16. [Order of Operations]

Skill 16.1 Using 'order of operations' mixing only × and/or ÷, or + and/or –

Order of operations rules Multiply (×) and/or divide (÷) in order from left to right.
Add (+) and/or subtract (–) in order from left to right.

Q. $21 \div 3 \times 4 =$

A. $21 \div 3 \times 4 =$ *work from left to right*
$= 7 \times 4$ *divide first*
$= \mathbf{28}$

a) $9 + 13 - 7 =$ *add first*
$= 22 - 7 =$ 15

b) $9 - 5 + 3 =$
$= \quad =$

c) $6 - 3 + 8 =$
$= \quad =$

d) $3 + 6 - 5 =$
$= \quad =$

e) $3 \times 6 \div 9 =$
$= \quad =$

f) $3 \times 3 \times 2 =$
$= \quad =$

g) $16 + 7 - 3 =$
$= \quad =$

h) $32 \div 8 \div 2 =$
$= \quad =$

i) $36 \div 9 \times 5 =$
$= \quad =$

j) $2 \times 9 \div 3 =$
$= \quad =$

k) $2 \times 3 \times 4 =$
$= \quad =$

l) $27 \div 3 \div 3 =$
$= \quad =$

m) $19 - 5 + 2 =$
$= \quad =$

n) $13 - 8 + 6 =$
$= \quad =$

o) $30 \div 6 \times 7 =$
$= \quad =$

p) $4 \times 6 \div 2 =$
$= \quad =$

q) $2 \times 5 \times 7 =$
$= \quad =$

r) $72 \div 12 \times 3 =$
$= \quad =$

Skill 16.2 Using 'order of operations' mixing ×, ÷, + and/or –

Order of operations rules

Multiply (×) and/or divide (÷) in order from left to right.
Add (+) and/or subtract (–) in order from left to right.

Q. $3 + 24 \div 4 \times 2 =$

A. $3 + 24 \div 4 \times 2 =$ *work from left to right*
$= 3 + 6 \times 2$ *divide first*
$= 3 + 12$
$= \mathbf{15}$

a) $2 + 3 \times 5 =$ *multiply first*
$= 15 + 2$ $=$ 17

b) $6 + 9 \div 3 =$
$=$ ..... $=$ ☐

c) $4 \times 3 - 7 =$
$=$ ..... $=$ ☐

d) $2 + 7 \times 4 =$
$=$ ..... $=$ ☐

e) $14 - 12 \div 2 =$
$=$ ..... $=$ ☐

f) $2 \times 5 + 8 =$
$=$ ..... $=$ ☐

g) $18 \div 6 - 3 =$
$=$ ..... $=$ ☐

h) $9 + 8 \div 4 =$
$=$ ..... $=$ ☐

i) $36 - 6 \times 5 =$
$=$ ..... $=$ ☐

j) $14 + 21 \div 7 =$
$=$ ..... $=$ ☐

k) $5 + 4 \times 9 =$
$=$ ..... $=$ ☐

l) $17 - 12 \div 3 =$
$=$ ..... $=$ ☐

m) $6 + 15 \div 3 \times 2 =$ *divide first*
$= 6 + 5 \times 2$
$= 6 + 10$ $=$ ☐

n) $9 \times 5 - 4 \times 6 =$
$=$ .....
$=$ ..... $=$ ☐

o) $19 + 16 - 4 \times 7 =$
$=$ .....
$=$ ..... $=$ ☐

p) $21 \div 3 - 15 \div 5 =$
$=$ .....
$=$ ..... $=$ ☐

q) $28 + 9 - 7 \times 3 =$
$=$ .....
$=$ ..... $=$ ☐

r) $4 \times 8 - 18 \div 2 =$
$=$ .....
$=$ ..... $=$ ☐

s) $5 + 48 \div 8 \times 3 =$
$=$ .....
$=$ ..... $=$ ☐

t) $10 \times 2 - 44 \div 11 =$
$=$ .....
$=$ ..... $=$ ☐

u) $22 - 3 \times 6 + 9 =$
$=$ .....
$=$ ..... $=$ ☐

Skill 16.3 Using 'order of operations' mixing ( ) with + and/or –

Order of operations rules

Multiply (×) and/or divide (÷) in order from left to right.
Add (+) and/or subtract (–) in order from left to right.

