20. [Equations]

Skill 20.1 Solving one-step equations by using the inverse operations of + and – (1).

- Consider the operation used to construct the expression involving the variable.
- Perform the inverse operation on both sides of the equation.

Operation	Inverse Operation	Operation	Inverse Operation
+	–	–	+
$x + 3 = 6$		$x - 3 = 6$	
$x + 3 - 3 = 6 - 3$		$x - 3 + 3 = 6 + 3$	
$x = 3$		$x = 9$	

Q. Solve for x: $x - 7 = 4$ **A.**

$x - 7 = 4$ *Operation: – 7*

$x - 7 + 7 = 4 + 7$ *Inverse of – 7 is + 7*

Simplify: – 7 + 7 = 0

$x = \mathbf{11}$

a) Solve for x: $x + 2 = 5$ *Operation: + 2*

$x + 2 - 2 = 5 - 2$

$x =$ 3

b) Solve for x: $x + 4 = 9$

$x + 4 - 4 = 9 - 4$

$x =$

c) Solve for x: $x + 6 = 9$

$x =$

d) Solve for x: $x + 4 = 2$

$x =$

e) Solve for x: $x + 7 = -3$

f) Solve for x: $5 + x = 2$

g) Solve for x: $x - 3 = 5$

$x - 3 + 3 = 5 + 3$

$x =$ 8

h) Solve for x: $x - 8 = 4$

$x - 8 + 8 = 4 + 8$

i) Solve for x: $x - 7 = 9$

j) Solve for x: $8 - x = 4$

k) Solve for x: $x - 5 = -7$

l) Solve for x: $6 - x = 9$

Skill 20.1 Solving one-step equations by using the inverse operations of + and – (2).

m) Solve for x: $21 + x = 32$

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n) Solve for x: $x - 4 = 9$

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o) Solve for x: $x - 14 = 7$

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p) Solve for x: $6 + x = 23$

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q) Solve for x: $18 - x = 9$

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r) Solve for x: $15 - x = 7$

.....

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s) Solve for x: $x + 12 = 21$

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.....

t) Solve for x: $x + 9 = 45$

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u) Solve for x: $11 - x = 3$

.....

.....

v) Solve for x: $x - 2 = 14$

.....

.....

w) Solve for x: $x - 7 = 7$

.....

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x) Solve for x: $x - 9 = 12$

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y) Solve for x: $13 - x = 8$

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z) Solve for x: $x + 7 = 16$

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A) Solve for x: $x + 11 = 19$

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B) Solve for x: $x - 8 = 32$

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C) Solve for x: $x - 12 = 8$

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D) Solve for x: $x + 5 = 42$

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Skill 20.2 Solving one-step equations by using the inverse operations of × and ÷ (1).

- Consider the operation used to construct the expression involving the variable.
- Perform the inverse operation on both sides of the equation.

Operation ×	Inverse Operation ÷	Operation ÷	Inverse Operation ×
$3x = 6$		$\frac{x}{3} = 6$	
$\frac{3x}{3} = \frac{6}{3}$		$\frac{x}{3} \times 3 = 6 \times 3$	
$x = 2$		$x = 18$	

Q. Solve for x: $\frac{x}{3} = 5$

A. $\frac{x}{3} = 5$ *Operation: ÷ 3*

$\frac{x}{3} \times 3 = 5 \times 3$ *Inverse of ÷ 3 is × 3*

$x = \mathbf{15}$

a) Solve for x: $\frac{x}{7} = 4$ *Operation: ÷ 7*

$\frac{x}{7} \times 7 = 4 \times 7$ *Inverse of ÷ 7 is × 7*

$x =$ 28

b) Solve for x: $\frac{x}{3} = 3$

$x =$

c) Solve for x: $\frac{x}{2} = 3$

$x =$

d) Solve for x: $4x = 16$ *Operation: × 4*

$\frac{\cancel{4}^{1}x}{\cancel{4}_{1}} = \frac{\cancel{16}^{4}}{\cancel{4}_{1}}$ *Inverse of × 4 is ÷ 4* *Simplify: ÷ 4*

$x =$ 4

e) Solve for x: $3x = 12$

$x =$

f) Solve for x: $2x = 14$

g) Solve for x: $\frac{x}{2} = 6$

$x =$

h) Solve for x: $\frac{x}{5} = 2$

i) Solve for x: $\frac{x}{8} = 6$

j) Solve for x: $3x = 27$

k) Solve for x: $4x = 28$

l) Solve for x: $5x = 45$

Skill 20.2 Solving one-step equations by using the inverse operations of × and ÷ (2).

