

PM

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Higher GCSE Revision

Exam Style Questions

Topics covered in this video...

- 👉 Standard Form
- 👉 Basic Laws of Indices
- 👉 Negative and Fractional Indices

See the description below for links to the files used in this video

1. Write the following in standard form:

$$(i) \quad \underbrace{400\,000\,000}_{\text{}} = 4 \times 10^8$$

$$(ii) \quad \underbrace{0.000\,000\,397}_{\text{}} = 3.97 \times 10^{-7}$$

2. Work out the following

$$(i) \quad \underbrace{(2 \times 10^2) \times (4 \times 10^5)}_{\text{}} = 8 \times 10^7$$

$$(ii) \quad \underbrace{4 \times 10^7 \times 3 \times 10^4}_{\text{}} = 12 \times 10^{11} = 1.2 \times 10^{12}$$

Give your answer in standard form.

3. Work out the following

(i) $\frac{8 \times 10^7}{2 \times 10^3} = 4 \times 10^4$

(ii) $\frac{3 \times 10^{11}}{6 \times 10^3} = 0.5 \times 10^8 = 5 \times 10^7$ $\frac{3}{6} = \frac{1}{2} = 0.5$

4. Here are six numbers written in standard form.

2.6×10^5 1.75×10^6 5.84×10^0 8.2×10^{-3} 3.5×10^{-1} 4.9×10^{-2}

(a) Write down the largest number. 1.75×10^6

(b) Write down the smallest number. 8.2×10^{-3}

(c) Write 4.9×10^{-2} as an ordinary number. 0.049

(d) Work out $2.6 \times 10^5 \div 10$
Give your answer in standard form. $2.6 \times 10^5 \div 10^1 = 2.6 \times 10^4$

5. (a) Work out $4 \times 10^8 \times 5 \times 10^{-6}$ Give your answer in standard form.

$$8 + (-6) = 2$$

$$= 20 \times 10^2$$

$$= \underline{2 \times 10^3}$$

(b) Work out $\frac{4 \times 10^8}{5 \times 10^{-6}}$ Give your answer in standard form.

$$8 - (-6) = 14$$

$$\frac{4}{5} = \frac{8}{10} = 0.8$$

$$= 0.8 \times 10^{14}$$

$$= \underline{8 \times 10^{13}}$$

6. (a) Write the number 0.000 000 38 in standard form.

$$= 3.8 \times 10^{-7}$$

(b) Violet light has a wavelength of 0.000 000 38 metres.

Work out the wavelength of violet light in centimetres.

Give your answer in standard form.

$$3.8 \times 10^{-7} \times 100$$

$$3.8 \times 10^{-7} \times 10^2$$

$$\underline{3.8 \times 10^{-5}}$$

$$-7 + 2 = -5$$

7. Simplify

(a) $w^6 \times w^2 = w^8$

(b) $x^3 \div x^5 = x^{-2}$ or $\frac{1}{x^2}$

(c) $(y^3)^2 = y^6$ $y^3 \times y^3 = y^6$

8. Estimate the value of 7.9^2 $7.9 \approx 8$ $7.9^2 \approx \underline{\underline{64}}$
 $8^2 = 64$

9. (a) Simplify

(i) $y^7 \times y^2 = y^9$

(ii) $y^7 \div y^2 = y^5$

(iii) $(y^7)^2 = y^{14}$

10. Glynn says that $\sqrt{16+9}$ is the same as $\sqrt{16} + \sqrt{9}$

Show that Glynn is wrong.

$$\sqrt{16+9} = \sqrt{25} = \underline{5}$$

$$\sqrt{16} + \sqrt{9} = 4 + 3 = \underline{\underline{7}}$$

11. (a) Write down the value of $9^0 = \underline{\underline{1}}$

(b) Work out 10^{-3} . Give your answer as a decimal.

$$10^{-3} = \frac{1}{10^3} = \frac{1}{1000} = 0.001$$

(c) Simplify $\frac{5^9 \times 5^2}{5^3}$. Give your answer as a power of 5.

