Equations and Formulae

7(x - 8) = 6(x + 2)
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Practice Tests

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Author of The Topics and Topic Tests: AS Kalra
Equations and formulae

Chapter 6: Equations and formulae

UNIT 1: One-step equations (addition and subtraction)

Question 1: Solve the following one-step equations.

a \( x + 5 = 9 \) 

b \( a + 7 = 15 \) 

c \( m - 3 = 4 \) 

d \( b + 3 = 11 \) 

e \( a + 4 = 10 \) 

f \( n + 9 = 12 \) 

g \( x - 3 = 12 \) 

h \( x + 5 = 16 \) 

i \( y + 8 = 20 \) 

j \( p - 2 = 10 \) 

k \( t - 4 = 1 \) 

l \( a - 9 = 9 \) 

m \( y - 2 = -3 \) 

n \( x - 5 = -6 \) 

o \( 5 + x = 20 \) 

Question 2: Solve the following equations.

a \( m + 7 = 2 \) 

b \( x + 3 = 1 \) 

c \( 9 + y = 14 \) 

d \( 12 + n = 18 \) 

e \( x - 10 = 12 \) 

f \( x - 1 = 8 \) 

g \( m + 15 = 30 \) 

h \( y - 12 = 27 \) 

i \( a + 5 = 13 \) 

j \( m - 4 = 11 \) 

k \( n - 12 = 19 \) 

l \( a - 7 = 1 \) 

m \( y - 5 = -5 \) 

n \( t - 6 = -3 \) 

o \( 10 + a = 14 \)
Equations and formulae

Q1. Solve the following one-step equations.

a. $4a = 16$
   
   $a = 4$

b. $\frac{x}{2} = 3$
   
   $x = 6$

c. $5y = 15$
   
   $y = 3$

d. $\frac{x}{3} = 7$
   
   $x = 21$

e. $\frac{y}{5} = 6$
   
   $y = 30$

f. $8x = -32$
   
   $x = -4$

g. $6m = -18$
   
   $m = -3$

h. $2x = 6$
   
   $x = 3$

i. $\frac{t}{4} = -5$
   
   $t = -20$

j. $2p = -8$
   
   $p = -4$

k. $\frac{y}{5} = -4$
   
   $y = -20$

l. $7t = 28$
   
   $t = 4$

m. $\frac{a}{2} = 9$
   
   $a = 18$

n. $3a = 24$
   
   $a = 8$

o. $\frac{x}{7} = -3$
   
   $x = -21$

Q2. Solve the following equations.

a. $\frac{x}{6} = 5$
   
   $x = 30$

b. $\frac{x}{6} = -2$
   
   $x = -12$

c. $\frac{x}{7} = 6$
   
   $x = 42$

d. $\frac{a}{3} = -20$
   
   $a = -60$

e. $\frac{a}{9} = -2$
   
   $a = -18$

f. $\frac{b}{8} = 9$
   
   $b = 72$

g. $\frac{m}{3} = 12$
   
   $m = 36$

h. $\frac{x}{3} = 9$
   
   $x = 27$

i. $\frac{y}{2} = -14$
   
   $y = -28$

j. $3a = 18$
   
   $a = 6$

k. $-2b = -10$
   
   $b = 5$

l. $-3x = -12$
   
   $x = 4$

m. $5x = 35$
   
   $x = 7$

n. $8x = 48$
   
   $x = 6$

o. $7x = 49$
   
   $x = 7$
Questions 1
Solve the following two-step equations.

a. \(2x + 1 = 3\)

b. \(18 = 3x - 6\)

c. \(10 = 5y - 15\)

d. \(\frac{5m}{3} = 10\)

e. \(\frac{x - 3}{4} = 5\)

f. \(2a + 9 = 19\)

g. \(\frac{x}{2} - 1 = 7\)

h. \(3x + 5 = 11\)

i. \(\frac{a - 2}{7} = 3\)

j. \(8x - 7 = 33\)

k. \(5x + 3 = 28\)

l. \(6t - 3 = 39\)

m. \(7y - 5 = 9\)

n. \(\frac{m}{3} - 4 = 6\)

o. \(2k + 3 = 21\)

Questions 2
Solve the following equations.