Q. $14 + (18 - 9) + 7 =$

A. $14 + (18 - 9) + 7 =$ *simplify inside the brackets*
$= 14 + 9 + 7$ *work from left to right*
$= 23 + 7$
$= \mathbf{30}$

a) $16 + 7 - (11 + 9) =$

$= 16 + 7 - 20$
$= 23 - 20 = \boxed{3}$

b) $5 + 4 - (3 - 1) =$

$= \quad = \quad = \boxed{}$

c) $9 - (3 + 4) + 6 =$

$= \quad = \quad = \boxed{}$

d) $6 - (9 - 5) + 6 =$

$= \quad = \quad = \boxed{}$

e) $16 - 1 - (2 + 8) =$

$= \quad = \quad = \boxed{}$

f) $8 + 15 - (3 + 4) =$

$= \quad = \quad = \boxed{}$

g) $12 - (4 + 7) + 6 =$

$= \quad = \quad = \boxed{}$

h) $13 - (11 - 4) - 2 =$

$= \quad = \quad = \boxed{}$

i) $7 + 6 - (8 - 4) =$

$= \quad = \quad = \boxed{}$

j) $14 + 9 - (4 + 7) =$

$= \quad = \quad = \boxed{}$

k) $15 - (7 - 2) + 8 =$

$= \quad = \quad = \boxed{}$

l) $6 + 9 - (3 + 5) =$

$= \quad = \quad = \boxed{}$

m) $4 + (13 - 8) + 6 =$

$= \quad = \quad = \boxed{}$

n) $18 - (10 - 4) - 3 =$

$= \quad = \quad = \boxed{}$

o) $17 - (6 + 7) + 4 =$

$= \quad = \quad = \boxed{}$

p) $19 - (3 + 9) - 7 =$

$= \quad = \quad = \boxed{}$

q) $9 + 16 - (8 + 3) =$

$= \quad = \quad = \boxed{}$

r) $14 - (16 - 9) + 3 =$

$= \quad = \quad = \boxed{}$

Skill 16.4 Using 'order of operations' mixing ( ), ×, ÷, + and/or –

Order of operations rules

First evaluate inside the brackets.
Then multiply (×) and/or divide (÷) in order from left to right.
Finally add (+) and/or subtract (–) in order from left to right.

Q. $12 + 4 \times (3 + 9) =$

A. $12 + 4 \times (3 + 9) =$ *simplify inside the brackets*
$= 12 + 4 \times 12$ *then multiply*
$= 12 + 48$
$= \mathbf{60}$

