1.1 Number Toolkit

Question Paper

Course	DP IB Maths
Section	1. Number & Algebra
Topic	1.1 Number Toolkit
Difficulty	Hard

Time allowed: 50

Score: /36

Percentage: /100

Question 1a

Let $P = \frac{(4\sin 2q - 2)(6\tan q + 2)}{10(r+s)^2}$, where $q = \frac{\pi}{6}$, $r = 6$ and $s = 2$.

(a) Calculate the exact value of P.

[4 marks]

Question 1b

(b) Give your answer from part (a) correct to

(i) two decimal places

(ii) two significant figures.

[2 marks]

Question 2a

Let $W = \frac{(2\cos 2x + y)(\tan\frac{x}{2} - z)}{10(5\sin x + z^2)}$, where $x = \frac{\pi}{2}$, $y = -1$ and $z = 2$.

(a) Find the value of W. Give your answer as a fraction.

[4 marks]

Question 2b

(b) Give your answer from part (a) to

(i) three decimal places

(ii) three significant figures.

[2 marks]

Question 3a

A prism has a cross sectional area of 5.50×10^3 cm^2 and volume of 4.40×10^4 cm^3.

(a) Calculate the length of the prism.

[3 marks]

Question 3b

The cross-sectional area of the prism is in the shape of a trapezium and its parallel sides measure 2 m and 2.4 m.

(b) Calculate the height of the trapezium. Give your answer in cm.

[3 marks]

Question 4a

Mary has found the exact answer for R is $\frac{45}{16}$.

(a) Write down the exact answer of R as a decimal.

[3 marks]

Question 4b

(b) Give your answer from part (a) correct to

(i) three decimal places

(ii) one significant figure.

[2 marks]

Question 5a

It is given that $\sin a = \frac{\sqrt{3}}{2}$ and $\sin b = \frac{1}{2}$, where $a \leq 180°$ and $b \leq 180°$.

(a) Find the size of the angles a and b.

[2 marks]

Question 5b

A circle has radius r equal to $\sqrt{\frac{\sin a}{\sin b}}$ cm.

(b) Find the exact value of the area of the circle, giving your answer in terms of π.

[4 marks]

Question 6a

A medium rare steak should have an internal temperature of 55°C to 56°C. Max decides to go 10 different steak houses, he measures the internal temperature of a medium rare steak at each establishment and records the following:

51.0, 52.1, 62.9, 49.0, 59.8, 50.2, 54.3, 47.7, 48.6, 65.4

(a) Find the mean internal temperature of Max's recordings.

[1 mark]

Question 6b

Max goes to 5 more steak houses and calculates the mean of all 15 restaurants to be 55.2°C.

(b) Calculate the mean internal temperature from the 5 additional steak houses Max went to.

[3 marks]

Question 6c

Max records one last steak that has an internal temperature of T °C.

(c) Calculate the interval of T such that the mean internal temperature for all 16 steaks is within the temperature range for a medium rare steak.

[3 marks]