a. \(3x - 3 = 9\)

b. \(\frac{m}{2} + 6 = 9\)

c. \(\frac{x - 5}{7} = 4\)

d. \(\frac{x - 2}{6} = 8\)

e. \(5x - 9 = 26\)

f. \(\frac{5m}{6} = 10\)

g. \(10 - 2m = 0\)

h. \(3y - 9 = 21\)

i. \(7y + 4 = -3\)

j. \(2x + 8 = 14\)

k. \(8x - 7 = 17\)

l. \(9x - 7 = 56\)

m. \(3a - 2.3 = 7\)

n. \(6a - 1\frac{1}{2} = 4\frac{1}{2}\)

o. \(8b + 0.3 = 2.7\)
Equations and formulae

**Topic 4: Three-step equations**

**Question 1** Solve the following three-step equations.

a. \(4x + 9 = 3x - 12\)  

b. \(2x - 7 = x - 3\)  

c. \(6t - 10 = 4t + 12\)

---

d. \(11m - 6 = 7m + 14\)  

e. \(9m - 3 = 7m + 9\)  

f. \(4a - 3 = 3a + 9\)

---

g. \(10y - 6 = 5y + 19\)  

h. \(6x - 4 = 2x + 16\)  

i. \(7y - 3 = 4y + 15\)

---

j. \(5x - 1 = 6x - 9\)  

k. \(3a + 5 = 21 - a\)  

l. \(12p - 3 = 7p + 32\)

---

m. \(6m - 7 = 4m + 13\)  

n. \(2y - 1 = y + 9\)  

o. \(4 + m = 16 - 3m\)

---

**Question 2** Solve the following equations.

a. \(6x - 20 = 4x + 48\)  

b. \(2x - 6 = 3 - x\)  

c. \(6x - 2 = 3x - 6\)

---

d. \(7y - 14 = 5y + 20\)  

e. \(2x - 14 = x - 12\)  

f. \(5x + 17 = 3 - 4x\)

---

g. \(3m - 2 = 2m + 7\)  

h. \(6x - 21 = 2x - 2\)  

i. \(3y + 1 = 2y + 7\)

---

j. \(6m + 7 = 7m + 10\)  

k. \(2x + 3 = x - 9\)  

l. \(4y - 3 = 2y + 11\)
Equations and formulae

Topic 5: Equations with grouping symbols

Question 1  Solve the following equations.

a  $3(x + 4) = 18$

b  $2(m + 1) = 5$

c  $6(m - 1) = 24$

d  $2(x + 5) = 18$

e  $3(a - 3) = 10$

f  $4(n - 3) = 36$

g  $5(2n - 1) = 25$

h  $2(3p - 1) = 22$

i  $5(2x + 3) = 45$

j  $4(a - 4) = 8$

k  $3(m + 2) = m + 14$

l  $2(3x + 2) = 16$

Question 2  Solve the following equations.

a  $5(a + 4) = 4(a - 3)$

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

c  $4(y - 3) = 3(y + 2)$

d  $7(x - 8) = 6(x + 2)$

e  $8(3 - x) = 7(x - 6)$

f  $2(a + 1) + a + 3 = 0$

g  $3(x + 7) + x + 3 = 18$

h  $5(a + 3) = 4(a + 9)$

i  $3(3a - 2) = 4(4 - a)$

j  $2(a + 1) - a + 7 = 9$

k  $3(a - 3) - 2a + 9 = 15$

l  $2(5a - 10) - 9a + 6 = 0$

m  $6(a + 7) = 5(a - 3)$

n  $8(2a + 7) = 5(3a - 8)$

o  $9(3a - 4) = 13(2a - 1)$
Equations and formulae

Topic 6: Equations with fractions

**Question 1** Solve the following equations.

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<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>( \frac{x}{4} = \frac{1}{2} )</td>
<td>b</td>
</tr>
<tr>
<td>d</td>
<td>( \frac{a}{2} + \frac{a}{3} = 10 )</td>
<td>e</td>
</tr>
<tr>
<td>g</td>
<td>( \frac{a + 5}{7} = 2 )</td>
<td>h</td>
</tr>
<tr>
<td>j</td>
<td>( \frac{x}{2} - \frac{x}{3} = 2 )</td>
<td>k</td>
</tr>
</tbody>
</table>