$$= \frac{5^{11}}{5^3} = \underline{\underline{5^8}}$$

12. Simplify

$$(a) \quad x^3 \times x^5 = x^8$$

$$(b) \quad y^{12} \div y^4 = y^8$$

$$(c) \quad (3wt^2)^3 = 3^3 \times w^3 \times (t^2)^3 = 27w^3t^6$$

13. (a) Find the value of $36^{\frac{1}{2}} = \pm\sqrt{36} = \pm 6$

$$6 \times 6 = 36$$
$$-6 \times -6 = 36$$

(b) Simplify $2^{-2} \times 81^{\frac{1}{4}} = \frac{1}{2^2} \times \sqrt[4]{81}$

$$3 \times 3 \times 3 \times 3 = 81$$

$$= \frac{1}{4} \times 3$$

$$= \frac{3}{4}$$

14. (a) Work out $81^{\frac{1}{2}} \times 2^{-3} = \sqrt{81} \times \frac{1}{2^3} = 9 \times \frac{1}{8} = \frac{9}{8}$ or $1\frac{1}{8}$

(b) Work out $125^{-\frac{2}{3}} = \frac{1}{125^{\frac{2}{3}}} = \frac{1}{25}$

$125^{\frac{2}{3}}$ — Square
— cube root

$\sqrt[3]{125} = 5$
 $5^2 = 25$

15. (a) Evaluate $16^{\frac{1}{4}} \times 5^{-2} \times 36^0 = \sqrt[4]{16} \times \frac{1}{5^2} \times 1$

$2 \times 2 \times 2 \times 2 = 16$

$= 2 \times \frac{1}{25}$

$= \frac{2}{25}$

(b) Write $64^{-\frac{2}{3}}$ as a fraction.

$\sqrt[3]{64} = 4$
 $4^2 = 16$

$64^{-\frac{2}{3}} = \frac{1}{64^{\frac{2}{3}}} = \frac{1}{16}$

16. Evaluate

$$(a) \quad 36^{\frac{1}{2}} \times 4^{-1} = \sqrt{36} \times \frac{1}{4} = 6 \times \frac{1}{4} = \frac{6}{4} = \frac{3}{2} = 1\frac{1}{2}$$

$$(b) \quad 1000^{-\frac{2}{3}} = \frac{1}{1000^{\frac{2}{3}}} = \frac{1}{100}$$

$$\begin{aligned} \sqrt[3]{1000} &= 10 \\ 10^2 &= 100 \end{aligned}$$

17. (a) Work out $49^{\frac{1}{2}} \times 5^{-3} = \sqrt{49} \times \frac{1}{5^3}$

$$= 7 \times \frac{1}{125} = \frac{7}{125}$$

(b) Simplify $\frac{4^7}{4^{-2}}$ giving your answer in the form 2^n . $(2^2) = 4$

$$\frac{4^7}{4^{-2}} = 4^9 = (2^2)^9 = \underline{\underline{2^{18}}}$$

(c) Work out the value of $81^{-\frac{3}{4}}$ Give your answer as a fraction.

$$81^{-\frac{3}{4}} = \frac{1}{81^{\frac{3}{4}}} = \frac{1}{27}$$

$$\begin{aligned} \sqrt[4]{81} &= 3 \\ 3^3 &= 27 \end{aligned}$$

18. (a) Find the value of $64^{\frac{1}{3}} = \sqrt[3]{64} = \underline{\underline{4}}$

(b) Find the value of $8x^0 = 8 \times x^0$
 $= 8 \times 1$
 $= \underline{\underline{8}}$

19. Simplify fully

(a) $8 \times 8^0 \times 8^{-1} = 8 \times 1 \times \frac{1}{8} = \frac{8}{8} = \underline{\underline{1}}$

(b) $5^{-2} \times (5^{\frac{1}{3}})^3 = \frac{1}{5^2} \times 5^1 = \frac{5^1}{5^2} = 5^{-1} = \underline{\underline{\frac{1}{5}}}$

20. (a) Work out $8^{\frac{2}{3}} = 4$

$$\sqrt[3]{8} = 2$$
$$2^2 = 4$$

(b) Work out $64^{-\frac{1}{3}} = \frac{1}{64^{\frac{1}{3}}} = \frac{1}{4}$

$$\sqrt[3]{64} = 4$$

21. (a) (i) Evaluate $13z^0 = 13 \times z^0 = 13 \times 1 = \underline{13}$

(ii) Evaluate $(13z)^0 = \underline{\underline{1}}$

(b) If $3^x = \frac{1}{27}$ find the value of x.

$$3^{-3} = \frac{1}{27}$$

$$\underline{x = -3}$$

(c) If $4^y = 64^{\frac{1}{2}}$ find the value of y.

$$\sqrt{4} = 2$$

Square root

$$2^3 = 8$$

Cube it

$$4^y = 8$$

$$4^{\frac{3}{2}}$$

$$\underline{y = \frac{3}{2}}$$

