

1.1 Number Toolkit

Question Paper

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| Course | DPIB Maths |
| Section | 1. Number & Algebra |
| Topic | 1.1 Number Toolkit |
| Difficulty | Medium |

Time allowed: 50
Score: /36
Percentage: /100

Question 1a

Let $Q = \frac{30 \sin 2a}{8b}$, where $a = 45^\circ$ and $b = 2$.

(a) Calculate the exact value of Q .

[1 mark]

Question 1b

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

- (i) two decimal places
- (ii) two significant figures.

[2 marks]

Question 2a

Let $R = \frac{4x}{6 \cos 5y}$, where $x = 1.25$ and $y = 36^\circ$.

(a) Write the angle of y in radians.

[1 mark]

Question 2b

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

[2 marks]

Question 2c

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

- (i) one decimal place
- (ii) three significant figures.

[2 marks]

Question 3a

Consider the numbers $a = 4.14 \times 10^6$ and $b = 2.54 \times 10^{-7}$.

(a) Calculate $C = \sqrt[10]{\left(\frac{a}{b}\right)^3}$. Give your answer correct to the

- (i) nearest integer
- (ii) three significant figures.

[3 marks]

Question 3b

(b) Give your answer to part (a) (i) in the form $a \times 10^k$, where $1 \leq a \leq 10$ and $k \in \mathbb{Z}$.

[2 marks]

Question 4a

A cylinder has radius of 12.7 cm and height of 14.4 cm.

(a) Calculate the volume of the cylinder correct to

- (i) one decimal place
- (ii) three significant figures
- (iii) the nearest integer.

[3 marks]

Question 4b

(b) Write your answer to part (a) (ii) in the form $a \times 10^k$, where $1 \leq a \leq 10$ and $k \in \mathbb{Z}$.

[2 marks]

Question 5a

A rectangular field has length, L , of 25.2 m and width, W , of 21.4 m, each correct to 1 decimal place.

(a) Calculate the lower and upper bound for

(i) L

(ii) W .

[2 marks]

Question 5b

(b) Calculate the lower and upper bound for the

(i) perimeter, P

(ii) area, A , of the field.

[4 marks]

Question 6

Calculate the following, giving your answer in the form $a \times 10^k$, where $1 \leq a \leq 10$ and $k \in \mathbb{Z}$.

(i) $4 \times (6.2 \times 10^{-5})$

(ii) $(4 \times 10^5) - (5 \times 10^4)$

(iii) $(4321^{-1})(1.2 \times 10^{-1})$.

[6 marks]

Question 7a

Consider the following four numbers.

$$a = 0.272 \quad b = 0.0272 \times 10^5 \quad c = e(10e)^{-1} \quad d = 2.72 \times 10^2$$

(a) Write down

- (i) the number that is in the form $a \times 10^k$, where $1 \leq a \leq 10$ and $k \in \mathbb{Z}$
- (ii) the largest of these numbers.

[2 marks]

Question 7b

- (b) (i) Find the value of $a + b - c + d$.
- (ii) Give your answer to part (b)(i) in the form $a \times 10^k$, where $1 \leq a \leq 10$ and $k \in \mathbb{Z}$.

[4 marks]