

WA2 Practice Paper

Inequalities, graphs, coordinate geometry and proportion

35 marks | Suggested time: 55 minutes

Name: Class: Date:

Answer all questions. Show your working. A scientific calculator may be used. Give non-exact answers to 3 significant figures unless stated otherwise.

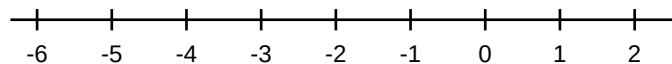
School WA topic coverage may differ. Suggested solutions start after the question paper.

© Daniel's Math Tuition. All rights reserved. Permission is granted to download and print for personal, non-commercial revision. Except as permitted by law, uploading, republishing, selling, distributing or adapting this paper for commercial use requires prior written permission. Please share the original download-page link instead of the PDF.

1. Linear inequality [3 marks]

Solve $5 - 2x \leq 13$.

Represent the solution on a number line.



Answer: [3]

2. Integer solutions [4 marks]

(a) Solve $-3 < \frac{2x + 1}{3} \leq 5$. [2]

(b) List all integer values of x satisfying both the inequality in (a) and $x < 2$. [2]

Answer: [4]

3. Coordinates and gradient [4 marks]

A(-2, 1) and B(4, 13) lie on a straight line.

(a) Find the gradient of AB. [2]

(b) Find the equation of AB in the form $y = mx + c$. [2]

Answer: [4]

4. Intercepts and area [4 marks]

The line $3x + 2y = 12$ meets the x-axis at P and the y-axis at Q.

- (a) Find the coordinates of P and Q. [2]
(b) Find the area of triangle OPQ, where O is the origin. [2]

Answer: [4]

5. Direct proportion [4 marks]

The cost C dollars of printing leaflets is directly proportional to the number n printed.

Printing 80 leaflets costs \$18.

- (a) Express C in terms of n. [2]
(b) Find the greatest number of leaflets that can be printed for \$30. [2]

Answer: [4]

6. Inverse proportion [5 marks]

The time t hours needed to complete a job is inversely proportional to the number w of workers.

Six workers take 10 hours.

- (a) Express t in terms of w. [2]
(b) Find the time taken by 8 workers. [1]
(c) Find the minimum number of workers needed to finish within 4 hours. State one assumption used by the model. [2]

Answer: [5]

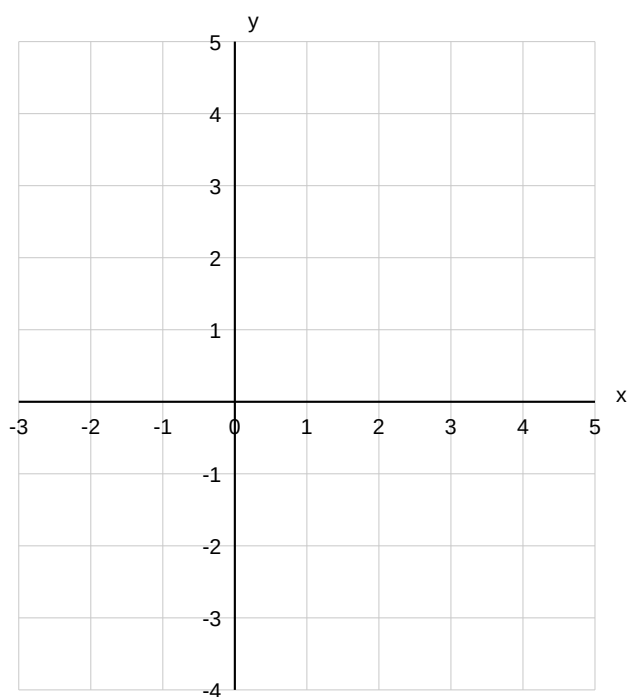
7. Quadratic graph [5 marks]

The function is $y = x^2 - 2x - 3$.

(a) Complete the table below. [2]

x	-2	-1	0	1	2	3	4
y	5	0	...	...	...	0	5

(b) On the grid provided, plot all seven points and draw a smooth curve. [2]



(c) Use your graph to estimate the minimum value of y . [1]

Answer: [5]

8. Comparing transport costs [6 marks]

Two bicycle rental companies charge by the hour. For a rental of h hours,

Company A charges \$4 plus \$3 per hour. Company B charges \$7 plus \$2 per hour.