a) $4 \times (3 + 7) =$ *brackets first*
$= 4 \times 10 \quad = 40$

b) $3 \times (5 - 2) =$
$= \quad\quad =$

c) $8 \div (1 + 3) =$
$= \quad\quad =$

d) $18 \div (6 - 3) =$
$= \quad\quad =$

e) $(23 - 3) \div 5 =$
$= \quad\quad =$

f) $(42 - 6) \div 9 =$
$= \quad\quad =$

g) $(12 - 7) \times 4 =$
$= \quad\quad =$

h) $6 \times (8 - 3) =$
$= \quad\quad =$

i) $5 \times (3 + 8) =$
$= \quad\quad =$

j) $14 \div (2 + 5) =$
$= \quad\quad =$

k) $28 \div (7 - 3) =$
$= \quad\quad =$

l) $9 \times (5 + 7) =$
$= \quad\quad =$

m) $9 \div (1 + 2) \times 4 =$
$= \quad\quad$
$= \quad\quad =$

n) $7 \times 8 - (8 - 2) =$
$= \quad\quad$
$= \quad\quad =$

o) $12 - 8 \div (2 + 2) =$
$= \quad\quad$
$= \quad\quad =$

p) $7 + 32 \div (8 - 4) =$
$= \quad\quad$
$= \quad\quad =$

q) $5 + 4 \times (6 + 2) =$
$= \quad\quad$
$= \quad\quad =$

r) $6 + (11 - 4) \times 3 =$
$= \quad\quad$
$= \quad\quad =$

s) $11 - (19 - 3 \times 5) =$
$= \quad\quad$
$= \quad\quad =$

t) $(6 - 3) \times (9 - 4) =$
$= \quad\quad$
$= \quad\quad =$

u) $(7 + 2 \times 8) - 15 =$
$= \quad\quad$
$= \quad\quad =$

Skill 16.5 Using 'order of operations' mixing powers, ( ), ×, ÷, + and/or –

Order of operations rules

First evaluate inside the brackets.
Secondly evaluate the powers.
Then multiply (×) and/or divide (÷) in order from left to right.
Finally add (+) and/or subtract (–) in order from left to right.

Q. $24 - 4^2 \div 8 =$

A. $24 - 4^2 \div 8 =$ *evaluate the power*
$= 24 - 16 \div 8$ *then divide*
$= 24 - 2$ *work from left to right*
$= \mathbf{22}$

a) $8 + 9^2 \times 2 =$

$= 8 + 81 \times 2$
$= 8 + 162 \quad = \boxed{170}$

b) $9 - 2^2 \times 2 =$

$= \quad = \quad = \boxed{}$

c) $7 + 2^2 \times 5 =$

$= \quad = \quad = \boxed{}$

d) $3 + (9 - 5)^2 =$

$= \quad = \quad = \boxed{}$

e) $9 + 5^2 \times 2 =$

$= \quad = \quad = \boxed{}$

f) $2 \times (15 - 3)^2 =$

$= \quad = \quad = \boxed{}$

g) $(18 - 10)^2 \div 4 =$

$= \quad = \quad = \boxed{}$

h) $(12 - 7)^2 =$

$= \quad = \quad = \boxed{}$

i) $(8 - 1)^2 =$

$= \quad = \quad = \boxed{}$

j) $16 - 2^2 + 3 \times 1 =$

$= \quad = \quad = \boxed{}$

k) $27 - 18 \div 3^2 - 2 =$

$= \quad = \quad = \boxed{}$

l) $10^2 - (5 - 2) \times 8 =$

$= \quad = \quad = \boxed{}$

m) $(6 - 1 \times 2)^2 =$

$= \quad = \quad = \boxed{}$

n) $21 \div 3 + (9 - 5)^2 =$

$= \quad = \quad = \boxed{}$

o) $24 \div 8 + 2^2 - 4 =$

$= \quad = \quad = \boxed{}$

p) $2 \times 6 + 4 \times 5^2 =$

$= \quad = \quad = \boxed{}$

q) $32 - (9 + 7) \div 2^2 =$

$= \quad = \quad = \boxed{}$

r) $(15 - 9 \div 3)^2 =$

$= \quad = \quad = \boxed{}$

Skill 16.6 Using 'order of operations' involving negative numbers and mixing powers, ( ), ×, ÷, + and/or –

Order of operations rules

First evaluate inside the brackets.
Secondly evaluate the powers.
Then multiply (×) and/or divide (÷) in order from left to right.
Finally add (+) and/or subtract (–) in order from left to right.

Q. $8 + (-4)^3 \div (-2 - 2) =$

A. $8 + (-4)^3 \div (-2 - 2)$ — *evaluate the bracket*
$= 8 + (-4)^3 \div -4$ — *evaluate the power*
$= 8 + (-64) \div -4$ — *evaluate the division*
$= 8 + 16$
$= \mathbf{24}$