m) Solve for x: $\frac{x}{4} = 10$

$x =$ ☐

n) Solve for x: $\frac{x}{6} = 7$

☐

o) Solve for x: $6x = 72$

☐

p) Solve for x: $\frac{x}{8} = 5$

$x =$ ☐

q) Solve for x: $\frac{x}{9} = 11$

☐

r) Solve for x: $7x = 140$

☐

s) Solve for x: $\frac{x}{7} = 7$

$x =$ ☐

t) Solve for x: $\frac{x}{10} = 12$

☐

u) Solve for x: $\frac{x}{5} = 6$

☐

v) Solve for x: $2x = 34$

☐

w) Solve for x: $5x = 250$

☐

x) Solve for x: $7x = 70$

☐

y) Solve for x: $\frac{x}{9} = 20$

$x =$ ☐

z) Solve for x: $\frac{x}{12} = 2$

☐

A) Solve for x: $4x = 32$

☐

B) Solve for x: $3x = 30$

☐

C) Solve for x: $9x = 54$

☐

D) Solve for x: $8x = 48$

☐

Skill 20.3 Solving two-step equations by using the inverse operations of +, –, × and ÷ (1).

- To isolate the variable (x) perform the inverse operations, in order, to both sides of the equation.

Q. Solve for x: $5 + \frac{2x}{3} = 1$

A.

$$5 + \frac{2x}{3} = 1$$

$$5 - 5 + \frac{2x}{3} = 1 - 5 \quad \text{Inverse of + 5 is – 5}$$

$$\frac{2x}{3} \times 3 = -4 \times 3 \quad \text{Inverse of ÷ 3 is × 3}$$

$$\frac{2x}{2} = \frac{-12}{2} \quad \text{Inverse of × 2 is ÷ 2}$$

$$x = -6$$

a) Solve for x: $4x - 1 = 11$

Inverse of – 1 is + 1

$4x - 1 + 1 = 11 + 1$

$4x = 12$

Inverse of × 4 is ÷ 4

$\frac{4x}{4} = \frac{12}{4}$

$x =$ 3

b) Solve for x: $7 + 3x = 22$

$7 - 7 + 3x = 22 - 7$

$3x =$

$=$

$x =$

c) Solve for x: $2x + 7 = -3$

$=$

$=$

$=$

$x =$

d) Solve for x: $5x - 1 = 24$

$=$

$=$

$=$

$x =$

e) Solve for x: $15 + 10x = 45$

$=$

$=$

$=$

$x =$

f) Solve for x: $3x + 12 = 3$

$=$

$=$

$=$

$x =$

g) Solve for x: $\frac{x}{4} + 3 = 5$

$\frac{x}{4} + 3 - 3 = 5 - 3$

$=$

$=$

$x =$

h) Solve for x: $\frac{x}{5} + 3 = 1$

$=$

$=$

$=$

$x =$

i) Solve for x: $\frac{5x}{2} - 3 = -1$

$=$

$=$

$=$

$x =$

Skill 20.3 Solving two-step equations by using the inverse operations of + , – , × and ÷ (2).

j) Solve for x: $2x - 8 = 14$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

k) Solve for x: $12 + 4x = 20$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

l) Solve for x: $3x - 6 = 9$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

m) Solve for x: $2x + 7 = -3$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

n) Solve for x: $6 + 5x = 1$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

o) Solve for x: $2x + 3 = 11$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

p) Solve for x: $6x - 5 = 0$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

q) Solve for x: $5 + 8x = 1$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

r) Solve for x: $\frac{3x}{7} + 4 = 1$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

s) Solve for x: $\frac{x}{2} - 1 = 3$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

t) Solve for x: $\frac{x}{5} + 6 = 1$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

u) Solve for x: $3 - \frac{x}{3} = 6$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

Skill 20.4 Solving equations by first expanding the brackets (1).

- Expand the brackets.
- To isolate the variable (x) perform the inverse operations, in order, to both sides of the equation.

