Revision & Prac e Worksheet 8

A Number applications: Ratios in a iagram

Skill 2.3

Measure the dimensions of the front cover of this book and then make a scale drawing $\frac{1}{4}$ the size. Show your measurements in millimetres.

B Number skills: Working with surds

Skill 1.7

1 Simplify these surds:

(a) $2\sqrt{18}$ (b) $3\sqrt{27}$ (c) $4\sqrt{50}$ (d) $2\sqrt{98}$

(e) $\sqrt{180}$ (f) $\sqrt{44}$ (g) $\sqrt{153}$ (h) $\sqrt{333}$

(i) $\sqrt{52}$ (j) $6\sqrt{18}$ (k) $7\sqrt{50}$ (l) $10\sqrt{27}$

2 Simplify:

(a) $3\sqrt{2}-8\sqrt{2}$ (b) $8\sqrt{3}+2\sqrt{3}+11\sqrt{3}$ (c) $5\sqrt{5}-6\sqrt{2}-10\sqrt{5}$

(d) $2\sqrt{3}\times\sqrt{7}$ (e) $5\sqrt{2}\times3\sqrt{2}$ (f) $5\sqrt{3}\times3\sqrt{5}$

(g) $\dfrac{\sqrt{21}}{\sqrt{3}}$ (h) $\dfrac{\sqrt{36}}{\sqrt{12}}$ (i) $\dfrac{4\sqrt{3}}{2\sqrt{3}}$

(j) $\dfrac{7\sqrt{3}}{3\sqrt{6}}$ (k) $\dfrac{2\sqrt{10}}{3\sqrt{2}}$ (l) $\dfrac{6\sqrt{15}}{2\sqrt{3}}$

C Number applications: Using ratios within a population

Skill 2.2

1 In my orchid collection the ratio of colours are 1:2:7:9 (green, white, red, brown). If I have 105 red ones, then:

(a) How many of the other colours do I have? (b) What is the total number of the collection?

2 Balloons are produced from a factory in the ratio 1:11:13:21 (red, blue, yellow, green). If 8203 yellow balloons are made each week, then:

(a) How many of the other colours are produced? (b) What is the total production in that week?

D Algebra: Solving simple quadratic equations

Skill 3.10

Solve these for x:

1 $\dfrac{x^2}{3}=3$ 2 $x^2-11=25$ 3 $(3x+1)(x-2)=0$

4 $\left(\dfrac{x}{3}+4\right)(x+1)=0$ 5 $3(x+1)(x-2)=0$ 6 $\dfrac{2}{3}(x-6)\left(\dfrac{x}{2}+1\right)=0$

7 $x^2+3x+2=0$ 8 $x^2-2x-15=0$ 9 $2x^2+x-3=0$

10 $3x^2+5x-2=0$ 11 $4x^2-3x-1=0$ 12 $5x^2+6x+1=0$

E Indices: Negative powers

Skill 4.6

1 Express with positive powers:

(a) $2^{-3}ab^{-2}$ (b) $5^{-2}a^{-2}b$ (c) $6^{-3}a^4b^{-3}$ (d) $3a^{-2}b^{-4}c$

(e) $2^{-4}ab^{-4}$ (f) $3^{-2}a^{-2}b^3$ (g) $9^{-1}a^4b^{-3}$ (h) $3^{-3}b^4c^{-3}$

(i) $7^{-3}a^{-2}b$ (j) $8^{-2}a^{-3}b^4$

2 Expand the brackets:

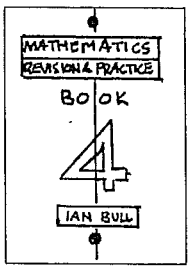
(a) $\left(3a^2b^{-4}\right)^{-1}$ (b) $\left(\dfrac{4a^2b^3}{c^4}\right)^{-2}$ (c) $\left(\dfrac{2^3a^{-4}b}{c^{-4}}\right)^{-3}$ (d) $\left(6^2a^{-4}b^3\right)^{-3}$

(e) $\left(\dfrac{3^{-2}a^{-4}b}{c^4}\right)^{-2}$ (f) $\left(\dfrac{11a^{-4}b}{c^{-4}}\right)^{-3}$ (g) $\left(\dfrac{2a^4b^{-3}}{c^2}\right)^{-2}$ (h) $\left(\dfrac{3a^2b^{-4}}{c^8}\right)^{-1}$

(i) $\left(\dfrac{12ab^{-2}}{c^{-8}}\right)^{-2}$

Worksheet 8

A 24.375 mm



33.75 mm

Check that you calculated the overall dimensions correctly, and that the internal detail matches.

B **1** **(a)** $6\sqrt{2}$ **(b)** $9\sqrt{3}$ **(c)** $20\sqrt{2}$ **(d)** $14\sqrt{2}$
(e) $6\sqrt{5}$ **(f)** $2\sqrt{11}$ **(g)** $3\sqrt{17}$ **(h)** $13\sqrt{2}$
(i) $2\sqrt{13}$ **(j)** $18\sqrt{2}$ **(k)** $35\sqrt{2}$ **(l)** $30\sqrt{3}$

2 **(a)** $-5\sqrt{2}$ **(b)** $21\sqrt{3}$ **(c)** $-6\sqrt{2}-5\sqrt{5}$
(d) $2\sqrt{21}$ **(e)** 30 **(f)** $15\sqrt{15}$ **(g)** $\sqrt{7}$
(h) $\sqrt{3}$ **(i)** 2 **(j)** $\frac{7}{3\sqrt{2}}$ **(k)** $\frac{2\sqrt{5}}{3}$
(l) $3\sqrt{5}$

C **1** 15 green, 30 white, 135 brown – total 285 orchids
2 631 red, 6941 blue, 13 251 green – total 29 026 balloons

D **1** $x=\pm 3$ **2** $x=\pm 6$ **3** $x=-\frac{1}{3}, 2$
4 $x=-12,-1$ **5** $x=-1,2$ **6** $x=6,-2$
7 $x=-1,-2$ **8** $x=5,-3$ **9** $x=-1\frac{1}{2}, 1$
10 $x=\frac{1}{3},-2$ **11** $x=-\frac{1}{4},1$ **12** $x=-\frac{1}{5}, 1$

E **1** **(a)** $\frac{a}{8b^2}$ **(b)** $\frac{b}{25a^2}$ **(c)** $\frac{a^4}{216b^3}$
(d) $\frac{3c}{a^2b^4}$ **(e)** $\frac{a}{16b^4}$ **(f)** $\frac{b^3}{9a^2}$
(g) $\frac{a^4}{9b^3}$ **(h)** $\frac{b^4}{27c^3}$ **(i)** $\frac{b}{343a^2}$
(j) $\frac{b^4}{64a^3}$

2 **(a)** $\frac{b^4}{3a^2}$ **(b)** $\frac{c^8}{16a^4b^6}$ **(c)** $\frac{a^{12}c^{12}}{512b^3}$
(d) $\frac{a^{12}}{46656b^9}$ **(e)** $\frac{81a^8c^8}{b^2}$ **(f)** $\frac{a^{12}}{1331b^3c^{12}}$
(g) $\frac{b^6c^4}{4a^8}$ **(h)** $\frac{b^4c^8}{3a^2}$ **(i)** $\frac{b^4}{144a^2c^{16}}$