

20. [Equations]

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

MM9 1 2 2 3 3 4 4
MM10 1 1 2 2 3 3 4 4

- 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: $-7 + 7 = 0$

$$x = 11$$

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

Operation: $+2$

$$x + 2 - 2 = 5 - 2$$

$$x = 3$$

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

$$x + 4 - 4 = 9 - 4$$

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x - 3 + 3 = 5 + 3$$

$$x = 8$$

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

$$x - 8 + 8 = 4 + 8$$

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

 MM9 1 1 2 2 3 3 4 4
 MM10 1 1 2 2 3 3 4 4

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Skill 20.2 Solving one-step equations by using the inverse operations of \times and \div (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
\times	\div	\div	\times
$3x = 6$		$\frac{x}{3} = 6$	
$\frac{3x}{3} = \frac{6}{3}$		$\frac{x}{3} \times 3 = 6 \times 3$	
$x = 2$		$x = 18$	

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

A. $\frac{x}{3} = 5$ Operation: $\div 3$

$\frac{x}{\cancel{3}} \times \cancel{3} = 5 \times 3$ Inverse of $\div 3$ is $\times 3$
 $x = 15$

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

Inverse of $\div 7$ is $\times 7$ $\frac{x}{\cancel{7}} \times \cancel{7} = 4 \times 7$

$x =$ 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: $\times 4$

Inverse of $\times 4$ is $\div 4$ $\frac{\cancel{4}x}{\cancel{1}} = \frac{16}{\cancel{4}}$ Simplify: $\div 4$

$x =$ 4

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

$x =$

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

$x =$

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

$x =$

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

$x =$

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

$x =$

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

$x =$

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

$x =$

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

$x =$

Skill 20.2 Solving one-step equations by using the inverse operations of \times and \div (2).

 MM9 1 2 2 3 3 4 4
 MM10 1 1 2 2 3 3 4 4

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

$$x = \boxed{}$$

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

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

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

$\frac{2x}{2} = \frac{-12}{2}$ *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

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

$x = \boxed{3}$

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

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

$3x =$

$=$

$x = \boxed{}$

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

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$x = \boxed{}$

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

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$x = \boxed{}$

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

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$x = \boxed{}$

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

$=$

$=$

$=$

$x = \boxed{}$

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

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

$=$

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$x = \boxed{}$

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

$=$

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$x = \boxed{}$

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

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$x = \boxed{}$

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

 MM9 1 1 2 2 3 3 4 4
 MM10 1 1 2 2 3 3 4 4

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

$$=$$

$$=$$

$$=$$

$$x = \boxed{}$$

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

$$=$$

$$=$$

$$=$$

$$x = \boxed{}$$

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

$$=$$

$$=$$

$$=$$

$$x = \boxed{}$$

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

$$=$$

$$=$$

$$=$$

$$x = \boxed{}$$

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

$$=$$

$$=$$

$$=$$

$$x = \boxed{}$$

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

$$=$$

$$=$$

$$=$$

$$x = \boxed{}$$

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

$$=$$

$$=$$

$$=$$

$$x = \boxed{}$$

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

$$=$$

$$=$$

$$=$$

$$x = \boxed{}$$

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

$$=$$

$$=$$

$$=$$

$$x = \boxed{}$$

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

$$=$$

$$=$$

$$=$$

$$x = \boxed{}$$

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

$$=$$

$$=$$

$$=$$

$$x = \boxed{}$$

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

$$=$$

$$=$$

$$=$$

$$x = \boxed{}$$

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 $\times -6$ is $\div -6$*
 $x = 5$

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 $\times 3$ is $\div 3$

$\frac{3x}{3} = \frac{12+6}{3}$

$x = \boxed{4}$

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

$=$

$=$

$=$

$x = \boxed{}$

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

$=$

$=$

$=$

$x = \boxed{}$

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

$=$

$=$

$=$

$x = \boxed{}$

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

$=$

$=$

$=$

$x = \boxed{}$

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

$=$

$=$

$=$

$x = \boxed{}$

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

$=$

$=$

$=$

$x = \boxed{}$

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

$=$

$=$

$=$

$x = \boxed{}$

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

$=$

$=$

$=$

$x = \boxed{}$

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

MM9 11 2 33 44
MM10 11 22 33 44

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

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$x =$

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

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$x =$

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

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$x =$

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

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$x =$

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

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$x =$

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

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$x =$

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

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$x =$

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

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$x =$

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

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$x =$

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

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$x =$

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

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$x =$

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

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$x =$

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

- If necessary, expand the brackets. (see skill 20.4, page 202)
- 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 $\div -6$

