

MATH 3208
INCLASS ASSIGNMENT # 1

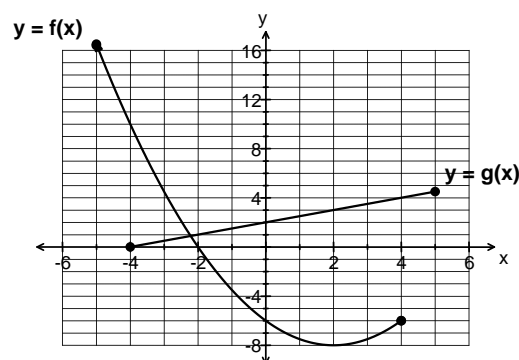
UNIT 1: FUNCTIONS/RATIONAL FUNCTIONS **NAME:** _____

PART A: MULTIPLE CHOICE (Value: 13)

Circle the letter of the correct response.

1. Evaluate: $f(4) + g(2)$

- (A) -2 (B) -3 (C) -4 (D) -6



2. Given $f(x) = x^2 - 2x$ and $g(x) = x - 1$ which function represents $h(x)$ if $h(x) = f(x) - g(x)$?

- (A) $h(x) = -x^2 + 3x - 1$ (B) $h(x) = x^2 + 3x + 1$
(C) $h(x) = x^2 - 3x + 1$ (D) $h(x) = x^2 - 3x - 1$

Use the given functions to answer questions # 3 – 5.

$$g(x) = x - 3 \quad p(x) = \sqrt{x - 2} \quad q(x) = \sqrt{x + 6}$$

3. Given $h(x) = g(x)q(x)$ determine the value of $h(-2)$.

- (A) -10 (B) 10 (C) -20 (D) 20

4. What is the domain of $k(x)$ if $k(x) = p(x)q(x)$?

- (A) $\{x \mid -6 \leq x \leq 2; x \in \mathbb{R}\}$ (B) $\{x \mid x \in \mathbb{R}\}$
(C) $\{x \mid x \geq 2; x \in \mathbb{R}\}$ (D) $\{x \mid x \leq -6; x \geq 2; x \in \mathbb{R}\}$

5. What is the domain of $r(x)$ if $r(x) = \frac{g(x)}{p(x)}$?

- (A) $\{x \mid x \neq 3; x \in \mathbb{R}\}$ (B) $\{x \mid x \neq 2; x \in \mathbb{R}\}$
(C) $\{x \mid x > 2; x \in \mathbb{R}\}$ (D) $\{x \mid x \geq 2; x \in \mathbb{R}\}$

6. Given the functions $f(x) = 3x$ and $g(x) = x^2 - x + 2$. Determine the value of $f(g(-1))$.

- (A) -6 (B) 6 (C) -12 (D) 12

7. Given the functions $g(x) = x^2 + 3$ and $h(x) = x - 2$. Which function represents $(g \circ h)(x)$?

- (A) $x^2 + 1$ (B) $x^2 - 4x + 4$ (C) $x^2 - 4x + 7$ (D) $x^2 - 4x - 1$

8. Given $h(x) = f(g(x))$ and $h(x) = \sqrt{x^3} + 1$. Which functions represent $f(x)$ and $g(x)$?

- (A) $f(x) = \sqrt{x^3 + 1}$ and $g(x) = x$ (B) $f(x) = \sqrt{x} + 1$ and $g(x) = x^3$
(C) $f(x) = \sqrt{x^3}$ and $g(x) = x + 1$ (D) $g(x) = \sqrt{x + 1}$ and $g(x) = x^3$

9. Given $p(x) = \sqrt{x-1}$ and $q(x) = x + 4$ what is the range of the composite function $q(p(x))$?

- (A) $\{y \mid y \geq 0; y \in \mathbf{R}\}$ (B) $\{y \mid y \geq 1; y \in \mathbf{R}\}$ (C) $\{y \mid y \geq 3; y \in \mathbf{R}\}$ (D) $\{y \mid y \geq 4; y \in \mathbf{R}\}$

10. Which function represents $f(g(x))$ if $f(x) = \frac{1}{1-x}$ and $g(x) = \frac{1}{x}$?

- (A) $\frac{x}{x-1}$ (B) $\frac{x}{1-x}$ (C) $\frac{x-1}{x}$ (D) $\frac{1-x}{x}$

11. Which statement is **FALSE** for the graph of the function $y = \frac{3x-6}{x+2}$?

- (A) The y-intercept is -3 . (B) The x-intercept is -2 .
 (C) The horizontal asymptote is $y = 3$. (D) The vertical asymptote is $x = -2$.

12. What is the point of discontinuity of the function $y = \frac{x^3 + x^2 - 12x}{x-3}$?

- (A) $(3, 21)$ (B) $(3, 7)$ (C) $(-3, -3)$ (D) $(-3, 1)$

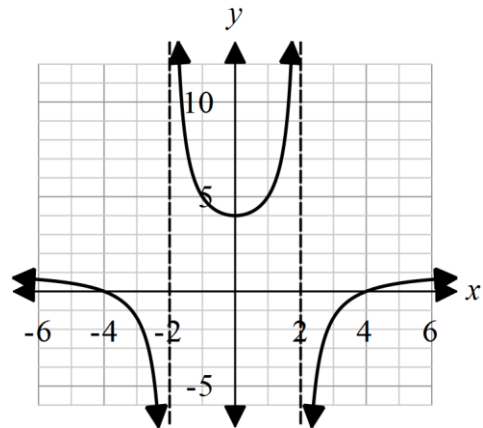
13. Which rational function is represented by the graph?

