

Integrated Math 2 Functions Assessment

Name _____

Date _____ Block _____

You have 65 minutes. Calculators are permitted. Notes and books are permitted. Computers are not permitted. If you use your calculator to do something, make sure to show enough work so that I know what you were thinking. No work = no evidence for me of your understanding.

1) State whether the following are functions or just relations. Give a reason.

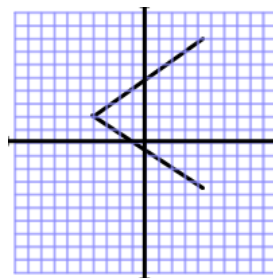
2 marks – K

2 marks – C

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



b)



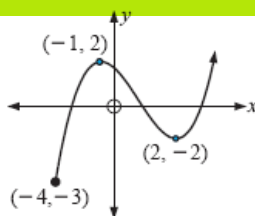
2) State the domain & range of the following relations, using proper notation.

6 marks – K

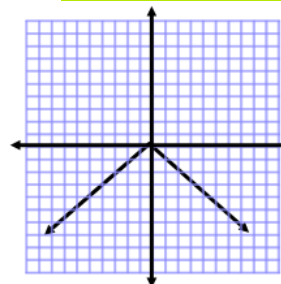
3 marks – C

a) $f(x) = 3x - 1$

b)



c) Assume each square represents one unit.



Domain:	{x	}
Range:	{y	}

Domain:	{x	}
Range:	{y	}

Domain:	{x	}
Range:	{y	}

3) Let $f(x) = 3x^2 - 7$.

5 marks – K

a) Find $f(4)$.

b) Find $f(x + 2)$.

4) Let $f(x) = 3x - 7$ and $g(x) = 2x + 5$. What value of x would make $f^{-1}(x) = g^{-1}(x)$?

2 marks – K

2 marks – T

1 mark – C

5) Functions f and g are defined as follows:

$f = \{(3,2), (5,1), (7,4), (9,3), (11,5)\}$ and $g = \{(1,3), (2,5), (3,5), (4,9), (5,7)\}$

a) Find $f(3)$.

1 mark – T

b) Find $g^{-1}(3)$.

1 mark – T

c) Is $g^{-1}(x)$ a function.

1 mark – T

d) Solve $f(x) = 4$.

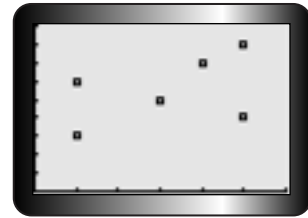
1 mark – T

Practise, Apply, Solve 3.2

A

1. The scatter plot shows a relation. The marks on each axis indicate single units.

- State the domain and range of this relation.
- Draw an arrow diagram to illustrate the relation.
- Is this relation a function? Explain.



2. For each of the following, state

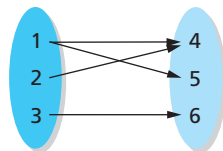
- the domain and range
- whether it defines a function or not, and justify your answer

(a) $\{(1, 2), (3, 1), (4, 2), (7, 2)\}$

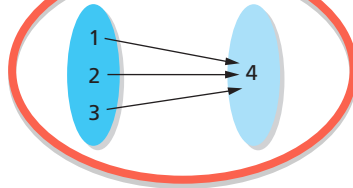
(b) $\{(1, 2), (1, 3), (4, 5), (6, 1)\}$

(c) $\{(1, 0), (0, 1), (2, 3), (3, 2)\}$

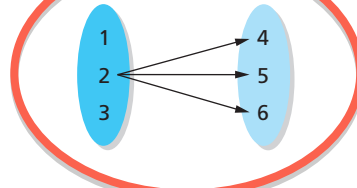
(d)



(e)



(f)



3. Consider the $\sqrt{\quad}$ key on your calculator. Recall that $\sqrt{\quad}$ means the positive square root.

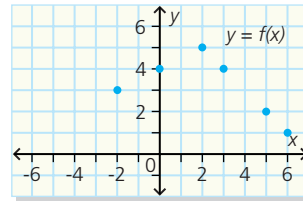
- What is the output if the input is 25?
- Does the output have more than one value for any input value?
- Why must this operation be a function? Explain.
- Are there any numbers that cannot be used as input?
- State the domain of this function.

4. Consider the rule “Take the square root of the input number to get the output number.”

- What is the output if the input is 25?
- Does the output have more than one value for any input value?
- Is this relation a function? Explain.
- Are there any numbers that cannot be used as input?

B

5. The graph of $y = f(x)$ is shown.



- i. State the domain and range of f .
- ii. Evaluate.

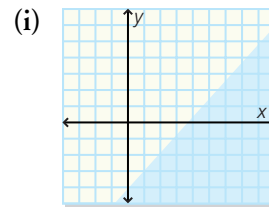
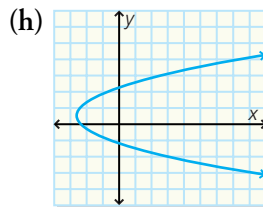
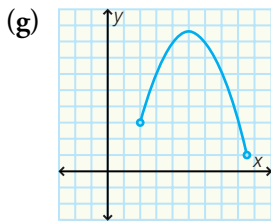
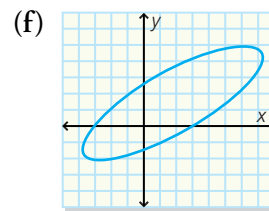
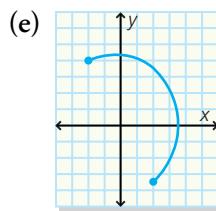
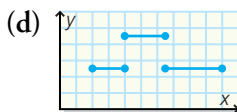
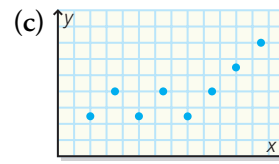
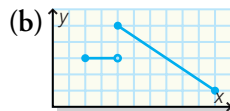
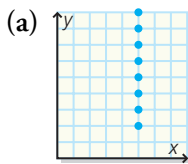
- (a) $f(3)$ (b) $f(5)$
- (c) $f(5 - 3)$ (d) $f(5) - f(3)$

- iii. In part ii, why is the function in (d) not the same as the answer in (c)?
- iv. $f(2) = 5$. What is the corresponding ordered pair? What does 2 represent? What does $f(2)$ represent?