$x =$

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: $3x = 21 - 4x$

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$x =$

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

$$=$$

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$$=$$

$x =$

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

MM9 11 22 3 3 4 4
MM10 11 22 3 3 4 4

j) Solve for x : *Expand the ()*

$$4x + 2(3x - 4) = 22$$

$$4x + 6x - 8 = 22$$

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

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

$$x = \boxed{3}$$

k) Solve for x :

$$2x + 3(4x - 3) = 19$$

$$x = \boxed{}$$

l) Solve for x :

$$2(x - 3) - 3x = -12$$

$$x = \boxed{}$$

m) Solve for x :

$$3x + 5(2 - 3x) = 10$$

$$x = \boxed{}$$

n) Solve for x :

$$x + 4(3 - 2x) = 5$$

$$x = \boxed{}$$

o) Solve for x :

$$5x + 2(x - 8) = 5$$

$$x = \boxed{}$$

p) Solve for x :

$$5(x - 4) = 3x$$

$$x = \boxed{}$$

q) Solve for x :

$$6(x - 7) = -x$$

$$x = \boxed{}$$

r) Solve for x :

$$3(x - 8) = 5x$$

$$x = \boxed{}$$

s) Solve for x :

$$2(4x - 10) = 3(x + 5)$$

$$x = \boxed{}$$

t) Solve for x :

$$3(2x + 4) = 4(2x - 1)$$

$$x = \boxed{}$$

u) Solve for x :

$$5(2x - 6) = 2(3x + 1)$$

$$x = \boxed{}$$

Skill 20.6 Solving equations involving fractions (1).

- Use inverse operations rules to isolate any fractions.
- Rewrite all expressions as fractions if necessary.
- Cross multiply. (see skill 10.6, page 102)
- Combine all variables on one side of the equation by using inverse operations. (see skill 20.5, page 207)
- 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.

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

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

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

$$x = 3x + 12$$

$$x - 3x = 3x - 3x + 12 \quad \text{Combine } x\text{'s: } -3x$$

$$-2x = 12$$

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

$$x = -6$$

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

Isolate the fraction

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

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

$$x = 4(-x + 10)$$

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

$$5x = 40$$

$$x = \boxed{}$$

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

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$$x = \boxed{}$$

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

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$$x = \boxed{}$$

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

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$$x = \boxed{}$$

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

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$$x = \boxed{}$$

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

$$=$$

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$$x = \boxed{}$$

Skill 20.6 Solving equations involving fractions (2).

MM9 11 22 3 44
MM10 11 2 33 44

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

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 $x =$

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

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 $x =$

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

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 $x =$

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

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 $x =$

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

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 $x =$

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

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 $x =$

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

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 $x =$

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

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 $x =$

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

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 $x =$

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 ≥.

<p>Q. Solve the inequation: $4x - 7 \leq 5$</p>	<p>A. $4x - 7 \leq 5$ $4x \not- 7 \not+ 7 \leq 5 + 7$ $\frac{4x}{4} \leq \frac{12}{4}$ $x \leq 3$</p>
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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:
 $3x - 8 < 7$

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 $<$

 $<$

 $<$

 $<$

$x <$

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

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 \leq

 \leq

 \leq

 \leq

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

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 \leq

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

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

.....
 \leq

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

.....
 \geq

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

.....
 $<$

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

.....
 \geq

Skill 20.7 Solving inequations (2).

j) Solve the inequation:

$$12 - x > 2(x + 3)$$

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

$$\cancel{12} - \cancel{12} - x > 2x + 6 - 12$$

$$-x - 2x > \cancel{2x} - \cancel{2x} - 6$$

$$-3x > -6$$

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

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

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

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

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

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

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

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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 eliminate one of the variables.

Q. Solve the simultaneous equations:

$$\begin{aligned} 2x + 3y &= 3 \\ x + 3y &= 6 \end{aligned}$$

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

$x + 3y = 6$ (2)

$$x = -3$$

$$-3 + 3y = 6$$

$$-3 + 3 + 3y = 6 + 3$$

$$3y = 9$$

$$\frac{3y}{3} = \frac{9}{3}$$

$$y = 3$$

$$(-3, 3)$$

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

Substitute $x = -3$ into (2)

a) Solve the simultaneous equations:

$$\begin{aligned} y &= 3x - 9 \\ x &= 4 \end{aligned}$$

Substitute $x = 4$ into (1)

$$y = 3 \times 4 - 9$$

$$y = 12 - 9$$

$$y = 3$$

(4,3)

b) Solve the simultaneous equations:

$$\begin{aligned} x + y &= 5 \\ y &= x + 1 \end{aligned}$$

Substitute $y = x + 1$ into (1)

c) Solve the simultaneous equations:

$$\begin{aligned} y &= 2x + 1 \\ y &= 3x - 2 \end{aligned}$$

d) Solve the simultaneous equations:

$$\begin{aligned} 4 &= 2x + y \\ x - 5 &= y \end{aligned}$$

e) Solve the simultaneous equations:

$$\begin{aligned} x + y &= 1 \\ x - y &= 3 \end{aligned}$$

f) Solve the simultaneous equations:

$$\begin{aligned} x - y &= 2 \\ 3x + y &= 14 \end{aligned}$$

Skill 20.10 Solving quadratic equations by factorising (1).

- Factorise the expression. (see skill 19.4, page 192 and skill 19.7, page 195)
- 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 :
 $x^2 - 4 = 0$

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

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

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

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

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

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

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Skill 20.10 Solving quadratic equations by factorising (2).MM9 11 22 33 44
MM10 11 22 33 44

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 :
 $x^2 + 9x = 0$

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

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

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