Functions and straight-line graphs - Practice test 1

Name: _____ Date: _____

10 questions | 46 marks | 70 minutes

A balanced paper on rules, graphs, linear geometry and practical models. Give exact values unless a question asks otherwise.

A scientific calculator may be used.

1. Let $f(x) = 2x - 3$. [6 marks]

(a) Find $f(-2)$. [2 marks]

(b) Simplify $f(a + 1)$. [2 marks]

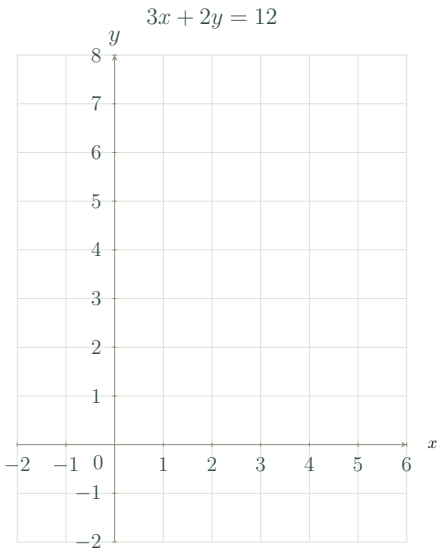
(c) Find the input when the output is 11. [2 marks]

2. Consider functions and their possible inputs. [4 marks]

(a) State the real domain and range of $g(x) = \sqrt{x+2}$. [2 marks]

(b) Does $\{(-1, 3), (0, 3), (2, 5)\}$ define a function of its first coordinate? Explain. [2 marks]

3. A line has equation $3x + 2y = 12$. [4 marks]



(a) Find its gradient and y-intercept. [2 marks]

(b) Find its x-intercept. Sketch the line on the grid, labelling both intercepts. [2 marks]

4. The line L passes through $A(-1, 4)$ and $B(3, -4)$. [6 marks]

(a) Find an equation of L. [2 marks]

(b) Find the line parallel to L through $(2, 5)$. [2 marks]

(c) Find the line perpendicular to L through $(2, 5)$. [2 marks]

5. A performance sells 9 tickets. Adult tickets cost 12 dollars and student tickets cost 7 dollars. Total revenue is 83 dollars. [5 marks]

(a) Define variables and form two equations. [2 marks]

(b) Find the number of each type and check your answer. [3 marks]

6. A segment joins $A(-2, 1)$ to $B(4, 9)$. [4 marks]

(a) Find its exact length. [2 marks]

(b) Find its midpoint. [2 marks]

7. A rectangle has fixed area 36 square metres. Its positive length is l metres and its width is w metres. [4 marks]

(a) Write w as a function of l and find w when $l = 9$. [2 marks]

(b) Find l when $w = 3$. Explain what happens to w when l doubles. [2 marks]

8. A circle has centre $(-1, 2)$ and radius 3. [4 marks]

(a) Write its equation. [2 marks]

(b) State the full circle range and decide whether $(2, 2)$ is on the circle. [2 marks]

9. A tank drains at a constant rate. The table shows its remaining volume. [4 marks]

Remaining water

Time t (min)	0	5	10
Volume V (L)	120	90	60

(a) Find a linear model $V(t)$, with units. [2 marks]

(b) Find when the tank becomes empty and state a sensible domain. [2 marks]

10. Hire company A charges $A(h) = 8 + 4h$ dollars and company B charges $B(h) = 20 + 2h$ dollars for non-negative hire time h in hours. [5 marks]

(a) Find when the charges are equal. [2 marks]

(b) Explain which company is cheaper before and after that time. [3 marks]