

# 15. [Order of Operations]

## Skill 15.1 Using 'order of operations' involving single $\times$ or $\div$ and $+$ or $-$

MM7 1 1 2 3 3 4 4  
MM8 1 1 2 2 3 3 4 4

The correct order of operations for questions involving a single  $\times$  or  $\div$  and a single  $+$  or  $-$  is: Firstly, work out the multiplication or division, then work out the addition or subtraction.

**Q.**  $2 + 3 \times 5 =$

**A.**  $2 + 3 \times 5$   
 $= 2 + 15$   
 $= 17$

First do the multiplication, 3 times 5 and then the addition, plus 2.

**Q.**  $8 \div 2 - 2 =$

**A.**  $8 \div 2 - 2$   
 $= 4 - 2$   
 $= 2$

First do the division, 8 divided by 2 and then the subtraction, take 2.

**a)**  $4 \times 3 - 6 =$

$= 12 - 6$   
 $= 6$

**b)**  $5 + 5 \times 5 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**c)**  $15 + 4 \times 4 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**d)**  $35 - 5 \times 6 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**e)**  $40 - 18 \div 3 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**f)**  $36 \div 9 - 4 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**g)**  $15 \div 3 + 6 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**h)**  $22 - 5 \times 4 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**i)**  $20 - 12 \div 2 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**j)**  $10 \times 3 + 40 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**k)**  $4 + 48 \div 3 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**l)**  $100 \div 4 - 6 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**m)**  $32 + 20 \times 8 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**n)**  $40 - 12 \div 4 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**o)**  $6 \times 3 - 3 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**p)**  $12 + 10 \times 2 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

When working with multiple addition (+) and/or subtraction (-), work from left to right.

**Q.**  $5 + 2 - 3 =$

**A.**  $5 + 2 - 3$   
 $= 7 - 3$   
 $= 4$

*Working from left to right means do the addition first, 5 plus 2 gives 7, then the subtraction, 7 minus 3.*

**Q.**  $9 - 4 - 3 =$

**A.**  $9 - 4 - 3$   
 $= 5 - 3$   
 $= 2$

*Working from left to right means do the subtraction 9 minus 4 first, then the subtraction, 5 minus 3.*

**a)**  $7 - 4 + 6 =$

$= 3 + 6$   
 $= 9$

**b)**  $10 + 5 - 8 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**c)**  $12 - 4 - 3 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**d)**  $13 + 5 + 2 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**e)**  $10 + 7 - 9 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**f)**  $9 + 5 - 6 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**g)**  $19 - 6 - 5 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**h)**  $14 - 8 + 5 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**i)**  $18 + 3 - 6 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**j)**  $36 - 23 + 4 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**k)**  $20 - 11 - 5 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**l)**  $5 + 25 + 50 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**m)**  $40 - 16 - 19 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**n)**  $24 + 8 - 16 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**o)**  $30 - 12 + 12 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**p)**  $10 + 8 - 8 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

When working with multiplication ( $\times$ ) and/or division ( $\div$ ), work from left to right.

**Q.**  $9 \div 3 \times 8 =$

**A.**  $9 \div 3 \times 8$   
 $= 3 \times 8$   
 $= 24$

Working from left to right means do the division first, 9 divided by 3, then do 3 multiplied by 8.

**Q.**  $36 \div 4 \div 3 =$

**A.**  $36 \div 4 \div 3$   
 $= 9 \div 3$   
 $= 3$

Working from left to right means do the division, 36 divided by 4 first, then do 9 divided by 3.

**a)**  $12 \div 4 \times 7 =$   
 $= 3 \times 7$   
 $= 21$

**b)**  $6 \times 2 \div 4 =$   
 $=$   
 $=$

**c)**  $24 \div 6 \times 2 =$   
 $=$   
 $=$

**d)**  $18 \div 6 \div 3 =$   
 $=$   
 $=$

**e)**  $8 \times 6 \div 4 =$   
 $=$   
 $=$

**f)**  $30 \div 5 \times 7 =$   
 $=$   
 $=$

**g)**  $54 \div 6 \times 3 =$   
 $=$   
 $=$

**h)**  $12 \times 10 \div 2 =$   
 $=$   
 $=$

**i)**  $36 \div 6 \times 4 =$   
 $=$   
 $=$

**j)**  $8 \times 5 \div 4 =$   
 $=$   
 $=$

**k)**  $60 \div 10 \times 9 =$   
 $=$   
 $=$

**l)**  $15 \times 3 \div 9 =$   
 $=$   
 $=$

**m)**  $36 \div 6 \div 2 =$   
 $=$   
 $=$

**n)**  $9 \times 8 \div 6 =$   
 $=$   
 $=$

**o)**  $45 \div 5 \div 3 =$   
 $=$   
 $=$

**p)**  $75 \div 25 \times 3 =$   
 $=$   
 $=$

**Skill 15.4** Using 'order of operations' involving brackets ( ) and one other operation.

MM7 11 22 33 44  
MM8 11 22 33 44

Simplify within the brackets before completing  $\times$ ,  $\div$  and/or finally  $+$ ,  $-$

