

1. Write these in order of size, starting with the smallest.  
Show your working.

$$5^2 \quad \sqrt{100} \quad 3^3 \quad 4^2$$

.....  
*smallest* .....

[2]

2. (a) Find the cube root of 64.

.....

[1]

- (b) Find the reciprocal of 4.

.....

[1]

- (c) Simplify, giving your answer as a power of 3.

(i)  $3^6 \times 3^2$

.....

[1]

(ii)  $3^6 \div 3^2$

.....

[1]

- (d) Write  $3.45 \times 10^4$  as an ordinary number.

.....

[1]

3. (a) Find the cube of 3.

.....

[1]

- (b) Write  $2 \times 2 \times 2 \times 2$  using index notation.

.....

[1]

- (c) Write  $\frac{25}{30}$  as a fraction in its simplest terms.

.....

[1]

4. Calculate, giving each answer in standard form.

(a)  $(3 \times 10^5) \times (2 \times 10^3)$

.....

[1]

(b)  $(8 \times 10^3) + (3 \times 10^2)$

.....

[2]

5. (a) Estimate the answer to this calculation.

$$\frac{17.5 \times 3.8}{0.483}$$

.....

[2]

(b) Explain how you can tell that the following answer must be wrong.

$$(4.1 \times 10^7) \times (4.8 \times 10^{15}) = 1.968 \times 10^{22}$$

.....

[1]

6. The population of India in July 2002 was  $1.05 \times 10^9$ .

The population of Bahrain in July 2002 was  $6.56 \times 10^5$ .

How many times larger than the population of Bahrain was the population of India?

.....

[2]

7. Calculate.

(a) The square of 16

..... [1]

(b)  $\sqrt{400}$

..... [1]

(c)  $2 \cdot 5^2$

..... [1]

8. (a) Write  $0.\dot{2}4$  as a fraction in its lowest terms.

..... [3]

(b) Simplify  $(5 - \sqrt{3})^2$

Write your answer in the form  $a - b\sqrt{3}$  where  $a$  and  $b$  are integers.

..... [2]

9. Work out.

$$\frac{3 \times 10^7}{6 \times 10^3}$$

Give your answer in standard form.

..... [2]

10. (a) Simplify  $\sqrt{2} + \sqrt{50}$ .

Give your answer in the form  $a\sqrt{2}$ .

..... [2]

(b) Expand and simplify.

$$(5 + \sqrt{3})^2$$

..... [2]

11. Work out.

(a)  $5^0$

..... [1]

(b)  $5^{-2}$

..... [1]

(c)  $400^{\frac{1}{2}}$

..... [1]

12. (a) Write 0.00365 in standard form.

..... [1]

(b) Work out  $(6 \times 10^4) \times (2 \times 10^{-2})$ .  
Give your answer in standard form.

..... [2]

13. (a) Work out.

(i)  $4^3 - \sqrt{49}$

..... [2]

(ii)  $\frac{5^4 \times 5^3}{5^3}$

..... [2]

(b) Write down the reciprocal of 8.

..... [1]

14. Evaluate.

(a)  $16^0$

..... [1]

(b)  $2^{-3}$

..... [1]

(c)  $64^{\frac{2}{3}}$

..... [2]

15. (a) Express as a single power of 6.

$$\frac{6^3 \times 6^6}{6^7}$$

..... [1]

(b) Express 420 as the product of its prime factors.

..... [2]

16. (a) Solve.

$$5x - 2 = x + 4$$

..... [3]

(b) Simplify.

(i)  $3a^2b \times 4a^3b$

..... [2]

(ii)  $(x^3)^4$

..... [1]

17. (a) Simplify.

$$\frac{12}{\sqrt{3}}$$

..... [2]

(b) Expand and simplify.

$$(\sqrt{3} - 5)^2$$

..... [3]

18. Work out.

(a)  $49^0$

..... [1]

(b)  $5^{-2}$

..... [1]

(c)  $9^{\frac{1}{2}}$

..... [1]

19. (a) Write 225 as a product of its prime factors.

..... [3]

(b) Find.

(i)  $\sqrt{225}$

..... [1]

(ii) the cube root of 64

..... [1]

20. (a) Write down the value of

(i)  $6^2$ ,

..... [1]

(ii)  $\sqrt{64}$ .

..... [1]

(b) Nasim says:

All square numbers are even.

Give an example to show that Nasim is wrong.

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

21. (a) Write down the value of  $\sqrt{169}$ .

..... [1]

(b) Change  $\frac{2}{9}$  to a recurring decimal.

..... [2]

22. (a) Write 0.00062 in standard form.

..... [1]

(b) Calculate.

$$(2.4 \times 10^2) + (1.6 \times 10^3)$$

Give your answer in standard form.

..... [2]

23. Work out.

(a)  $5^2 \times 5^{-2}$

..... [2]

(b)  $\left(\frac{5^9}{5^5}\right)^{\frac{1}{2}}$

..... [2]

24. (a) Express 0.0042 in standard form.

..... [1]

(b) Calculate  $(8.4 \times 10^4) + (6 \times 10^3)$ .  
Give your answer in standard form.

..... [2]