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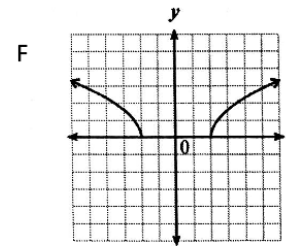
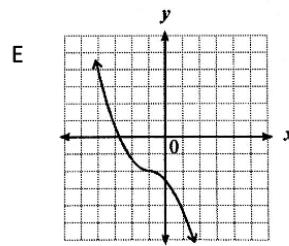
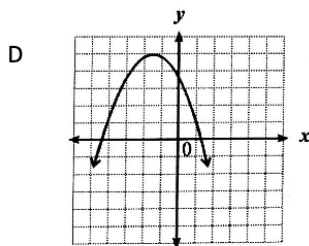
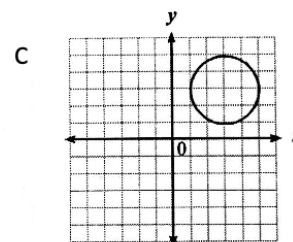
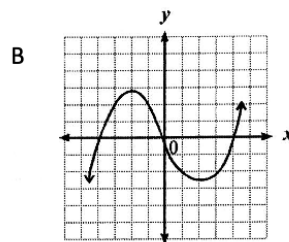
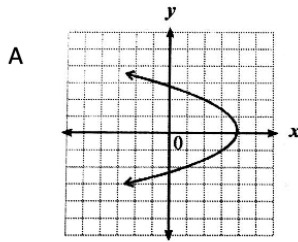
CLASS: _____

DATE: _____

PART ONE. Answer all questions.

1. Given the following graphs below:

[4]



(a) Write down the letter/s of the graph/s that represent functions.

(b) Write down the letter/s of the graph/s which has an inverse.

2. A function f is given by $f : x \rightarrow x^2 - x + 1$. Find, in simplest form:

[4]

(a) $f(2)$

(b) $f(-3)$

(c) $f(x - 1)$

3. The function f is defined by $f : x \rightarrow a + \frac{b}{x}$, where a and b are constants.

[4]

Given that $f(3) = 2$ and $f^{-1}(7) = 2$, find the value of a , b and the image of the element -3 under f .

4. State the domain or range of the following.

[7]

FUNCTION	DOMAIN	RANGE
$f(x) = \sqrt{x - 4}$		$f(x) > 2$
$f(x) = 2x^2 + 1$	$\{-2, -1, 0, 1, 2\}$	
$f(x) = (x - 2)^2 + 7$	$1 \leq x \leq 5$	
$f(x) = x^2 - 2$		$\{-2, -1, 7\}$
$f(x) = x^2 - 3x + 2$	$0 \leq x \leq 5$	
$f(x) = x - 3 $	$-1 \leq x < 3$	
$f(x) = 3 - x - 2$	$-1 \leq x \leq 6$	

5. Given that $f(x) = x + 3$ and $g(x) = x^2$, express the following in terms of f and g .

[5]

- (a) $x^2 + 3$
- (b) $x^2 + 6x + 9$
- (c) $x + 6$
- (d) $x^2 + 6x + 12$
- (e) $x^2 - 6x + 9$

6. Functions f and g are defined as:

$$f : x \rightarrow \frac{2}{x+1} \quad \text{for } x \in \mathbb{R}, x \neq -1 \quad \text{and} \quad g : x \rightarrow 3x - 2 \quad \text{for } x \in \mathbb{R}$$

(a) Find

- (i) fg [1]
- (ii) gf [1]
- (iii) g^2 [2]
- (iv) f^{-1} [2]
- (v) $(gf)^{-1}$ [2]

7. Solve/Choose ONLY 2.

[6]

(a) $7 - |1 - 2x| = 3x$

(b) $|9 - x^2| = 3 - x$

(c) $|2x^2 - 2x + 5| = 1 - x$

8. Given that $f(x) = 2x - 3$.

[4]

(a) Find $f^{-1}(x)$, the inverse of $f(x)$.

(b) Solve graphically $f(x) = f^{-1}(x)$.

9. Choose only ONE.

[4]

EITHER

Solve the simultaneous equations:

$$y = 2x + 5 \quad \text{and} \quad y = |3 - x^2|$$

OR

Given the function $f(x) = \frac{2x+1}{x+2}, x \neq -2$.

(a) Find $f^{-1}(x)$, the inverse of $f(x)$.

(b) Find, algebraically, the points of intersection of the graphs of $f(x)$ and $f^{-1}(x)$.

10. Choose only ONE.

[4]

EITHER

Using 2 cm to represent 2 units on both axes, solve graphically $|x - 1| = |2x - 5|$.

OR

(a) Draw the graph of $y = |2x + 1|$ for $-3 \leq x \leq 3$ showing the intercepts and min/max point.

(b) On the same diagram, sketch $y = 3x$.

(c) Use your graphs in (a) and (b) to solve the equation $3x = |2x + 1|$.