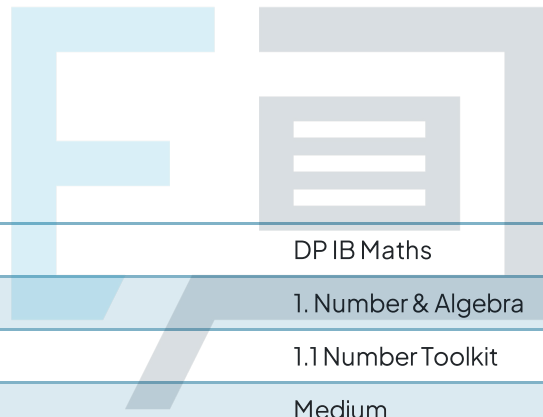




# 1.1 Number Toolkit

## Mark Schemes



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

# Exam Papers Practice

To be used by all students preparing for DP IB Maths AA SL  
Students of other boards may also find this useful

Question 1

a) sub in  $a = 45^\circ$  and  $b = 2$  into Q.

$$Q = \frac{30 \sin 2(45^\circ)}{8(2)} = \frac{30 \sin(90^\circ)}{16}$$

$$\sin(90^\circ) = 1$$

$$Q = \frac{30}{16} \text{ or } 1.875$$

b) i)  $Q = 1.88 \text{ (2 dp)}$

ii)  $Q = 1.9 \text{ (2 sf)}$

Exam Papers Practice

Question 2

a) degrees  $\rightarrow \times \frac{\pi}{180} \rightarrow$  radians

$$\cancel{36} \times \frac{\pi}{\cancel{180}^5} = \frac{\pi}{5}$$

$$y = \frac{\pi}{5} \text{ radians}$$

b) sub in  $x = 1.25$  and  $y = 36^\circ$  into R.

$$R = \frac{4(1.25)}{6 \cos 5(36^\circ)} = \frac{5}{6 \cos 180^\circ}$$

$$\cos 180^\circ = -1$$

$$R = -\frac{5}{6}$$

c)  $R = -\frac{5}{6} = -0.8333\dots$

i)  $R = -0.8$  (1dp)

ii)  $R = -0.833$  (3sf)

Question 3

a) Sub a and b into C.

$$C = 10 \sqrt{\left( \frac{4.14 \times 10^6}{2.54 \times 10^{-7}} \right)^3}$$

$$C = 9197.0804\dots$$

i)  $C = 9197$  (nearest integer)

ii)  $C = 9200$  (3 s.f)

b)  $C = 9.197 \times 10^3$

Exam Papers Practice



## Question 4

a) Volume of a cylinder formula

$$V = \pi r^2 h \quad (\text{in formula booklet})$$

$$r = 12.7 \quad h = 14.4$$

Sub  $r$  and  $h$  into formula.

$$V = \pi (12.7)^2 (14.4)$$

$$V = 7296.58\dots$$

i)  $V = 7296.6 \text{ cm}^3$  (1dp)

ii)  $V = 7300 \text{ cm}^3$  (3sf)

iii)  $V = 7297$  (nearest integer)

b)  $V = 7.3 \times 10^3 \text{ cm}^3$



## Question 5

a) For L

Any value equal to or more than 25.15cm will be rounded up to 25.2 cm (1dp).

Any value less than 25.25cm will be rounded down to 25.2 cm (1dp).

For W

Any value equal to or more than 21.35cm will be rounded up to 21.4 cm (1dp).

Any value less than 21.45cm will be rounded down to 21.4 cm (1dp).

Write bounds as an inequality.

i)  $25.15\text{ m} \leq L < 25.25\text{ m}$

ii)  $21.35\text{ m} \leq W < 21.45\text{ m}$

b) For lower bound use

$$L = 25.15 \quad W = 21.35$$

$$P = 2(25.15) + 2(21.35) \quad A = (25.15)(21.35)$$

$$P = 93 \text{ m} \quad A = 536.9525 \text{ m}^2$$

For upper bound use

$$L = 25.25 \quad W = 21.45$$

$$P = 2(25.25) + 2(21.45) \quad A = (25.25)(21.45)$$

$$P = 93.4 \text{ m} \quad A = 541.6125 \text{ m}^2$$

i)  $93 \text{ m} \leq P < 93.4 \text{ m}$

ii)  $537 \text{ m}^2 \leq A < 541 \text{ m}^2$  (3sf)

# Exam Papers Practice

## Question 6

i) Input equation into calculator.

$$4 \times (6.2 \times 10^{-5}) = 0.000248$$

Rewrite into form  $a \times 10^k$ , where  $1 \leq a < 10$ ...

$$2.48 \times 10^{-4}$$

ii) Input equation into calculator.

$$(4 \times 10^5) - (5 \times 10^4) = 350\,000$$

Rewrite into form  $a \times 10^k$ , where  $1 \leq a < 10$ ...

$$3.5 \times 10^5$$

iii) Input equation into calculator.

$$(4321^{-1})(1.2 \times 10^{-1}) = 0.0002777...$$

Rewrite into form  $a \times 10^k$ , where  $1 \leq a < 10$ ...

$$2.78 \times 10^{-5} \text{ (3sf)}$$

## Question 7

a) i)  $d = 2.72 \times 10^2$

$$a = 0.272 \quad b = 2720 \quad c = 0.1 \quad d = 272$$

ii)  $b = 0.0272 \times 10^5$



b) Sub a, b, c and d into equation.

$$0.272 + 0.0272 \times 10^5 - e(10e)^{-1} + 2.72 \times 10^2$$

$$0.272 + 2720 + 0.1 + 272$$

$$= 2992.172$$

i)  $2990$  (3sf)

ii)  $2.99 \times 10^3$



# Exam Papers Practice