Name: **Date:**

Algebra 2 Summer Assignment

Algebra 2 Diagnostic Exam

Please complete this exam to the best of your ability. You will not be graded for accuracy, as the goal of this assignment is to determine how much prior knowledge you have pertaining to this course before the start of the school year.

1. If $f(x) = 2x - 5$ and $g(x) = x^2 - 1$, what is $g(f(x))$?

a. $4x^2 - 20x + 24$ b. $2x^2 - 20x + 26$
c. $2x^2 - 5x - 24$ d. $4x^2 - 10x - 24$

2. The expression $(x + a)(x + b)$ can *not* be written as

a. $a(x + b) + x(x + b)$ b. $x^2 + (a + b)x + ab$
c. $x^2 + abx + ab$ d. $x(x + a) + b(x + a)$

3. Written in simplest form, $\frac{c^2-d^2}{d^2+cd-2c^2}$ where $c \neq d$, is equivalent to

a. $\frac{c+d}{d+2c}$ b. $\frac{-c-d}{d+2c}$
c. $\frac{c-d}{d+2c}$ d. $\frac{-c+d}{d+2c}$

4. What is the inverse of $f(x) = -6(x - 2)$?

a. $f^{-1}(x) = -2 - \frac{x}{6}$ b. $f^{-1}(x) = 2 - \frac{x}{6}$
c. $f^{-1}(x) = \frac{1}{-6(x-2)}$ d. $f^{-1}(x) = 6(x + 2)$

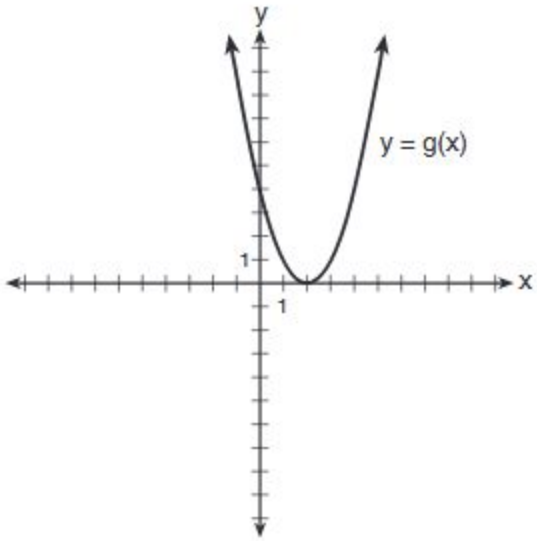
5. The function $f(x) = \frac{x-3}{x^2+2x-8}$ is undefined when x equals

a. 2 or -4 b. 3, only
c. 4 or -2 d. 2, only

6. When factored completely, $m^5 + m^3 - 6m$ is equivalent to

a. $(m + 3)(m - 2)$ b. $m(m^4 + m^2 - 6)$
c. $(m^3 + 3m)(m^2 - 2)$ d. $m(m^2 + 3)(m^2 - 2)$

7. What is the solution to the system of equations $y = 3x - 2$ and $y = g(x)$ where $g(x)$ is defined by the function below?



a. (0, -2) b. (1, 6)
c. (0, -2) and (1, 6) d. (1,1) and (6, 16)

8. Given $f^{-1}(x) = -\frac{3}{4}x + 2$, which equation represents $f(x)$?
a. $f(x) = \frac{4}{3}x - \frac{8}{3}$ b. $f(x) = \frac{3}{4}x - 2$
c. $f(x) = -\frac{4}{3}x + \frac{8}{3}$ d. $f(x) = -\frac{3}{4}x + 2$

9. The equation $4x^2 - 24x + 4y^2 + 72y = 76$ is equivalent to
a. $4(x-3)^2 + 4(y+9)^2 = 76$ b. $4(x-3)^2 + 4(y+9)^2 = 121$
c. $4(x-3)^2 + 4(y+9)^2 = 166$ d. $4(x-3)^2 + 4(y+9)^2 = 436$

10. The zeros for $f(x) = x^4 - 4x - 9x^2 + 36x$ are
a. $0, \pm 3, 4$ b. $0, \pm 3, -4$
c. $0, 3, 4$ d. $0, 3, -4$

11. Verify the following Pythagorean Identity for all values of x and y

$$(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$$

12. Given $r(x) = x^3 - 4x^2 + 4x - 6$, find the value of $r(2)$.

What does your answer tell you about $x - 2$ as a factor? Explain.

13. Determine if $x - 5$ is a factor of $2x^3 - 4x^2 - 7x - 10$. Explain.

14. Solve the system of equation shown below algebraically

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