Order by Size
Difficulty: Easy

Model Answers 1

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Number
Sub-Topic	Order by Size
Paper	Paper 2
Difficulty	Easy
Booklet	Model Answers 1

Time allowed: **39 minutes**

Score: **/30**

Percentage: **/100**

Grade Boundaries:

CIE IGCSE Maths (0580)

A*	A	B	C	D	E
>88%	76%	63%	51%	40%	30%

CIE IGCSE Maths (0980)

9	8	7	6	5	4	3
>94%	85%	77%	67%	57%	47%	35%

Write the following in order of size, smallest first.

π 3.14 $\frac{22}{7}$ 3.142 3 [2]

The order of size can be found by writing all of these numbers out to the same number of decimal places, and then comparing. In order to do this, Put each of the values into the same format (decimals) using the 'S⇔D' button (located above 'DEL') on your calculator

$\pi = 3.14159\ (5.d.p)$

$3.14 = 3.14000\ (5.d.p)$

$\frac{22}{7} = 3.14286\ (5.d.p)$

$3.142 = 3.14200\ (5.d.p)$

$3 = 3.00000\ (5.d.p)$

Therefore, the order we get (smallest to largest) is:

3 < 3.14 < π < 3.142 < 22/7

Write the following in order of size, smallest first.

$0.34 \quad 0.6 \quad 0.6^2 \quad 0.7^3$ [2]

Write values in decimal form

$$\sqrt{0.6} = 0.7745966692$$

$$0.6^2 = 0.36$$

$$0.7^3 = 0.343$$

Hence

$$\mathbf{0.34 < 0.7^3 < 0.6^2 < \sqrt{0.6}}$$

Write the following in order of size, smallest first. [2]

0.5^2 0.5 0.5^3 $\sqrt[3]{0.5}$

$0.5^2 = 0.25$

0.5

$0.5^3 = 0.125$

$\sqrt[3]{0.5} = 0.793$

The order, starting from the smallest is:

$0.125 < 0.25 < 0.5 < 0.793$

The equivalent of:

$0.5^3 < 0.5^2 < 0.5 < \sqrt[3]{0.5}$

Write the following in order, smallest first.

$\sqrt{0.1}$ $\quad \frac{43}{201}$ $\quad 2\frac{1}{2}\%$ $\quad 0.2$ [2]

Write each in decimal form

$$\sqrt{0.1} = 0.3162$$

$$\frac{43}{201} = 0.2139$$

$$2\frac{1}{2}\% = 0.025$$

Hence

$$\mathbf{2\frac{1}{2}\% < 0.2 < \frac{43}{201} < \sqrt{0.1}}$$

Write the following in order of size, largest first.

sin 158° cos 158° cos 38° sin 38° [2]

sin 158° = 0.3746...

cos 158° = -0.9271...

sin 38° = 0.6156...

cos 38° = 0.7880...

The number in order, starting from the largest one, are:

0.788 > 0.616 > 0.375 > -0.927

Equivalent with:

cos 38° > sin 38° > sin 158° > cos 158°

Write the following in order of size, **smallest** first.

$\sqrt{0.9}$ $\sqrt[3]{0.9}$ 0.9^2 0.9^3 [2]

$0.9^3 < 0.9^2 < \sqrt{0.9} < \sqrt[3]{0.9}$

Write the following in order of size, **smallest** first.

$\frac{20}{41}$ $\frac{80}{161}$ 0.492 4.93% [2]

$4.93\% = 0.0493$

$\frac{20}{41} = 0.4878$

$\frac{80}{161} = 0.4969$

So

$$\mathbf{4.93\% < \frac{20}{41} < 0.492 < \frac{80}{161}}$$

Write the numbers in order of size with the **smallest** first.

$\sqrt{10}$ 3.14 $\frac{22}{7}$ π [2]

Write each value in decimal form

$\sqrt{10} = 3.16227766$

$\frac{22}{7} = 3.142857$

$\pi = 3.14159$

Hence

$$\mathbf{3.14 < \pi < \frac{22}{7} < \sqrt{10}}$$

Write the following in order of size, smallest first.

$\sqrt{\frac{9}{17}}$ $\frac{5}{7}$ 72% $\left(\frac{4}{3}\right)^{-1}$ [2]

$\sqrt{\frac{9}{17}} = 0.727$

$\frac{5}{7} = 0.714$

$72\% = \frac{72}{100} = 0.72$

$(\frac{4}{3})^{-1} = \frac{3}{4} = 0.75$

The order, starting from the smallest is:

$\frac{5}{7} < 72\% < \sqrt{\frac{9}{17}} < (\frac{4}{3})^{-1}$

Write the following in order of size, smallest first.

$\frac{399}{401}$ $\frac{698}{701}$ $\frac{598}{601}$ [2]

Write the fractions in decimal form:

$$\frac{399}{401} = 0.995012$$

$$\frac{698}{701} = 0.995720$$

$$\frac{598}{601} = 0.995008$$

Hence:

$$\mathbf{\frac{598}{601} < \frac{399}{401} < \frac{698}{701}}$$

Write the following in order of size, **smallest** first.

$\cos 100°$ $\sin 100°$ $\tan 100°$ [2]

$\cos 100° = -0.173$

$\sin 100° = 0.984$

$\tan 100° = -5.671$

Order starting from the smallest:

$\tan 100° < \cos 100° < \sin 100°$

$(0.8)^{\frac{1}{2}}$, 0.8, $\sqrt{0.8}$, $(0.8)^{-1}$, $(0.8)^2$.

From the numbers above, write down

To compare them, we need t have the number written in the same form. In this case, the easiest is to write them as 0.8 raised to a power.

The numbers we will compare are:

$(0.8)^{1/2}$

$0.8 = 0.8^1$

$\sqrt{0.8} = 0.8^{1/2}$

0.8^{-1}

0.8^2

Since 0.8 is a number in decimal form, the largest number is 0.8 raised to the lowest power, while the smallest number is 0.8 raised to the smallest power.

(a) the smallest, [1]

The smallest number: $0.8^2 = 0.64$

(b) the largest. [1]

The largest number: $0.8^{-1} = 1.25$

Write the numbers 0.5^2, $\sqrt{0.5}$, 0.5^3 in order with the smallest first. [2]

When you square a number between 0 and 1 it gets smaller and when you cube it it gets smaller still.

Squaring rooting is the opposite of squaring so a number between 0 and 1 will get bigger when square rooted.

so:

$$\mathbf{0.5^3 < 0.5^2 < \sqrt{0.5}}$$

("<" signs are optional as the question just requires a list.)

Write in order of size, smallest first,

$$\frac{5}{98}, \quad 0.049, \quad 5\%.$$

[2]

$\frac{5}{98} = 0.051$

0.049

$5\% = \frac{5}{100} = 0.05$

The order, starting from the smallest is:

$0.049 < 5\% < \frac{5}{98}$

Write the four values in order, smallest first.

$\frac{1}{1000}$, $\frac{11}{1000}$, 0.11%, 0.0108. [2]

$\frac{1}{1000}$ = 0.001

$\frac{11}{1000}$ = 0.011

0.11% = $\frac{0.11}{100}$ = 0.0011

0.0108

The order, starting with the smallest is:

$\frac{1}{1000}$ < 0.11% < 0.0108 < $\frac{11}{1000}$