Q. Solve for x: $6(2 - x) = -18$

A.

$$6(2 - x) = -18$$ *Expand the ( )*

$$12 - 6x = -18$$

$$12 - 12 - 6x = -18 - 12$$ *Inverse of + 12 is – 12*

$$-6x = -30$$

$$\frac{-6x}{-6} = \frac{-30}{-6}$$ *Inverse of × –6 is ÷ –6*

$$x = 5$$

a) Solve for x: $3(x - 2) = 12$

Expand the ( ) $3x - 6 = 12$

Inverse of – 6 is + 6 $3x - 6 + 6 = 12 + 6$

Inverse of × 3 is ÷ 3 $\frac{3x}{3} = \frac{12}{3}$

$x =$ 4

b) Solve for x: $3(2 + x) = 21$

$x =$

c) Solve for x: $2(x - 3) = 14$

$x =$

d) Solve for x: $5(1 + x) = 20$

$x =$

e) Solve for x: $7(2 + x) = 35$

$x =$

f) Solve for x: $4(x - 3) = 4$

$x =$

g) Solve for x: $4(x - 5) = 8$

$x =$

h) Solve for x: $2(9 - x) = 8$

$x =$

i) Solve for x: $3(2x - 3) = 15$

$x =$

Skill 20.4 Solving equations by first expanding the brackets (2).

j) Solve for x: $2(x - 6) = 10$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

k) Solve for x: $6(3 - x) = 18$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

l) Solve for x: $3(x + 8) = 30$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

m) Solve for x: $8(2 + x) = 88$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

n) Solve for x: $7(x - 1) = 21$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

o) Solve for x: $4(5 - x) = 16$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

p) Solve for x: $5(x + 7) = 45$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

q) Solve for x: $9(3 + x) = 36$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

r) Solve for x: $3(x - 5) = 24$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

s) Solve for x: $2(8 - x) = 12$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

t) Solve for x: $4(x + 3) = 20$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

u) Solve for x: $5(7 + x) = 35$

$=$ .....

$=$ .....

$=$ .....

$x =$ ☐

Skill 20.5 Solving equations with variables in more than one place (1).

- If necessary, expand the brackets. (see skill 20.4, page 209)
- Combine all variables on one side of the equation by using inverse operations.
- To isolate the variable (x) perform the inverse operations, in order, to both sides of the equation.

Q. Solve for x: $x = 3x + 12$

A.

$$x = 3x + 12$$ *Combine x's: $-3x$*

$$x - 3x = 3x - 3x + 12$$

$$-2x = 12$$

$$\frac{-2x}{-2} = \frac{12}{-2}$$ *Inverse of $\times -2$ is $\div -2$*

$$x = -6$$

a) Solve for x: $6 - 3x = 3x$

$6 - 6 - 3x = 3x - 6$

$-3x - 3x = 3x - 3x - 6$

$\frac{-6x}{-6} = \frac{-6}{-6}$ *Inverse of $\times -6$ is $\div -6$*

$x =$ 1

b) Solve for x: $6x + 4 = 8x$

$=$

$=$

$=$

$x =$

c) Solve for x: $25 - 4x = x$

$=$

$=$

$=$

$x =$

d) Solve for x: $6x - 4 = 5x$

$=$

$=$

$=$

$x =$

e) Solve for x: $15 - 3x = 2x$

$=$

$=$

$=$

$x =$

f) Solve for x: $7x - 24 = 4x$

$=$

$=$

$=$

$x =$

g) Solve for x: $5x = 2x - 6$

$=$

$=$

$=$

$x =$

h) Solve for x: $3x = 21 - 4x$

$=$

$=$

$=$

$x =$

i) Solve for x: $8x = 3x - 15$

$=$

$=$

$=$

$x =$

Skill 20.5 Solving equations with variables in more than one place (2).

j) Solve for x:
$4x + 2(3x - 4) = 22$

Expand the ( )

$4x + 6x - 8 = 22$

Combine the variables

$10x - 8 + 8 = 22 + 8$

$\frac{10x}{10} = \frac{30}{10}$

$x = 3$

k) Solve for x:
$2x + 3(4x - 3) = 19$

$x =$

l) Solve for x:
$2(x - 3) - 3x = -12$

$x =$

m) Solve for x:
$3x + 5(2 - 3x) = 10$

$x =$

n) Solve for x:
$x + 4(3 - 2x) = 5$

$x =$

o) Solve for x:
$5x + 2(x - 8) = 5$

$x =$

p) Solve for x:
$5(x - 4) = 3x$

$x =$

q) Solve for x:
$6(x - 7) = -x$

$x =$

r) Solve for x:
$3(x - 8) = 5x$

$x =$

s) Solve for x:
$2(4x - 10) = 3(x + 5)$

$x =$

t) Solve for x:
$3(2x + 4) = 4(2x - 1)$

$x =$

u) Solve for x:
$5(2x - 6) = 2(3x + 1)$

$x =$

Skill 20.6 Solving equations involving algebraic fractions (1).

