

Algebra practice

Skill 3.1 Simplifying algebraic expressions

Simplify the following:

- A 1 $2b - 3a + 6b + 2a$ 2 $6ab + 2c - 3ab - 4c$
 3 $5ac + 4ca - 13a$ 4 $5a - 8b + 2a - 6b - b$
 5 $3ab + 2a - 4b + 4a - 6ba$
 B 6 $6a \times 2b \times -3$ 7 $4ab \times -5c$
 8 $-2a \times -3b \times 4$ 9 $3a \times -2b \times 4$
 10 $7ab \times -2c \times 3$
 C11 $45ac \div 15a$ 12 $17b \div 51a$
 13 $120abc \div 42c$ 14 $\frac{38abc}{19bc}$
 15 $\frac{98abd}{16ac}$

Skill 3.2 Expanding brackets

Expand the following brackets:

- 1 $a(2 - a)$ 2 $-ab(3 + c)$
 3 $\frac{ac}{2}(4 + 3b)$ 4 $1.8c(2a - 4)$
 5 $(a + b)(a - b)$ 6 $(2a - 3)(a + 1)$
 7 $(x + 2y)(x - y)$ 8 $(2x + 5)(2x + 1)$
 9 $(a + b)(2a - b)$ 10 $(4a - 2b)(c + 1)$

Skill 3.3 Algebraic fractions

Simplify:

- 1 $\frac{2a}{3} \times \frac{bc}{8}$ 2 $\frac{7a}{2} \times \frac{4b}{14}$
 3 $\frac{a+2}{3} \times \frac{19}{2(a+2)}$ 4 $\frac{3a}{2b} \div \frac{4c}{b}$
 5 $\frac{5a}{2} \times \frac{6}{7a} \div \frac{3(a+1)}{4}$
 6 $\frac{4a}{2b} \div \frac{2(a+1)}{3} \times \frac{9}{4(a+1)}$
 7 $\frac{5}{a} + \frac{2}{b}$ 8 $\frac{6}{a} + \frac{a}{2}$
 9 $\frac{7}{c} - \frac{2}{a}$ 10 $\frac{(a+1)}{2} + \frac{(a+2)}{3}$
 11 $\frac{9}{a+1} - \frac{a}{2}$ 12 $\frac{8}{a-2} + \frac{2a}{3}$

Skill 3.4 Factorising algebraic expressions

Factorise the following:

- 1 $3a^2b + 6b$ 2 $6ab^2 + 2b$
 3 $4a + 2b - 8c$ 4 $12a^2 + 6ab - 3ac$
 5 $a^2 - b^2$ 6 $4a^2 - 1$

- 7 $100a^2 - 4b^2$ 8 $(3x - y)^2 - (x + 2y)^2$
 9 $(x + y)^2 - (2x + y)^2$ 10 $x^2 + 4x + 3$
 11 $a^2 - a - 2$ 12 $2a^2 - 3a - 2$
 13 $4x^2 + 5x - 6$ 14 $2x^2 - 3x + 1$
 15 $ab + 2b = 3a + 6$ 16 $cx + 2c - 2x - 4$
 17 $2ax + 2ay + x + y$ 18 $a^2 - ac + ab - bc$
 19 $5ac - 4c + 3ab - 2b$
 20 $3a^2 + 2x - 3ax - 2a$

Skill 3.5 Solving simple linear equations

Solve these equations for x:

- 1 $x - 2.8 = 15$ 2 $x + 3 = 14.2$
 3 $2x = 9.6$ 4 $5x = 12.8$
 5 $\frac{x}{4} = -12.3$ 6 $\frac{x}{1.2} = 3.9$
 7 $2x - 1 = 12$ 8 $5x + 3 = 14$
 9 $\frac{x+2}{3} = 8$ 10 $\frac{x-4}{3} = -11$
 11 $\frac{2x}{7} = 13$ 12 $\frac{5x}{3} = 2.5$
 13 $2(x+3) = 22$ 14 $-2(x-3) = 5$
 15 $\frac{3(x+7)}{2} = 19$ 16 $\frac{-5(x+1)}{4} = 7$
 17 $6(x-4) = 17$ 18 $\frac{3(x+2)}{5} = 2\frac{1}{2}$

Skill 3.6 Solving complex linear expressions

Solve these equations for x:

- 1 $4x + 1 = 2x - 7$ 2 $7x - 4 = -2x + 3$
 3 $-5x - 4 = x + 8$ 4 $5(x + 2) = 2x - 3$
 5 $-2(x - 4) = 3x + 4$ 6 $\frac{4x+1}{3} - 2 = 12$
 7 $\frac{-2x+1}{5} + 3 = 10$ 8 $\frac{2(x+3)}{5} + 2 = 12$
 9 $\frac{-4(2x+3)}{5} = 48$ 10 $5(2x-3) + 11 = -2$