(a) Write expressions for the costs A and B in terms of h . [2]

(b) Find the rental duration at which the costs are equal. [2]

(c) A customer rents for a whole number of hours. Find the least duration for which Company B is cheaper. Explain. [2]

Answer: [6]

End of question paper

WA2 Suggested Worked Solutions

Use these solutions after attempting the paper. Other mathematically valid methods may be accepted. The mark allocations are suggestions for this practice paper, not an official school marking scheme.

1. Linear inequality [3]

$-2x \leq 8$; dividing by -2 gives $x \geq -4$.

Use a filled circle at -4 and a ray pointing to the right.

Suggested marking: 1 rearrangement; 1 correct inequality; 1 correct number line.

Watch out: Reverse the inequality sign when dividing by a negative number.

2. Integer solutions [4]

(a) $-9 < 2x + 1 \leq 15$; $-10 < 2x \leq 14$.

Therefore $-5 < x \leq 7$.

(b) The integers are $-4, -3, -2, -1, 0, 1$.

Suggested marking: (a) 1 for multiplication/subtraction, 1 for bounds; (b) 2 for complete list, 1 if exactly one error.

Watch out: An open boundary at -5 excludes -5 .

3. Coordinates and gradient [4]

$$(a) \text{ Gradient} = \frac{13 - 1}{4 - (-2)} = \frac{12}{6} = 2.$$

(b) $y = 2x + c$. Using A: $1 = -4 + c$, so $c = 5$.

The equation is $y = 2x + 5$.

Suggested marking: Each part: 1 method, 1 answer.

Watch out: Keep the order of subtraction the same in numerator and denominator.

4. Intercepts and area [4]

(a) At P, $y = 0$, so $x = 4$: P(4, 0).

At Q, $x = 0$, so $y = 6$: Q(0, 6).

$$(b) \text{ Area} = \frac{1}{2} \times 4 \times 6 = 12 \text{ square units.}$$

Suggested marking: (a) 1 each intercept; (b) 1 area method, 1 answer.

Watch out: At an x-intercept the y-coordinate is zero.

5. Direct proportion [4]

(a) $C = kn$; $k = 18 \div 80 = 0.225$. Therefore $C = 0.225n$.

(b) $n = 30 \div 0.225 = 133.333\dots$

The greatest whole number is 133 leaflets (cost \$29.925).

Suggested marking: (a) 1 constant, 1 formula; (b) 1 calculation, 1 rounding down.

Watch out: A budget limit requires rounding down to a whole leaflet.

6. Inverse proportion [5]

(a) $t = \frac{k}{w}$; $k = 6 \times 10 = 60$. Thus $t = \frac{60}{w}$.

(b) $t = 60 \div 8 = 7.5$ hours.

(c) $60 \div w \leq 4$, so $w \geq 15$. Minimum: 15 workers.

Assume every worker works at the same constant rate (or extra workers do not reduce efficiency).

Suggested marking: (a) 1 constant, 1 formula; (b) 1; (c) 1 minimum, 1 valid assumption.

Watch out: Inverse proportion keeps the product wt constant.

7. Quadratic graph [5]

(a) Missing values: -3, -4, -3.

(b) Plot (-2,5), (-1,0), (0,-3), (1,-4), (2,-3), (3,0), (4,5).

Join with a smooth U-shaped curve; vertex (1,-4).

(c) Minimum $y = -4$.

Suggested marking: (a) 2 all correct, 1 for two correct; (b) 1 points, 1 smooth curve; (c) 1 minimum.

Watch out: The vertex gives the minimum y -value, not the x -value.

8. Comparing transport costs [6]

(a) $A = 4 + 3h$; $B = 7 + 2h$.

(b) $4 + 3h = 7 + 2h$ gives $h = 3$ hours.

(c) $7 + 2h < 4 + 3h$ gives $h > 3$.

The least whole-number duration is 4 hours.

Suggested marking: Each part: 1 setup/reasoning, 1 answer (part a: 1 per expression).

Watch out: At 3 hours the costs are equal; B becomes cheaper after 3 hours.