G3 MATHEMATICS HOLIDAY REVISION

Week 4

Exam mode

Student worksheet

Upper Secondary - Sec 3 and Sec 4

15 original questions

Show your working. Choose a method, keep track of restrictions and check that your answer fits the question.

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STUDENT WORKSHEET

Week 4 · Exam mode

TIMED CHECKS

Q1

[4 marks]

Solve the compound inequality $3x - 5 < 2x + 4 \leq 4x + 10$. Write the answer as one interval and test one boundary.

WORKING SPACE

STUDENT WORKSHEET

Week 4 · Exam mode

TIMED CHECKS

Q2

[4 marks]

Solve $4^{x+1} = 8^{2x-1}$. Give an exact answer and show a common-base check.

WORKING SPACE

STUDENT WORKSHEET

Week 4 · Exam mode

MIXED APPLICATIONS

Q3

[5 marks]

A tank starts empty. Water enters at 6 litres per minute for 8 minutes, then at 4 litres per minute for 12 minutes. The tank holds 120 litres. How much more water is needed, and how long will that take at 3 litres per minute?

WORKING SPACE

STUDENT WORKSHEET

Week 4 · Exam mode

MIXED APPLICATIONS

Q4

[4 marks]

A bag has 3 red and 2 blue counters. Two are drawn without replacement. Find the probability of exactly one blue counter, showing the different possible orders.

WORKING SPACE

STUDENT WORKSHEET

Week 4 · Exam mode

MIXED APPLICATIONS

Q5

[6 marks]

A(−1,2) and B(3,10) are endpoints of a segment. Find its midpoint, the equation of its perpendicular bisector and where that bisector meets the x-axis.

WORKING SPACE

STUDENT WORKSHEET

Week 4 · Exam mode

MIXED APPLICATIONS

Q6

[4 marks]

A map has scale 1:25 000. A path measures 7.2 cm on the map. A square park has side 2 cm on the same map. Find the path length in kilometres and the actual park area in hectares. (1 hectare = 10 000 m².)

WORKING SPACE

STUDENT WORKSHEET

Week 4 · Exam mode

MIXED APPLICATIONS

Q7

[5 marks]

A discrete data set has values 1, 2 and 3 with respective frequencies 2, 5 and 3. Find the mean and standard deviation, using population standard deviation for these ten values.

WORKING SPACE

STUDENT WORKSHEET

Week 4 · Exam mode

MIXED APPLICATIONS

Q8

[5 marks]

A shop sells pens at $2 each and notebooks at $5 each. Its sales matrix has rows for Day 1 and Day 2 and columns for pens and notebooks: [[3,2],[1,4]]. Choose a price vector, use matrix multiplication to find each day's revenue, and find the two-day total.

WORKING SPACE

STUDENT WORKSHEET

Week 4 · Exam mode

MIXED APPLICATIONS

Q9

[5 marks]

A cylindrical container of radius 3 cm and height 10 cm is open at the top. It is filled to 80% of capacity. Find the volume of water and the outside area to be painted if only the curved surface and base are painted. Give exact answers.

WORKING SPACE

STUDENT WORKSHEET

Week 4 · Exam mode

MISTAKE ANALYSIS

Q10

[5 marks]

For $y = x^2 - 6x + 5$, find the turning point and x-intercepts. A student says the line $y = -3$ meets the curve only once because the turning point lies below it. Explain the error and find every intersection with $y = -3$.

WORKING SPACE

STUDENT WORKSHEET

Week 4 · Exam mode

MISTAKE ANALYSIS

Q11

[4 marks]

A student writes $(x^2-4)/(x-2)=x+2$ and then says $x=2$ is a solution of $(x^2-4)/(x-2)=x+2$ because both sides equal 4. Identify the error and state the complete set of real solutions to the original equation.

WORKING SPACE

STUDENT WORKSHEET

Week 4 · Exam mode

EXTENDED EXAM TASKS

Q12

[8 marks]

A rectangular community garden has perimeter 40 m and area 96 m². A 2 m-wide entrance is left unfenced. Fencing costs $12 per metre before a 10% discount on the fencing bill. Find the garden’s dimensions, its diagonal exactly, and the final fencing cost. Check that the dimensions fit both original conditions.

WORKING SPACE

STUDENT WORKSHEET

Week 4 · Exam mode

EXTENDED EXAM TASKS

Q13

[8 marks]

Printer A completes a booklet order on its own in x hours. Printer B takes 3 hours longer than printer A to complete the same order. Together they complete one order in 2 hours. Find x, showing why any rejected algebraic root is impossible. On a second identical order, both printers run for 1 hour before A stops. How much longer does B need to finish it? Check your result using fractions of an order completed.

WORKING SPACE

STUDENT WORKSHEET

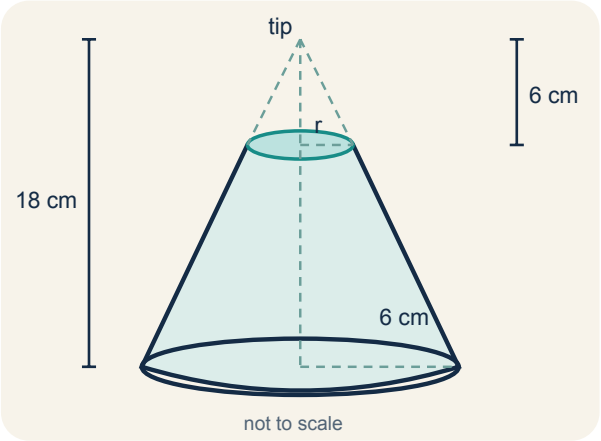
Week 4 · Exam mode

EXTENDED EXAM TASKS

Q14

[9 marks]

A solid right circular cone has height 18 cm and base radius 6 cm. A plane parallel to the base cuts off a smaller cone of height 6 cm at the tip. Find the radius of the new circular top face and the exact volume of the remaining solid. Find its total surface area, including both circular faces. A student multiplies the original cone's volume by 12/18 because the remaining solid is 12 cm high. Explain why this is invalid.



WORKING SPACE

STUDENT WORKSHEET

Week 4 · Exam mode

EXTENDED EXAM TASKS

Q15

[9 marks]

The journey times of two groups of 40 students are grouped into 0–<10, 10–<20, 20–<30, 30–<40 and 40–<50 minutes. Group A has respective frequencies 4, p, 14, q, 2 and an estimated mean of 25 minutes. Group B has frequencies 8, 10, 10, 8, 4. Find p and q, estimate Group B's mean, and identify the median class of each group. A student claims Group A must have a higher exact median because its estimated mean is higher. Assess that claim. Finally, find the probability that a randomly chosen Group A student is in a journey-time class of at least 30 minutes.

WORKING SPACE