Standard Form

1. Write the following in standard form:

(i) 400 000 000

(ii) 0.000 000 397

(2)

2. Work out the following

(i) $(2 \times 10^2) \times (4 \times 10^5)$

(ii) $4 \times 10^7 \times 3 \times 10^4$

Give your answer in standard form.

(3)

3. Work out the following

(i) $\frac{8\times10^7}{2\times10^3}$

(ii) $\frac{3\times10^{11}}{6\times10^3}$

Give your answer in standard form.

(3)

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)

(b) Write down the smallest number.

(1)

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

(1)

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

(1)

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

(2)

(b) Work out $\frac{4\times10^8}{5\times10^{-6}}$ Give your answer in standard form.

(3)

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

(1)

(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.

(2)

Basic Indices

7. Simplify (a) $w^6 \times w^2$ (b) $x^3 \div x^5$ (c) $(y^3)^2$

(3)

8. Estimate the value of 7.9^2

(3)

9. (a) Simplify (i) $y^7 \times y^2$ (ii) $y^7 \div y^2$ (iii) $(y^7)^2$

(3)

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

Show that Glynn is wrong.

(2)

11. (a) Write down the value of 9^0

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

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

(5)

12. Simplify

(a) $x^3 \times x^5$ (b) $y^{12} \div y^4$ (c) $(3wt^2)^3$

(4)

Harder Indices

13. (a) Find the value of $36^{\frac{1}{2}}$ (b) Simplify $2^{-2} \times 81^{\frac{1}{4}}$

(3)

14. (a) Work out $81^{\frac{1}{2}} \times 2^{-3}$ (b) Work out $125^{-\frac{2}{3}}$

(5)

15. (a) Evaluate $16^{\frac{1}{4}} \times 5^{-2} \times 36^0$ (b) Write $64^{-\frac{2}{3}}$ as a fraction.

(3)

16. Evaluate (a) $36^{\frac{1}{2}} \times 4^{-1}$ (b) $1000^{-\frac{2}{3}}$

(2)

17. (a) Work out $49^{\frac{1}{2}} \times 5^{-3}$ (b) Simplify $\frac{4^7}{4^{-2}}$ giving your answer in the form 2^n.

(4)

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

(3)

18. (a) Find the value of $64^{\frac{1}{3}}$ (b) Find the value of $8x^0$

(Total 2 marks)

19. Simplify fully

(a) $8 \times 8^0 \times 8^{-1}$ (b) $5^{-2} \times (5^{\frac{1}{3}})^3$

(Total 4 marks)

20. (a) Work out $8^{\frac{2}{3}}$ (b) Work out $64^{-\frac{1}{3}}$ Give your answer as a fraction.

(Total 4 marks)

21. (a) (i) Evaluate $13z^0$ (ii) Evaluate $(13z)^0$

(1)

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

(2)

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

(2)