**Question 2** Solve the following equations.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>( \frac{2x}{5} = 8 )</td>
<td>b</td>
</tr>
<tr>
<td>d</td>
<td>( \frac{m - 7}{3} = 4 )</td>
<td>e</td>
</tr>
<tr>
<td>g</td>
<td>( \frac{3x}{4} + 1 = 7 )</td>
<td>h</td>
</tr>
<tr>
<td>j</td>
<td>( \frac{3m - 1}{4} = 8 )</td>
<td>k</td>
</tr>
<tr>
<td>m</td>
<td>( \frac{3x}{5} = -2 )</td>
<td>n</td>
</tr>
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Equations and formulae

Topic 7: Formulae

**Question 1** Given the formula $V = Ah$, find $V$ if:

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</thead>
<tbody>
<tr>
<td>a</td>
<td>$A = 10$, $h = 3$</td>
<td>b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>$A = 12$, $h = 8$</td>
<td>e</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g</td>
<td>$A = 12$, $h = 7$</td>
<td>h</td>
</tr>
</tbody>
</table>

**Question 2** Given the formula $P = 2L + 2B$, find $P$ if:

<p>| | | |</p>
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<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>a</td>
<td>$L = 18$, $B = 10$</td>
<td>b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>$L = 20$, $B = 10$</td>
<td>e</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g</td>
<td>$L = 8$, $B = 4$</td>
<td>h</td>
</tr>
</tbody>
</table>

**Question 3** If $y = mx + b$, find $y$ for the given values of $m$, $x$ and $b$.

<p>| | | |</p>
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<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>a</td>
<td>$m = 1$, $x = 3$, $b = 2$</td>
<td>b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>$m = 2$, $x = 4$, $b = 3$</td>
<td>e</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g</td>
<td>$m = -2$, $x = 8$, $b = 3$</td>
<td>h</td>
</tr>
</tbody>
</table>

**Question 4** If $A = \frac{1}{2}bh$, find $A$ for the given values of $b$ and $h$.

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<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>a</td>
<td>$b = 4$, $h = 3$</td>
<td>b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>$b = 12$, $h = 5$</td>
<td>e</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g</td>
<td>$b = 6$, $h = 3$</td>
<td>h</td>
</tr>
</tbody>
</table>
Equations and formulae

Topic 8: Equations arising from substitution in formulae

**Question 1** For the formula $V = Ah$, find $A$ if:

- **a** $V = 84, h = 7$
- **b** $V = 36, h = 9$
- **c** $V = 18, h = 3$
- **d** $V = 48, h = 6$
- **e** $V = 72, h = 6$
- **f** $V = 400, h = 10$
- **g** $V = 96, h = 8$
- **h** $V = 120, h = 8$
- **i** $V = 88, h = 11$

**Question 2** For the formula $P = 2L + 2B$, find $L$ if:

- **a** $P = 30, B = 5$
- **b** $P = 24, B = 4$
- **c** $P = 80, B = 15$
- **d** $P = 38, B = 8$
- **e** $P = 54, B = 7$
- **f** $P = 44, B = 9$
- **g** $P = 33, B = 7.5$
- **h** $P = 56, B = 12$
- **i** $P = 50, B = 7$

**Question 3** For the formula $v = u + at$, find $u$ if:

- **a** $v = 60, a = 6, t = 8$
- **b** $v = 14, a = 2, t = 3$
- **c** $v = 21, a = 3, t = 4$
- **d** $v = 52, a = 7, t = 5$
- **e** $v = 36, a = 4, t = 2$
- **f** $v = 18, a = 2, t = 3$
- **g** $v = 90, a = 10, t = 5$
- **h** $v = 48, a = 3.2, t = 5.6$
- **i** $v = 38, a = 1.2, t = 3.5$

**Question 4** For the formula $y = mx + b$, find $x$ if:

- **a** $y = 6, m = 1, b = 3$
- **b** $y = 8, m = \frac{1}{2}, b = 4$
- **c** $y = 10, m = \frac{1}{4}, b = 2$
- **d** $y = 4, m = -1, b = 4$
- **e** $y = 5, b = 3, m = -2$
- **f** $y = 8, b = 2, m = 2$
- **g** $y = 7, b = 1.5, m = 1$
- **h** $y = 6, b = 2, m = -1$
- **i** $y = 9, b = 3, m = -2$
Equations and formulae

Topic 9: Problem solving with equations

In the following questions, suppose the number is represented by \( x \). Write the statement as an equation and find the value of \( x \).