**Q.**  $5 \times (12 - 8) =$

**A.**  $5 \times (12 - 8)$   
 $= 5 \times 4$   
 $= 20$

*Simplify inside the brackets first:  $12 - 8 = 4$ , then multiply by 5.*

**Q.**  $15 - (9 + 3) =$

**A.**  $15 - (9 + 3)$   
 $= 15 - 12$   
 $= 3$

*Simplify inside the brackets first:  $9 + 3 = 12$ , then subtract 12 from 15.*

**a)**  $6 - (3 + 2) =$   
 $= 6 - 5$   
 $= 1$

**b)**  $5 \times (48 \div 8) =$   
 $=$   
 $=$

**c)**  $(27 - 17) \times 4 =$   
 $=$   
 $=$

**d)**  $16 \div (3 + 5) =$   
 $=$   
 $=$

**e)**  $16 - (8 + 4) =$   
 $=$   
 $=$

**f)**  $7 \times (14 - 9) =$   
 $=$   
 $=$

**g)**  $(18 - 15) \times 9 =$   
 $=$   
 $=$

**h)**  $(8 + 12) \div 5 =$   
 $=$   
 $=$

**i)**  $20 - (8 + 9) =$   
 $=$   
 $=$

**j)**  $4 \times (36 \div 3) =$   
 $=$   
 $=$

**k)**  $(10 - 8) \times 3 =$   
 $=$   
 $=$

**l)**  $45 \div (9 + 6) =$   
 $=$   
 $=$

**m)**  $32 - (15 + 7) =$   
 $=$   
 $=$

**n)**  $6 \times (17 - 8) =$   
 $=$   
 $=$

**o)**  $(23 - 16) \times 7 =$   
 $=$   
 $=$

**p)**  $(15 + 25) \div 10 =$   
 $=$   
 $=$

The correct order of operations is:

1. Simplify within brackets.
2. Multiply and/or divide from left to right.
3. Add and/or subtract from left to right.

<b>Q.</b> $24 \div 3 + 8 \div 2 =$	<b>A.</b> $24 \div 3 + 8 \div 2$ $= 8 + 4$ $= 12$	Do the divisions first, $24 \div 3 = 8$ and $8 \div 2 = 4$ , then add 8 and 4.
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<b>Q.</b> $(6 + 12 \div 4) \times 4 =$	<b>A.</b> $(6 + 12 \div 4) \times 4$ $= (6 + 3) \times 4$ $= 9 \times 4$ $= 36$	Simplify inside the brackets: first the division $12 \div 4 = 3$ , then the addition of 6. Finally, multiply by 4.
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<b>a)</b> $24 \div 2 + 4 \times 2 =$ $= 12 + 8$ $= 20$	<b>b)</b> $4 \times 3 - 5 \times 2 =$ $=$ $=$	<b>c)</b> $36 \div 6 - 36 \div 9 =$ $=$ $=$	<b>d)</b> $2 \times 8 - 2 \times 6 =$ $=$ $=$
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<b>e)</b> $1 + 4 \times 6 \div 3 =$ $= 1 + 24 \div 3$ $= 1 + 8$ $= 9$	<b>f)</b> $3 + 6 \times 3 \times 2 =$ $=$ $=$ $=$	<b>g)</b> $81 \div (9 \div 3) - 5 =$ $=$ $=$ $=$	<b>h)</b> $4 \times (8 - 5) \div 3 =$ $=$ $=$ $=$
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<b>i)</b> $(4 + 1 - 3) \times 2 =$ $=$ $=$ $=$	<b>j)</b> $91 - (2 + 7) \times 10 =$ $=$ $=$ $=$	<b>k)</b> $4 \times (9 - 7) \div 2 =$ $=$ $=$ $=$	<b>l)</b> $(4 \times 9 - 8) \div 2 =$ $=$ $=$ $=$
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<b>m)</b> $6 \times (12 + 8) \times 4 =$ $=$ $=$ $=$	<b>n)</b> $6 \times 8 \div 4 - 12 =$ $=$ $=$ $=$	<b>o)</b> $(2 + 9) \times (4 + 3) =$ $=$ $=$ $=$	<b>p)</b> $(18 - 9) \times (2 + 5) =$ $=$ $=$ $=$
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The correct order of operations is:

1. Simplify within brackets.
2. Simplify powers.
3. Multiply and/or divide from left to right.
4. Add and/or subtract from left to right.

**Q.**  $5 + 4^2 =$

**A.**  $5 + 4^2$   
 $= 5 + 16$   
 $= 21$

First complete the square.  
4 times 4 and then do the addition, plus 5.

**Q.**  $(2 \times 6)^2 =$

**A.**  $(2 \times 6)^2$   
 $= 12^2$   
 $= 144$

First work within the brackets multiplying  
2 by 6 and then square the result.

**a)**  $7^2 - 7 =$

$= 49 - 7$   
 $= 42$

**b)**  $4 \times 3^2 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**c)**  $(4 \times 3)^2 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**d)**  $6^2 \div 3 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**e)**  $5^2 \times 3 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**f)**  $4^2 \div 2 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**g)**  $(8 - 2)^2 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**h)**  $5^2 + 25 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$

**i)**  $4 + 3^2 \times 5 =$

$= 4 + 9 \times 5$   
 $= 4 + 45$   
 $= 49$

**j)**  $4^2 \div (3 + 5) =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$   
 $= \dots\dots\dots$

**k)**  $5 \times (3^2 + 1) =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$   
 $= \dots\dots\dots$

**l)**  $3 \times 5^2 - 3 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$   
 $= \dots\dots\dots$

**m)**  $16 \div (3^2 - 1) =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$   
 $= \dots\dots\dots$

**n)**  $8^2 \div (6 - 2) =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$   
 $= \dots\dots\dots$

**o)**  $10 + 5^2 \div 1 =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$   
 $= \dots\dots\dots$

**p)**  $24 \div (2^2 + 2^2) =$

$= \dots\dots\dots$   
 $= \dots\dots\dots$   
 $= \dots\dots\dots$