(A) $y = \frac{x^2 + 4}{x^2 - 16}$

(B) $y = \frac{x^2 - 4}{x^2 - 16}$

(C) $y = \frac{x^2 + 16}{x^2 - 4}$

(D) $y = \frac{x^2 - 16}{x^2 - 4}$



PART B: QUESTIONS (Value: 33)

Answer all questions in the space provided. Show all workings to ensure full marks!

14. Given the functions $f(x) = x^2 + 2x$, $g(x) = x - 1$, $h(x) = \sqrt{x+5}$, $k(x) = \frac{1}{x}$.

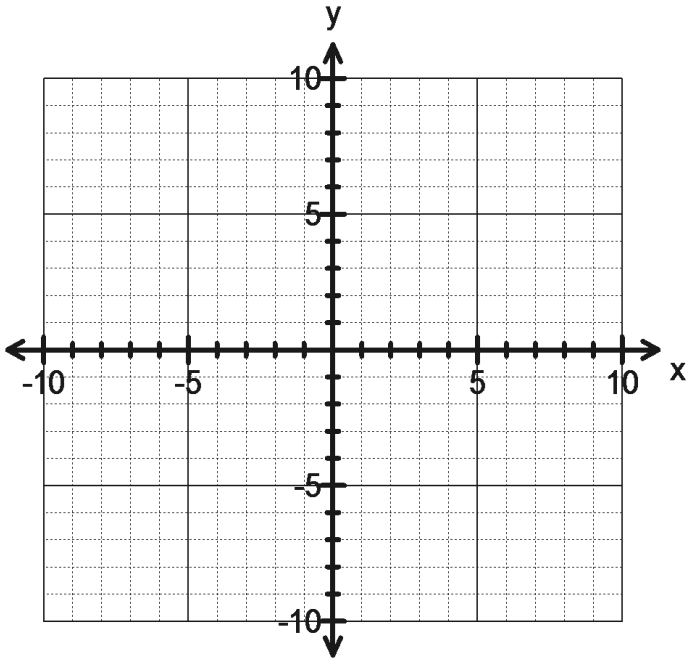
Determine the following composite functions and state their domain and range. (9)

(a) $g(f(x))$

(b) $h(g(x))$

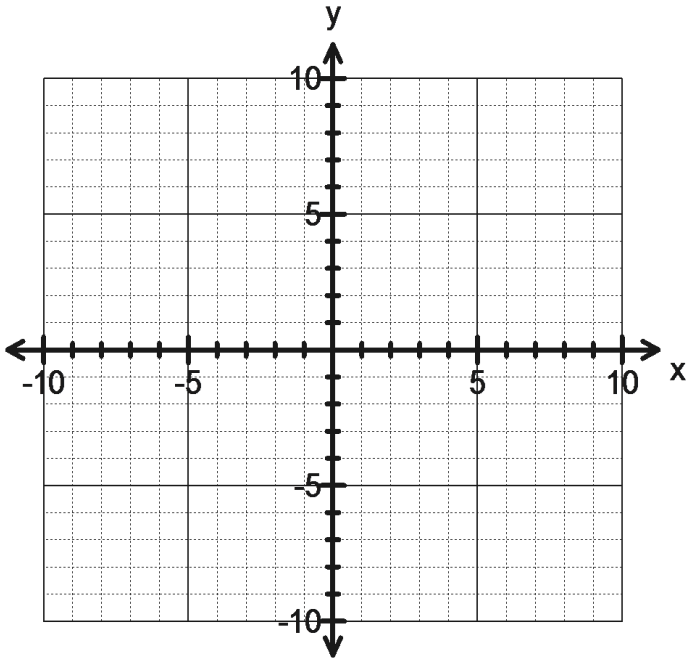
(c) $k(g(x))$

15. Sketch the graph of the function $y = \frac{x^2 - 6x + 8}{x^2 - x - 2}$. Identify the important characteristics (12) of the graph by completing the table below. (Remember to show x-intercept(s) and y-intercept).



Characteristic	$y = \frac{x^2 - 6x + 8}{x^2 - x - 2}$
Domain	
Range	
Equation of Vertical Asymptote(s)	
Equation of Horizontal Asymptote(s)	
Non-Permissible Value(s)	
Feature at Non-Permissible Value(s)	
Behaviour Near Non-Permissible Value(s)	
End Behaviour	

16. Sketch the graph of the function $y = \frac{x^2 + 3x - 4}{4 - x^2}$. Identify the important characteristics (12) of the graph by completing the table below. (Remember to show x-intercept(s) and y-intercept).



Characteristic	$y = \frac{x^2 + 3x - 4}{4 - x^2}$
Domain	
Range	
Equation of Vertical Asymptote(s)	
Equation of Horizontal Asymptote(s)	
Non-Permissible Value(s)	
Feature at Non-Permissible Value(s)	
Behaviour Near Non-Permissible Value(s)	
End Behaviour	