- Use inverse operations rules to isolate any algebraic fractions.
- Rewrite all expressions as fractions if necessary.
- Cross multiply. (see skill 10.11, page 109)
- Combine all variables on one side of the equation by using inverse operations. (see skill 20.5, page 211)
- To isolate the variable (x) perform the inverse operations, in order, to both sides of the equation.

Q. Solve for x: $\frac{x}{3} = x + 4$

A.

$$\frac{x}{3} = x + 4$$

$$\frac{x}{3} \times \frac{x+4}{1}$$ *Cross multiply*

$$x = 3(x + 4)$$

$$x = 3x + 12$$

$$x - 3x = 3x - 3x + 12$$ *Combine x's: –3x*

$$-2x = 12$$

$$\frac{-2x}{-2} = \frac{12}{-2}$$ *Inverse of × –2 is ÷ –2*

$$x = \mathbf{-6}$$

a) Solve for x: $\frac{x}{4} - 10 = -x$

Isolate the fraction

$\frac{x}{4} - 10 + 10 = -x + 10$

$\frac{x}{4} \times \frac{-x+10}{1}$ *Rewrite expression as fraction*

$x = 4(-x + 10)$

$x + 4x = -4x + 4x + 40$

$5x = 40$

$x =$ ☐

b) Solve for x: $\frac{18}{x} = 2$

$=$

$=$

$=$

$x =$ ☐

c) Solve for x: $\frac{6}{x} = \frac{3}{10}$

$=$

$=$

$=$

$=$

$x =$ ☐

d) Solve for x: $\frac{10}{x} = 5$

$=$

$=$

$=$

$=$

$x =$ ☐

e) Solve for x: $\frac{12}{x} = 3$

$=$

$=$

$=$

$=$

$x =$ ☐

f) Solve for x: $\frac{4}{x} = \frac{2}{7}$

$=$

$=$

$=$

$=$

$x =$ ☐

Skill 20.6 Solving equations involving algebraic fractions (2).

g) Solve for x: $\frac{20-2x}{3}=2$

$=$

$=$

$=$

$=$

$x=$ ☐

h) Solve for x: $\frac{3x-2}{5}=8$

$=$

$=$

$=$

$=$

$x=$ ☐

i) Solve for x: $\frac{5x-1}{3}=3$

$=$

$=$

$=$

$=$

$x=$ ☐

j) Solve for x: $\frac{2x}{5}=x-3$

$=$

$=$

$=$

$=$

$x=$ ☐

k) Solve for x: $8-x=\frac{2x}{5}$

$=$

$=$

$=$

$=$

$x=$ ☐

l) Solve for x: $\frac{2x}{3}+10=4x$

$=$

$=$

$=$

$=$

$x=$ ☐

m) Solve for x: $\frac{x-2}{4}=\frac{x+6}{5}$

$=$

$=$

$=$

$=$

$x=$ ☐

n) Solve for x: $\frac{x+4}{3}=\frac{10-x}{4}$

$=$

$=$

$=$

$=$

$x=$ ☐

o) Solve for x: $\frac{x+3}{3}-\frac{x-2}{5}=3$

$=$

$=$

$=$

$=$

$x=$ ☐

Skill 20.7 Solving inequations (1).

- Manipulate the inequation in the same way as you would an equation.

EXCEPT:

- When both sides are multiplied or divided by a negative number, reverse the inequality signs. < becomes > and ≤ becomes ≥.

