Functions and straight-line graphs - Practice test 2

Name: _____ Date: _____

10 questions | 42 marks | 70 minutes

Use symbolic rules, intercepts and contextual restrictions. Explanations matter as well as calculations.

A scientific calculator may be used.

1. Let $f(x) = x^2 - 2x + 3$. [4 marks]

(a) Find $f(-1)$. [2 marks]

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

2. Consider the reciprocal rule $g(x) = \frac{4}{x-3}$ and the relation $R = \{(2,1), (2,5), (4,3)\}$. [4 marks]

(a) State the domain and range of g. [2 marks]

(b) Explain whether R is a function of x. [2 marks]

3. A line passes through $(-2, -1)$ and $(4, 8)$. [4 marks]

(a) Find its equation. [2 marks]

(b) Find both axis intercepts. [2 marks]

4. Use gradients to construct the required lines. [4 marks]

(a) Find the line perpendicular to $3x + 2y = 8$ through $(3, -2)$. [2 marks]

(b) Give the lines parallel and perpendicular to $x = -5$ through $(2, 3)$. [2 marks]

5. A collection contains 20 coins, each either a 2-dollar coin or a 50-cent coin. Their total value is 22 dollars. [5 marks]

(a) Form equations for the two numbers of coins. [2 marks]

(b) Solve and check the numbers. [3 marks]

6. A segment has endpoint $A(-3, 4)$ and midpoint $M(2, -1)$. [4 marks]

(a) Find its other endpoint B. [2 marks]

(b) Find the exact length AB. [2 marks]

7. y is inversely proportional to x. When $x = 4$, $y = -5$. [4 marks]

(a) Find the rule and evaluate y at $x = -2$. [2 marks]

(b) State the asymptotes and explain whether y can be zero. [2 marks]

8. The circle relation is $x^2 + (y+1)^2 = 16$. [5 marks]

(a) State its centre and radius. [2 marks]

(b) Write its upper semicircle as a function and state its domain and range. [3 marks]

9. A delivery service proposes a linear fee model using the supplied table. [4 marks]

Distance d (km)	2	5	8
Fee C (dollars)	9	15	21

(a) Find the fee rule $C(d)$. [2 marks]

(b) Predict the fee for 10 km. State one assumption behind your prediction. [2 marks]

10. Two lines are $y = (k-1)x + 2$ and $y = 3x - 5$. [4 marks]

(a) Find k for which they are parallel. Can they ever be the same line? [2 marks]

(b) Find their intersection when $k = 2$. [2 marks]