) $\{-7, 8\}$
3) $\{7\}$
4) $\{\ \}$

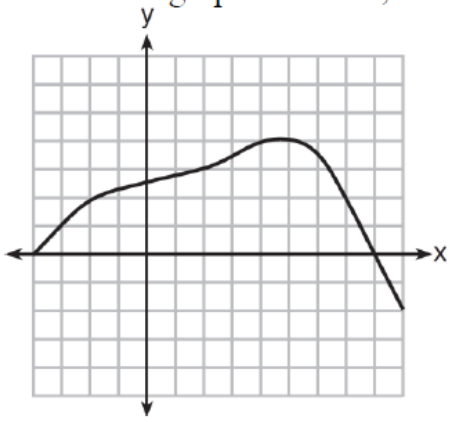
5) The zeros for $f(x) = x^4 - 4x^3 - 9x^2 + 36x$ are

1) $\{0, \pm 3, 4\}$
2) $\{0, 3, 4\}$
3) $\{0, \pm 3, -4\}$
4) $\{0, 3, -4\}$

6) The expression $\sqrt{-180x^{16}}$ is equivalent to

1) $-6x^4\sqrt{5}$
2) $-6x^8\sqrt{5}$
3) $6x^4 i\sqrt{5}$
4) $6x^8 i\sqrt{5}$

7) Which value is in the domain of the function graphed below, but is *not* in its range?



1) 0
2) 2
3) 3
4) 7

8) The expression $\frac{4x^3 + 5x + 10}{2x + 3}$ is equivalent to

1) $2x^2 + 3x - 7 + \frac{31}{2x+3}$
2) $2x^2 - 3x + 7 - \frac{11}{2x+3}$
3) $2x^2 + 2.5x + 5 + \frac{15}{2x+3}$
4) $2x^2 - 2.5x - 5 - \frac{20}{2x+3}$

9) The table below shows the cost of mailing a postcard in different years. During which time interval did the cost increase at the greatest average rate?

Year	1898	1971	1985	2006	2012
Cost (¢)	1	6	14	24	35

1) 1898-1971
2) 1971-1985
3) 1985-2006
4) 2006-2012

10) If $f(x) = 2x^2 - 3x + 4$, then $f(x+3)$ is equal to
1) $2x^2 - 3x + 7$
2) $2x^2 - 3x + 13$
3) $2x^2 + 9x + 13$
4) $2x^2 + 9x + 25$

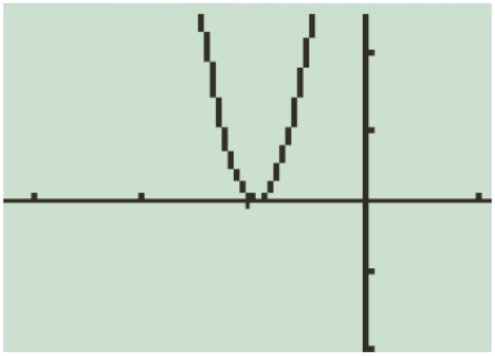
11) If $f(x) = x^2 - x$ and $g(x) = x + 1$, determine $f(g(x))$ in simplest form.

12) Solve the system of equations shown below algebraically.

$$(x-3)^2 + (y+2)^2 = 16$$
$$2x + 2y = 10$$

13) Simplify: $\dfrac{1 - \frac{1}{x} - \frac{6}{x^2}}{1 - \frac{4}{x} + \frac{3}{x^2}}$

14) Consider the polynomial function $g(x) = x^4 + 2x^3 + 10x^2 + 18x + 9$ and its graph below.



a. Based on the appearance of the graph, what does the real solution to the equation $x^4 + 2x^3 + 10x^2 + 18x + 9 = 0$ appear to be?

b. Using the graph, what must be a factor of the polynomial graphed above?

c. Find the two complex number zeros of $y = g(x)$.

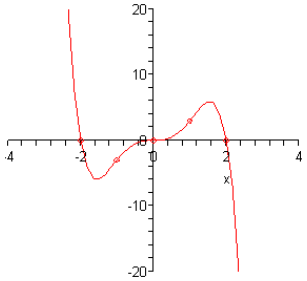
d. Using the solution from parts a-c, express the polynomial in terms of linear factors.

15) Add and fully simplify: $\dfrac{3}{x-2}+\dfrac{7}{x+5}$

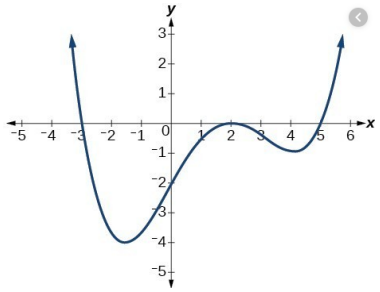
16) Perform the indiciated operations and fully simplify: $\dfrac{x^2-4}{x^2+2x-15}\bullet\dfrac{x^2-2x-3}{6x+42}\div\dfrac{x^2+2x}{9x^2+45x}$

17) Write the equation of the following graphs in factored form.

a.



b.



18) Determine the vertex, focus and directrix of the following parabolas:

a. $y=\dfrac{1}{16}(x-4)^2-5$

b. $x=\dfrac{1}{20}(y+2)^2-3$