Q. Solve the inequation: $4x - 7 \leq 5$

A.

$$4x - 7 \leq 5$$
$$4x - 7 + 7 \leq 5 + 7$$
$$\frac{4x}{4} \leq \frac{12}{4}$$
$$x \leq 3$$

a) Solve the inequation: $20 \geq 5(7 - 2x) - 35$

$20 \geq 35 - 10x - 35$

$20 - 20 + 10x \geq -10x + 10x - 20$

$10x \geq -20$

$\frac{10x}{10} \geq -\frac{20}{10}$

$x \geq -2$

b) Solve the inequation: $3x - 8 < 7$

<

<

<

<

$x <$

c) Solve the inequation: $2x + 6 \leq 10$

≤

≤

≤

≤

d) Solve the inequation: $2x - 9 \leq 7$

≤

e) Solve the inequation: $5x - 1 > 12$

>

f) Solve the inequation: $3x + 8 \leq 2$

≤

g) Solve the inequation: $\frac{x}{4} + 3 \geq 6$

≥

h) Solve the inequation: $\frac{x}{3} - 2 < 9$

<

i) Solve the inequation: $\frac{x}{6} - 2 \geq 5$

≥

Skill 20.7 Solving inequations (2).

j) Solve the inequation:
$12 - x > 2(x + 3)$

$12 - x > 2x + 6$

$12 - 12 - x > 2x + 6 - 12$

$-x - 2x > 2x - 2x - 6$

$-3x > -6$ *Both sides negative so reverse inequality sign*

$\frac{-3x}{-3} < \frac{-6}{-3}$

$x < 2$

k) Solve the inequation:
$-5(x + 7) \geq 10$

l) Solve the inequation:
$4 < 2(3 - 2x) - 10$

m) Solve the inequation:
$6(3 - 2x) > -6$

n) Solve the inequation:
$5(3x - 1) - 12 \geq 13$

o) Solve the inequation:
$29 \leq 4(3 - 4x) - 15$

p) Solve the inequation:
$\frac{3(x + 4)}{2} > 15$

q) Solve the inequation:
$\frac{4(x + 1)}{4} \geq 10$

r) Solve the inequation:
$\frac{4x}{3} - x > -1$

s) Solve the inequation:
$\frac{5(x - 2)}{6} > 3$

t) Solve the inequation:
$\frac{3(x + 6)}{5} \leq 1$

u) Solve the inequation:
$\frac{4x}{7} - x > 27$

Skill 20.8 Solving quadratic equations (1).

- Make either factor equal zero. Use the zero multiplication property.
  $a \times 0 = 0$ and $0 \times a = 0$
  Hint: A quadratic equation always has 2 solutions.

Q. Solve for x:
$(x - 8)(x + 9) = 0$

If either $(x - 8) = 0$ or $(x + 9) = 0$ then $(x - 8)(x + 9) = 0$

A. $(x - 8)(x + 9) = 0$
$x - 8 + 8 = 0 + 8$
$x = 8$

OR

$x + 9 - 9 = 0 - 9$
$x = -9$

8, –9

Check:
If $x = 8$
$(8 - 8)(8 + 9) = 0$
$0 \times 17 = 0$ is true
If $x = -9$
$(-9 - 8)(-9 + 9) = 0$
$-17 \times 0 = 0$ is true

a) Solve for x:
$(x - 6)(x - 5) = 0$

Make $(x - 6) = 0$ *Make $(x - 5) = 0$*

If $x - 6 = 0$, then *If $x - 5 = 0$, then*

$x - 6 + 6 = 0 + 6$ $x - 5 + 5 = 0 + 5$

$x = 6$ $x = 5$ 6, 5

b) Solve for x:
$(x + 7)(x - 2) = 0$

If $x + 7 = 0$, then *If $x - 2 = 0$, then*

c) Solve for x:
$(x - 2)(x + 9) = 0$

d) Solve for x:
$(x + 3)(x + 4) = 0$

e) Solve for x:
$(x - 4)(x + 7) = 0$

f) Solve for x:
$(x + 1)(x + 9) = 0$

g) Solve for x:
$x(x - 8) = 0$

h) Solve for x:
$x(x + 3) = 0$

Skill 20.8 Solving quadratic equations (2).

i) Solve for x:
$x(x - 4) = 0$

.....

.....

.....

j) Solve for x:
$x(x + 11) = 0$

.....

.....

.....

k) Solve for x:
$(x + 2)(x - 10) = 0$

.....

.....

.....

l) Solve for x:
$(x - 6)(x - 4) = 0$

.....

.....

.....

m) Solve for x:
$(x - 5)(x + 3) = 0$

.....

.....

.....

n) Solve for x:
$(x + 7)(x + 8) = 0$

.....

.....

.....

o) Solve for x:
$(x + 4)(x - 1) = 0$

.....

.....

.....

p) Solve for x:
$(x - 9)(x - 3) = 0$

.....

.....

.....

q) Solve for x:
$(x - 7)(x + 6) = 0$

.....

.....

