A Algebra: Simultaneous equations
Skill 3.9

1 Solve these simultaneous equations using the substitution method:

(a) $y = 4x, x + y = -10$

(b) $y = 2x - 1, y = x + 3$

(c) $y = x - 1, 2x + y = 8$

(d) $y = 3x + 2, x + y = -10$

2 Solve the simultaneous equations using the elimination method:

(a) $x + y = 14$
$x - y = 2$

(b) $3x + y = 6$
$2x + y = 1$

(c) $3x + 2y = 12$
$x + y = 4$

(d) $5x + 2y = 10$
$x + y = 2$

B Indices: Working with fractional powers
Skill 4.7

1 Evaluate:

(a) $169^{\frac{1}{2}}$

(b) $1^{\frac{1}{3}} - 1$

(c) $36^{\frac{1}{2}} + 5$

(d) $27^{\frac{1}{3}}$

(e) $(-27)^{\frac{1}{3}} + 2$

(f) $3(-8)^{\frac{1}{3}}$

(g) $(49 \times 25)^{\frac{1}{2}} + 9$

(h) $225^{\frac{1}{2}} + 64^{\frac{1}{3}}$

(i) $4 \times 8^{\frac{1}{3}} + 10$

(j) $2500^{\frac{1}{2}} - 36$

2 Simplify:

(a) $\left(\dfrac{36a^8b^4}{c^4}\right)^{\frac{1}{2}}$

(b) $\left(\dfrac{27a^9b^3}{c^{12}}\right)^{\frac{1}{3}}$

(c) $\left(\dfrac{64a^8b^4}{c^{12}}\right)^{\frac{1}{2}}$

(d) $\left(-\dfrac{125a^3b^9}{c^{21}}\right)^{\frac{1}{3}}$

(e) $-\left(289x^4y^6\right)^{\frac{1}{2}}$

C Cartesian plane: Plotting cubic equations
Skill 5.10

Generate a set of points for these cubics and then plot them on a set of axes:

1 $y = x^3 + 2x$

x	-2	-1	0	1	2
y					

2 $y = 5x - x^3$

x	-2	-1	0	1	2
y					

## D Cartesian plane: Finding the gradient of a line between two points
Skill 5.1

1 Find the gradient of the line between the points using the graph construction method

(a) (1, 2) and (5, 8)

(b) (-1, 2) and (7, 3)

(c) (2, -1) and (-4, 3)

(d) (-6, -2) and (3, 4)

(e) (-2, 6) and (3, -2)

2 Find the gradient of the line between these points using the formula method

(a) (6, -12) and (2, 4)

(b) (-3, 0) and (7, -5)

(c) (11, 12) and (4, -3)

(d) (7, 17) and (-3, 2)

(e) (5, -3) and (-2, 8)

E Geometry: Angle properties of circles
Skill 6.3

Find the labelled angles or sides in these:
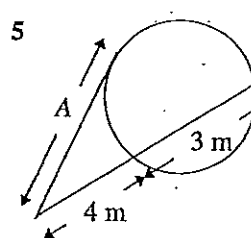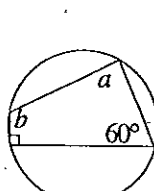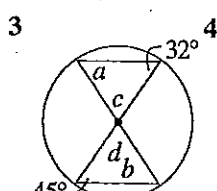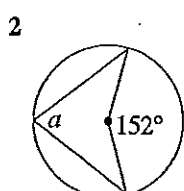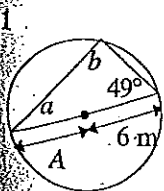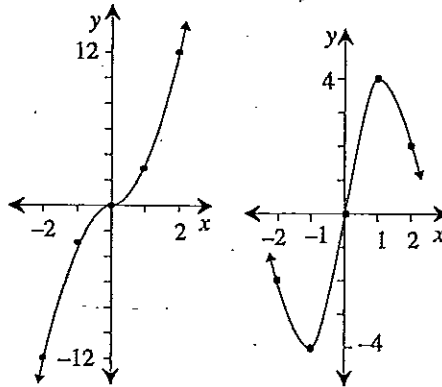
A 1 (a) $x = -2, y = -8$ (b) $x = 4, y = 7$
     (c) $x = 3, y = 2$ (d) $x = -3, y = -7$

   2 (a) $x = 8$ (b) $x = 5$ (c) $x = 4$
       $y = 6$ $y = -9$ $y = 0$

     (d) $x = 2$
       $y = 0$

B 1 (a) 13   (b) 0   (c) 11   (d) 3
     (e) −1   (f) −6   (g) 44   (h) 19
     (i) 18   (j) 14

   2 (a) $\dfrac{6a^4b^2}{c^2}$ (b) $\dfrac{3a^3b}{c^4}$ (c) $\dfrac{8a^4b^2}{c^6}$

     (d) $-\dfrac{5ab^3}{c^7}$ (e) $-17x^2y^3$

C 1 $(-12, -3, 0, 3, 12)$ **2** $(-2, -4, 0, 4, 2)$

D 1 (a) $1\frac{1}{2}$ (b) $\frac{1}{8}$ (c) $-\frac{2}{3}$ (d) $\frac{2}{3}$
     (e) $-1\frac{3}{5}$

   2 (a) −4   (b) $-\frac{1}{2}$ (c) $2\frac{1}{7}$ (d) $1\frac{1}{2}$
     (e) $-1\frac{4}{7}$

E 1 $b = 90°$ **2** $a = 76°$ **3** $a = 45°$
     $a = 41°$ $b = 32°$
     $A = 6\,\text{m}$ $c = d = 103°$

   4 $a = 90°$ **5** $A = \sqrt{12}$
     $b = 120°$ $= 3.46\,\text{m}$