

## REVISION

1. Write as a decimal: (a) 2.5% (b)  $\frac{5}{12}$  (c)  $\frac{3}{7}$
2. Change to a percentage: (a)  $\frac{2}{5}$  (b) 1.56 (c) 0.034
3. Express as fractions in lowest terms: (a)  $0.\overline{57}$  (b)  $0.2\overline{3}$
4. The cost of a calculator is now \$32. If it has increased by 3.5%, how much was the old cost?
5. Evaluate correct to 3 significant figures: (a)  $\frac{0.5 \times 76.3}{7.8 + 3.1}$  (b)  $\sqrt{\frac{0.9 + 1.4}{5.2 - 3.6}}$
6. Use the index laws to simplify: (a)  $(5y^{-2})^3$  (b)  $\frac{m^3 \times (n^3)^4}{m^2 n^{-1}}$  (c)  $\frac{(y^6)^3 \times y^{-4}}{y^5}$   
(d)  $(27m^9)^{\frac{1}{3}}$  (e)  $\frac{2(a^{-5})^2 b^4}{4a^{-9}(b^2)^{-1}}$  (f)  $-9(a^4 b^{-1})^3 \div -18a^{-1}b^3$
7. Evaluate  $\frac{e^2 f^3}{e^3 f}$  when  $e = \left(\frac{1}{3}\right)^2$  and  $f = \left(\frac{3}{2}\right)^3$
8. Express as fractions: (a)  $7^{-1}$  (b)  $6^{-2}$
9. Simplify: (a)  $144^{\frac{1}{2}}$  (b)  $32^{\frac{1}{5}}$  (c)  $27^{\frac{2}{3}}$  (d)  $4^{\frac{5}{2}}$
10. Write without negative indices: (a)  $t^{-5}$  (b)  $2x^{-3}$  (c)  $(2x)^{-3}$
11. Simplify:  $\frac{m^{-1} + n^{-1}}{m + n}$
12. Write in index form:  $\frac{1}{\sqrt[3]{(7x-1)^2}}$
13. Write in scientific notation: (a) 5 000 000 (b) 29 000  
(c) 0.00003 (d) 0.078
14. Evaluate: (a)  $| -3 | - | 7 |$  (b)  $| -2 |^3$  (c)  $| 2 - 5 \times 2 |$  (d)  $| -7 | - 2|3| + 5| - 6 |$
15. Expand and simplify: (a)  $4a + 3(a - 5) - (a - 2)$  (b)  $(2x - 1)(3x + 5)$   
(c)  $(3a - 5)^2$  (d)  $(6y + 1)(6y - 1)$  (e)  $(x - 2)(x^2 + 2x + 4)$
16. Factorise: (a)  $ap^2 - aq^2$  (b)  $2x^2 - 6x - 20$  (c)  $24x - 3x^4$   
(d)  $81a^4 - b^4$  (e)  $4a^2 - 9(b - c)^2$  (f)  $a^6 + 7a^3 - 8$
17. Simplify: (a)  $\frac{x+3}{5} - \frac{x}{7}$  (b)  $\frac{4x^2}{2x^2 - 162} \times \frac{x^2 - 5x - 36}{x^2 + 4x}$

**Answers**

1. (a) 0.025 (b) 0.416 (c) 0.428571

2. (a) 40% (b) 156% (c) 3.4%

3. (a)  $\frac{57}{99}$  (b)  $\frac{7}{30}$

4. \$30.92

5. (a) 3.50 (b) 1.20

6. (a)  $125y^{-6}$  (b)  $mn^{13}$  (c)  $y^9$  (d)  $3m^3$  (e)  $\frac{b^6}{2a}$  (f)  $\frac{a^{13}}{2b^6}$

7.  $\frac{3^8}{2^6} = \frac{6561}{64}$

8. (a)  $\frac{1}{7}$  (b)  $\frac{1}{36}$

9. (a) 12 (b) 2 (c) 9 (d) 32

10. (a)  $\frac{1}{t^3}$  (b)  $\frac{2}{x^3}$  (c)  $\frac{1}{(2x)^3}$

11.  $\frac{1}{nm}$

12.  $(7x - 1)^{-\frac{2}{3}}$

13. (a)  $5 \times 10^6$  (b)  $2.9 \times 10^4$  (c)  $3 \times 10^{-5}$  (d)  $7.8 \times 10^{-2}$

14. (a) -4 (b) 8 (c) 8 (d) 31

15. (a)  $6a - 13$  (b)  $6x^2 + 7x - 5$  (c)  $9a^2 - 30a + 25$  (d)  $36y^2 - 1$

(e)  $x^3 - 8$

16. (a)  $a(p - q)(p + q)$  (b)  $2(x - 5)(x + 2)$  (c)  $3x(2 - x)(4 + 2x + x^2)$

(d)  $(3a - b)(3a + b)(9a^2 + b^2)$  (e)  $[2a - 3(b - c)][2a + 3(b - c)]$

(f)  $(a + 2)(a^2 - 2a + 4)(a - 1)(a^2 + a + 1)$

17. (a)  $\frac{2x + 21}{35}$  (b)  $\frac{2x}{x + 9}$