# Indices and surds – 2022 GCSE Mathematics Higher

**1.** June/2022/Paper_J560/04/No.1

**(a)** Write 6 050 000 in standard form.

**(a)** ..... **[1]**

**(b)** Write $4.58 \times 10^{-3}$ as an ordinary number.

**(b)** ..... **[1]**

**2.** June/2022/Paper_J560/04/No.2

Calculate.

$$\frac{270}{2.5^2} - \frac{4.6 + 17.2}{8.4 - 6.8}$$

..... **[2]**

**3.** June/2022/Paper_J560/05/No.3

Dinosaurs first appeared on Earth $2.4 \times 10^8$ years ago.
Dinosaurs became extinct on Earth $7 \times 10^7$ years ago.

**(a)** Explain why it is appropriate to use standard form for these numbers.

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..... **[1]**

**(b)** Use the given information to work out how long dinosaurs existed on Earth.
Give your answer in standard form.

**(b)** ..... **[3]**

**4.** June/2022/Paper_J560/05/No.4

**(a)** Complete this statement by writing the missing power in the box.

$$784 = 2^{\square} \times 7^2$$

**[1]**

**(b)** Use your answer to part **(a)** to find the value of $\sqrt{784}$.

**(b)** ..... **[2]**

**5.** June/2022/Paper_J560/06/No.3

Light from the Sun travels 1 kilometre in $3.3 \times 10^{-6}$ seconds.
The distance from the Sun to the Earth is $1.5 \times 10^{8}$ kilometres.

How long does it take light to travel from the Sun to the Earth?
Give your answer in minutes and seconds.

..... minutes ..... seconds **[4]**

**6.** June/2022/Paper_J560/06/No.4

You are given that

$$\frac{10a^k \times a^8}{ma^5} = \frac{2a^7}{5}$$

where $k$ and $m$ are integers.

Find the value of $k$ and the value of $m$.

$k =$ ..... and $m =$ ..... **[4]**

**7.** June/2022/Paper_J560/06/No.17

Blake is asked to write 15552000000 as a product of prime factors in index form.
Blake writes

$15552000000 = 2^7 \times 5^6 \times 6^5$.

**(a)** Explain Blake's mistake.

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..... **[1]**

**(b)** Write 15552000000 as a product of prime factors in index form.

**(b)** ..... **[2]**

**(c)** You are given that $140000 = 2^5 \times 5^4 \times 7$.

Find the highest common factor (HCF) of 15552000000 and 140000.

**(c)** ..... **[2]**