Skill 3.7 Solving linear Inequalities

Solve the following inequations and show the solution on a number line:

- 1 $x - 6 > 2$ 2 $x + 4 < -3$
 3 $2x \geq -6$ 4 $-\frac{x}{3} \geq 4$
 5 $-3x + 4 < 10$

Algebra

Skill 3.1

- | | | | | | |
|----|------------|----|------------------|----|-------------------|
| 1 | $8b - a$ | 2 | $3ab - 2c$ | 3 | $9ac - 13a$ |
| 4 | $7a - 15b$ | 5 | $-3ab + 6a - 4b$ | | |
| 6 | $-36ab$ | 7 | $-20abc$ | 8 | $24ab$ |
| 9 | $-2Aab$ | 10 | $-42abc$ | | |
| 11 | $3c$ | 12 | $\frac{b}{3a}$ | 13 | $\frac{20ab}{7}$ |
| | | 14 | $2a$ | 15 | $\frac{49bd}{8c}$ |

Skill 3.2

- | | | | | | |
|----|-----------------------|---|------------------|---|------------------------|
| 1 | $2a - a^2$ | 2 | $-3ab - abc$ | 3 | $2ac + \frac{3abc}{2}$ |
| 4 | $3.6ac - 7.2c$ | 5 | $a^2 - b^2$ | 6 | $2a^2 - a - 3$ |
| 7 | $x^2 + xy - 2y^2$ | 8 | $4x^2 + 12x + 5$ | 9 | $2a^2 + ab - b^2$ |
| 10 | $4ac + 4a - 2bc - 2b$ | | | | |

Skill 3.3

- | | | | | | |
|----|--------------------|----|---------------------------|----|-------------------------------|
| 1 | $\frac{abc}{12}$ | 2 | ab | 3 | $\frac{19}{6} = 3\frac{1}{6}$ |
| 4 | $\frac{3a}{8c}$ | 5 | $\frac{20}{7(a+1)}$ | 6 | $\frac{27a}{2b(a+1)^2}$ |
| 7 | $\frac{5b+2a}{ab}$ | 8 | $\frac{12+a^2}{2a}$ | 9 | $\frac{7a-2c}{ac}$ |
| 10 | $\frac{5a+7}{6}$ | 11 | $\frac{18-a^2-a}{2(a+1)}$ | 12 | $\frac{24+2a^2-4a}{3(a-2)}$ |

Skill 3.4

- | | | | |
|----|---------------------|----|---------------------|
| 1 | $3b(a^2 + 2)$ | 2 | $2b(3ab + 1)$ |
| 3 | $2(2a + b - 4c)$ | 4 | $3a(4a + 2b - c)$ |
| 5 | $(a - b)(a + b)$ | 6 | $(2a - 1)(2a + 1)$ |
| 7 | $4(5a - b)(5a + b)$ | 8 | $(4x + y)(2x - 3y)$ |
| 9 | $-x(3x + 2y)$ | 10 | $(x + 1)(x + 3)$ |
| 11 | $(a - 2)(a + 1)$ | 12 | $(2a + 1)(a - 2)$ |
| 13 | $(4x - 3)(x + 2)$ | 14 | $(2x - 1)(x - 1)$ |
| 15 | $(b + 3)(a + 2)$ | 16 | $(c - 2)(x + 2)$ |
| 17 | $(2a + 1)(x + y)$ | 18 | $(a + b)(a - c)$ |
| 19 | $(2c + b)(3a - 2)$ | 20 | $(3a - 2)(a - x)$ |

Skill 3.5

- | | | | | | | | | | |
|----|-----------------|----|----------------|----|----------------|----|---------------|----|--|
| 1 | 17.8 | 2 | -17.2 | 3 | 4.8 | 4 | 2.56 | 5 | |
| 6 | 4.68 | 7 | $6\frac{1}{2}$ | 8 | $2\frac{1}{5}$ | 9 | 22 | 10 | |
| 11 | $45\frac{1}{2}$ | 12 | 1.5 | 13 | 8 | 14 | $\frac{1}{2}$ | 15 | |
| 16 | $-6\frac{3}{5}$ | 17 | $6\frac{5}{6}$ | 18 | $2\frac{1}{6}$ | | | | |

Skill 3.6

- | | | | | | | | | | |
|---|-----------------|---|---------------|---|----|---|----------------|----|--|
| 1 | -4 | 2 | $\frac{7}{9}$ | 3 | -2 | 4 | $-\frac{4}{9}$ | 5 | |
| 6 | $10\frac{1}{4}$ | 7 | -17 | 8 | 22 | 9 | $\frac{1}{2}$ | 10 | |

Skill 3.7

- | | | | |
|---|-------------|---|--------------|
| 1 | $x > 8$ | 2 | $x < -7$ |
| 3 | $x \geq -3$ | 4 | $x \leq -12$ |
| 5 | $x > -2$ | | |
-