

A Indices: Numbers and indices

Skill 4.1

Evaluate the following:

1 $2^7 + 3^3$	2 $5^2 + 3^4$	3 $\frac{2^2 + 2^3}{3^2}$	4 $(3^3 - 12)^2$
5 $4^3 \times 2^2$	6 $5^3 - 6^2$	7 $8^3 + 4^3 + 3^3$	8 $9^2 \times 3^2 - 11^2$
9 $2^3(4^2 + 3^3 + 4)$	10 $\frac{4^2 + 3^3}{5^2}$	11 $2^4(5^2 - 3^2)$	12 $\frac{9^2 \times 3^2}{2^4}$

B Number applications: Rates

Skill 2.9

- Find the rate (in °C/h) at which these bodies cool if they all cool to 20°C in $2\frac{1}{2}$ hours:
 - cup of coffee at 80°C
 - heated iron bar at 1620°C
 - cup of soup at 66°C
 - bag of chips at 58°C
 - iron nail heated to 200°C
- If a rocket ship in space travels at a constant speed of 15 m/s then how far will it travel in:
 - 3 seconds
 - $4\frac{1}{2}$ minutes
 - $12\frac{1}{4}$ minutes
 - $3\frac{1}{5}$ minutes
 - 1 hour
 - $6\frac{1}{4}$ hours
 - $23\frac{1}{2}$ hours
 - 1 day
 - 2 weeks
 - $7\frac{1}{2}$ weeks
- A tap leaks 3 litres in 5 mins. How long will it take to leak:
 - 120 L
 - 16 L
 - 15 L
 - $23\frac{1}{2}$ L
 - $26\frac{1}{2}$ L
 - $125\frac{1}{2}$ L
 - 10 L
 - 50 L
 - 92 L
 - 380 L

C Algebra: Factorising algebraic expressions

Skill 3.4

Factorise the following:

1 $4ab + 6b$	2 $12ab - 6a + 3ac$	3 $4a^2 + 8a$
4 $9ax + 81x - 3bx$	5 $x^2 - y^2$	6 $100a^2 - 1$
7 $50x^4y^2 - 98$	8 $(a + 2b)^2 - (a - b)^2$	9 $x^2 + 5x + 6$
10 $x^2 - x - 20$	11 $2x^2 + 11x + 12$	12 $6x^2 + x - 2$
13 $2ac + a + 2bc + b$	14 $8bx + 12x - 2ab - 3a$	15 $3x + 3y + ax + ay$
16 $8b - 6 - 12ab + 9a$		

D Algebra: Solving simple linear equations

Skill 3.5

Solve these equations for x:

1 $x - 3.9 = 14.2$	2 $3x = 14$	3 $\frac{x}{2} = 4.01$	4 $\frac{3x}{2} = -1.92$
5 $3x + 1 = 15$	6 $4x - 2 = 17$	7 $\frac{x - 4}{2} = 18$	8 $\frac{x + 5}{3} = -1$
9 $2(x + 1) = 14$	10 $\frac{-6(x + 1)}{7} = 24$	11 $\frac{x + 5}{3} = -12$	12 $5.2(x + 3) = 15.6$

E Indices: Dividing index expressions

Skill 4.3

Simplify:

1 $x^4 \div x^3$	2 $2x^4 \div 6x$	3 $a^{12} \div 3a^4b^3$
4 $5a^4b^3 \div 6a^2b$	5 $7a^4b^{11} \div 6a^5b^{13}$	6 $120a^5b^4 \div 6a^2$
7 $18a^4b^6 \div 2ab^4$	8 $19a^4b^{11} \div 17ab^{13}$	9 $15a^2b^3 \div 5a^4b$
10 $36a^4b^2 \div 9ab^4$	11 $48a^6b^{11} \div 4a^7b^4$	12 $120a^4b^{12} \div 45a^5$

Worksheet 5

- A** 1 155 2 106 3 $\frac{12}{9} = 1\frac{1}{3}$
 4 225 5 256 6 89
 7 603 8 608 9 376
 10 $1\frac{18}{25}$ 11 -32 12 $\frac{729}{16} = 45\frac{9}{16}$
- B** 1 (a) 24°C/h (b) 640°C/h (c) 18.4°C/h
 (d) 15.2°C/h (e) 72°C/h
 2 (a) 45 m (b) 4050 m (c) 11 025 m
 (d) 2880 m (e) 54 km (f) 337.500 km
 (g) 1269 km (h) 1296 km (i) 18 144 km
 (j) 68 040 km
 3 (a) 200 mins (b) 26 mins 40 sec
 (c) 25 mins (d) 39 mins 10 sec
 (e) 44 mins 10 sec (f) 209 mins 10 sec
 (g) 16 mins 40 sec (h) 83 mins 20 sec
 (i) 153 mins 20 sec (j) 633 mins 20 sec
- C** 1 $2b(2a+3)$ 2 $3a(4b-2+c)$
 3 $4a(a+2)$ 4 $-3x(3a+27-b)$
 5 $(x-y)(x+y)$ 6 $(10a-1)(10a+1)$
 7 $2(5x^2y-7)(5x^2y+7)$ 8 $3b(2a+b)$
 9 $(x+2)(x+3)$ 10 $(x-5)(x+4)$
 11 $(2x+3)(x+4)$ 12 $(3x+2)(2x-1)$
 13 $(a+b)(2c+1)$ 14 $(4x-a)(2b+3)$
 15 $(3+a)(x+y)$ 16 $(2-3a)(4b-3)$
- D** 1 18.1 2 $4\frac{2}{3}$ 3 8.02 4 -1.28
 5 $4\frac{2}{3}$ 6 $4\frac{3}{4}$ 7 40 8 -8
 9 6 10 -29 11 -41 12 0
- E** 1 x 2 $\frac{x^3}{3}$ 3 $\frac{a^8}{3b^3}$ 4 $\frac{5a^2b^2}{6}$
 5 $\frac{7}{ab^2}$ 6 $20a^3b^4$ 7 $9a^3b^2$ 8 $\frac{19a^3}{17b^2}$
 9 $\frac{3b^2}{a^2}$ 10 $\frac{4a^3}{b^2}$ 11 $\frac{12b^7}{a}$ 12 $\frac{8b^{12}}{3a}$