6. For $g(x) = 3 - 2x$, find

- (a) $g(3)$ (b) $g(0)$ (c) $g(-2)$ (d) $2g(1)$
- (e) $g(-2) - 3$ (f) $g(-2 - 3)$ (g) $g(a)$

7. State whether each graph shows a function. Justify your answer.



8. Consider the function $g(t) = 3t + 5$.

- i. Create a table and graph the function.
- ii. Determine each value.

- (a) $g(0)$ (b) $g(1)$ (c) $g(2)$
- (d) $g(3)$ (e) $g(1) - g(0)$ (f) $g(2) - g(1)$
- (g) $g(3) - g(2)$ (h) $g(1001) - g(1000)$ (i) $g(a + 1) - g(a)$
- (j) $\frac{g(4) - g(0)}{4 - 0}$

- iii. In part ii, what are the answers to (e), (f), and (g), as a group, commonly called? Why is the answer to (j) the same as those for (e), (f), (g), (h), and (i)?

9. Knowledge and Understanding: For each of the following,

- i. sketch the relation
- ii. state the domain and range
- iii. explain why the relation is a function

(a) $y = \frac{1}{x}$

(b) $y = 6 - 2x$

(c) $x + 3y = 6$

(d) $y = x^2 + 3$

10. Bill called a garage to ask for a price quote on tires. Bill told the clerk what size of tire he needed, and the clerk told him the price. When Bill called back later that same day, another clerk told him a different price. How could this happen? Explain why this situation is not a function. How could you adapt this situation to make it a function?

11. The adjacent table lists all of the ordered pairs belonging to a function g .

x	y
1	5
2	7
3	9
4	11
5	13

- i. Determine the equation of the line that passes through these points.
- ii. Write $g(x)$.
- iii. Evaluate.

- (a) $g(5)$
- (b) $g(5 - 3)$
- (c) $g(5) - g(3)$
- (d) $2g(3) - 5$

12. Consider the function $f(s) = s^2 - 6s + 9$.

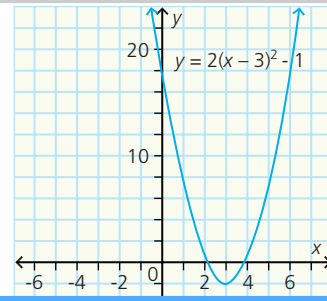
- i. Create a table for the function.
- ii. Determine each value.

- (a) $f(0)$
- (b) $f(1)$
- (c) $f(2)$
- (d) $f(3)$
- (e) $f(4)$
- (f) $f(1) - f(0)$
- (g) $f(2) - f(1)$
- (h) $f(3) - f(2)$
- (i) $f(4) - f(3)$
- (j) $[f(2) - f(1)] - [f(1) - f(0)]$
- (k) $[f(3) - f(2)] - [f(2) - f(1)]$
- (l) $[f(4) - f(3)] - [f(3) - f(2)]$
- (m) $[f(1002) - f(1001)] - [f(1001) - f(1000)]$

iii. In part ii, what are the answers to (f), (g), (h), and (i), as a group, commonly called? What are the answers to (j), (k), and (l), as a group, commonly called?

13. The graph shows $f(x) = 2(x - 3)^2 - 1$.

- Evaluate $f(-2)$.
- What does $f(-2)$ represent on the graph of f ?
- State the domain and range of the relation.
- How do you know that f is a function from its graph?
- How do you know that f is a function from its equation?



14. Consider the relation $y = x^2 - 3x$.

- Are there any values of the independent variable for which the dependent variable is not unique?
- Is this relation a function? Explain.

15. A relation is defined by $x^2 + y^2 = 25$.

- Sketch a graph of the relation.
- Is this relation a function? Explain.

16. For each of the following,

- graph the relation
- state the domain and range
- is the relation a function? Why or why not?

(a) $y = 3x - 1$

(b) $y = 10 - 4.9x^2$

(c) $y = 3(x - 2)^2 - 5$

(d) $y = \frac{1}{x^2}$

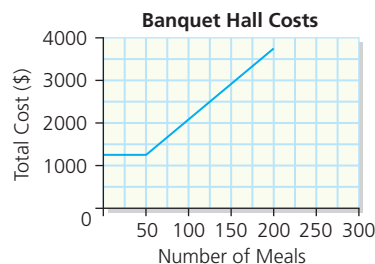
(e) $x^2 - y = 3x$

(f) $y = x(x - 4)$

(g) $5x + 3y = 15$

17. State the domain and range of the function $y = \sqrt{x - 1} + 2$.

18. The cost of renting a banquet hall depends on the size of the room and the number of meals served. A graph of the number of meals versus cost is shown.



- What problems would the banquet hall have if this relation were not a function?
- What is the domain and range of this function?
- Why does the domain have an upper limit?
- Why is the graph a reasonable representation of the cost to rent a banquet hall?