$-4 \times -4 \times -4 =$
$= 16 \times -4$
$= -64$

a) $-4 - 60 + 3^3 \times 2 =$

$= -4 - 60 + 27 \times 2$
$= -4 - 60 + 54$ — *work from left to right*
$= -64 + 54 \quad = \boxed{-10}$

b) $(-3 - 2) \times (-2) - 4^2 =$

$= \ldots\ldots$
$= \ldots\ldots$
$= \ldots\ldots \quad = \boxed{}$

c) $3^2 - (8 + 4) \div (-3) =$

$= \ldots\ldots$
$= \ldots\ldots$
$= \ldots\ldots \quad = \boxed{}$

d) $(-3 - 2)^2 + 4 \times 1 =$

$= \ldots\ldots$
$= \ldots\ldots$
$= \ldots\ldots \quad = \boxed{}$

e) $5 \times 2 + (-3 - 4)^2 =$

$= \ldots\ldots$
$= \ldots\ldots$
$= \ldots\ldots \quad = \boxed{}$

f) $5^2 - (2 + 6) \times (-5) =$

$= \ldots\ldots$
$= \ldots\ldots$
$= \ldots\ldots \quad = \boxed{}$

g) $(-2 - 8)^2 \times 14 \div 7 =$

$= \ldots\ldots$
$= \ldots\ldots$
$= \ldots\ldots \quad = \boxed{}$

h) $10 + (-25) \div 5 - 2^3 =$

$= \ldots\ldots$
$= \ldots\ldots$
$= \ldots\ldots \quad = \boxed{}$

i) $-3 \times 5 - 4^2 \times 2 =$

$= \ldots\ldots$
$= \ldots\ldots$
$= \ldots\ldots \quad = \boxed{}$

j) $(-1)^3 - 2 \times 4 \div 2 =$

$= -1 - 2 \times 4 \div 2$
$= \ldots\ldots$
$= \ldots\ldots \quad = \boxed{}$

k) $1 + (-1)^3 \div (5 - 6) =$

$= \ldots\ldots$
$= \ldots\ldots$
$= \ldots\ldots \quad = \boxed{}$

l) $15 + 30 \div 6 - 2^3 =$

$= \ldots\ldots$
$= \ldots\ldots$
$= \ldots\ldots \quad = \boxed{}$

Skill 16.7 Using 'order of operations' mixing square roots, powers, ×, ÷, + and/or –

Order of operations rules

First evaluate inside the brackets.
Secondly evaluate the powers.
Then multiply (×) and/or divide (÷) in order from left to right.
Finally add (+) and/or subtract (–) in order from left to right.

Q. $\sqrt{25} \times 2^3 - 7 =$

A. $\sqrt{25} \times 2^3 - 7 =$ *evaluate the square root* / *evaluate the power*
$= 5 \times 8 - 7$
$= 40 - 7$
$= \mathbf{33}$

a) $\sqrt{25+144} =$

$= \sqrt{169}$

$= \sqrt{13 \times 13} =$ $= \boxed{13}$

b) $\sqrt{16+9} =$

$=$ .....

$=$ ..... $=$ $\boxed{}$

c) $\sqrt{6^2+8^2} =$

$=$ .....

$=$ ..... $=$ $\boxed{}$

d) $\sqrt{64} \times 2 + 2^2 =$

$=$ .....

$=$ .....

$=$ ..... $=$ $\boxed{}$

e) $\sqrt{25} + 16 \div 2^2 =$

$=$ .....

$=$ .....

$=$ ..... $=$ $\boxed{}$

f) $\sqrt{81} \div 3^2 + 9 =$

$=$ .....

$=$ .....

$=$ ..... $=$ $\boxed{}$

g) $2^3 \times \sqrt{36} - 20 =$

$=$ .....

$=$ .....

$=$ ..... $=$ $\boxed{}$

h) $18 - 4^3 \div \sqrt{4} =$

$=$ .....

$=$ .....

$=$ ..... $=$ $\boxed{}$

i) $\sqrt{25} \times 2^3 - 7 =$

$=$ .....

$=$ .....

$=$ ..... $=$ $\boxed{}$

j) $50 - 3 \times \sqrt{100} + 2^3 =$

$=$ .....

$=$ .....

$=$ ..... $=$ $\boxed{}$

k) $3 \times \sqrt{49} + 4 - 2^3 =$

$=$ .....

$=$ .....

$=$ ..... $=$ $\boxed{}$

l) $13 + 5^2 \div \sqrt{25} =$

$=$ .....

$=$ .....

$=$ ..... $=$ $\boxed{}$