.....

r) Solve for x:
$(x + 5)(x + 2) = 0$

.....

.....

.....

Skill 20.9 Solving simultaneous equations (1).

EITHER
- Find the value of one of the variables in relation to the other.
- Substitute this value of the variable into the other equation.
- Solve for one variable.
- Substitute the result into either equation to find the second variable.

OR
- Add or subtract the equations together to elimimate one of the variables.

Q. Solve the simultaneous equations:
$2x + 3y = 3$
$x + 3y = 6$

A. $2x + 3y = 3$ (1)
$x + 3y = 6$ (2)

Eliminate 'y' by subtracting (1) – (2)

$x = -3$

$-3 + 3y = 6$

Substitute x = –3 into (2)

$-3 + 3 + 3y = 6 + 3$
$3y = 9$
$\frac{3y}{3} = \frac{9}{3}$
$y = 3$
(–3, 3)

a) Solve the simultaneous equations:
$y = 3x - 9$
$x = 4$

Substitute x = 4 into (1)

$y = 3 \times 4 - 9$

$y = 12 - 9$

$y = 3$ (4,3)

b) Solve the simultaneous equations:
$x + y = 5$
$y = x + 1$

Substitute y = x + 1 into (1)

c) Solve the simultaneous equations:
$y = 2x + 1$
$y = 3x - 2$

d) Solve the simultaneous equations:
$4 = 2x + y$
$x - 5 = y$

e) Solve the simultaneous equations:
$x + y = 1$
$x - y = 3$

f) Solve the simultaneous equations:
$x - y = 2$
$3x + y = 14$

Skill 20.9 Solving simultaneous equations (2).

g) Solve the simultaneous equations:
$x = -3$
$y = 2x + 1$

.....

.....

.....

h) Solve the simultaneous equations:
$y = -x$
$y = 2x - 6$

.....

.....

.....

i) Solve the simultaneous equations:
$x + y = 5$
$2x - y = 10$

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.....

j) Solve the simultaneous equations:
$x - y = 2$
$2x + 3y = 9$

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.....

.....

k) Solve the simultaneous equations:
$y = -x + 2$
$y = 2x - 4$

.....

.....

.....

l) Solve the simultaneous equations:
$y = x - 4$
$3y = x - 6$

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m) Solve the simultaneous equations:
$x + y = 8$
$4x - y = 7$

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n) Solve the simultaneous equations:
$x - y = 4$
$x + 3y = 12$

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Skill 20.10 Solving quadratic equations by factorising (1).

- Factorise the expression. (see skills 19.4, page 196 and 19.7, page 199)
- Make either factor equal zero. Use the zero multiplication property.
  $a \times 0 = 0$ and $0 \times a = 0$

Q. Solve for x:
$x^2 + 7x = 0$

A. $x^2 + 7x = 0$ *Factorise*
$x(x + 7) = 0$
$x = 0$
OR
$x + 7 - 7 = 0 - 7$
$x = -7$
0, –7

If either $x = 0$ or $(x + 7) = 0$ then $x^2 + 7x = 0$

a) Solve for x:
$x^2 - 16 = 0$

Factorise

If either $(x + 4) = 0$ or $(x - 4) = 0$ then $x^2 - 16 = 0$

$(x + 4)(x - 4) = 0$

so $x = -4$ or $x = 4$

–4, 4

b) Solve for x:
$x^2 - 4 = 0$

c) Solve for x:
$x^2 - 2x = 0$

d) Solve for x:
$x^2 - 3x = 0$

e) Solve for x:
$x^2 + 4x = 0$

f) Solve for x:
$x^2 + 5x = 0$

g) Solve for x:
$x^2 - 64 = 0$

h) Solve for x:
$x^2 - 144 = 0$

Skill 20.10 Solving quadratic equations by factorising (2).

i) Solve for x:
$x^2 - 25 = 0$

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j) Solve for x:
$x^2 - 6x = 0$

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k) Solve for x:
$x^2 - 11x = 0$

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l) Solve for x:
$x^2 - 81 = 0$

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m) Solve for x:
$x^2 - 100 = 0$

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n) Solve for x:
$x^2 + 7x = 0$

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o) Solve for x:
$x^2 - 36 = 0$

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.....

p) Solve for x:
$x^2 + 9x = 0$

.....

.....

q) Solve for x:
$x^2 - 15x = 0$

.....

.....

r) Solve for x:
$x^2 - 121 = 0$

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