1. The sum of a number and 8 is 24. ____________________________

2. 9 subtracted from 3 times a number is 21. _________________________

3. I think of a number and add 12. The result is 26. _______________________

4. A number increased by 9 is 27. ________________________________

5. The difference between 5 times a number and 3 is 7. _________________

6. I think of a number, double it, and the result is 24. ______________________

7. I think of a number, double it and add 12. The result is 48. _________________

8. I think of a number, divide it by 4, subtract 2 and the result is 7. _________________

9. The difference between 7 times a number and 6 is 29. _______________________

In the following questions, write an equation using the pronumeral \( x \) for the unknown number and then find the value of \( x \).

10. A rectangle is 5 cm longer than it is wide. If its perimeter is 26 cm, find the width and the length of the rectangle. _________________

11. If the perimeter of an equilateral triangle is 36 cm, what is the length of each side? _________________

12. The length of a rectangle is 8 cm and its perimeter is 22 cm. Find its width. _________________

13. If I subtract 29 from a certain number the result is 23. What is the number? _________________

14. Find \( x \) if the sum of 3, 5, 8, \( x \) is 28. _________________

15. I think of a number, add 3 to it, multiply this sum by 7 and then subtract 9. The result is 47. What is the number? _________________
## Equations and formulae

### Topic Test

#### PART A

**Instructions**
- This part consists of 12 multiple-choice questions.
- Each question is worth 1 mark.
- Fill in only ONE CIRCLE for each question.
- Calculators are NOT allowed.

**Time allowed: 15 minutes**

**Total marks = 12**

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>If $\frac{n}{3} = 7$, $n$ equals</td>
<td>7</td>
<td>11</td>
<td>17</td>
<td>21</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>If $x - 10 = -2$, $x$ equals</td>
<td>-12</td>
<td>-8</td>
<td>8</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>If $2x - 5 = 21$, what is the value of $x$?</td>
<td>6</td>
<td>8</td>
<td>13</td>
<td>26</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>If $\frac{m}{3} = 6$, find the value of $m$.</td>
<td>2</td>
<td>3</td>
<td>9</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>If $2p - 5 = 23$, then $p$ equals</td>
<td>8</td>
<td>9</td>
<td>14</td>
<td>28</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>If $n + 3 = -4$ then $n$ equals</td>
<td>-7</td>
<td>-1</td>
<td>1</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Solve for $x$, $5x + 3 = 2(x + 12)$</td>
<td>3</td>
<td>5</td>
<td>9</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>If $2(t + 3) = t - 4$ then $t$ equals</td>
<td>-10</td>
<td>2</td>
<td>8</td>
<td>none of these</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>If $2(7 - x) = 3$ then $x$ equals</td>
<td>11</td>
<td>-17</td>
<td>8 $\frac{1}{2}$</td>
<td>5 $\frac{1}{2}$</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>$2(x - 3) = 3(2x + 4)$ then $x$ equals</td>
<td>1 $\frac{1}{2}$</td>
<td>$\frac{1}{4}$</td>
<td>-4 $\frac{1}{2}$</td>
<td>-3 $\frac{3}{4}$</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>$x - \frac{3}{4} = \frac{x - 2}{5}$, $x$ equals</td>
<td>7</td>
<td>9</td>
<td>6</td>
<td>none of these</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>$\frac{2x - 1}{3} = \frac{x + 1}{2}$, $x$ equals</td>
<td>5</td>
<td>$\frac{5}{7}$</td>
<td>-5</td>
<td>8</td>
<td>1</td>
</tr>
</tbody>
</table>

Total marks achieved for PART A: 12
# Equations and formulae

## Topic Test

**PART B**

**Instructions**
- This part consists of 15 questions
- Each question is worth 2 marks
- Write answers in the answers-only column
- Calculators may be used

**Time allowed:** 15 minutes  
**Total marks = 30**

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers only</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solve the following equations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1  ( x - 7 = 30 )</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>2  ( \frac{x}{12} = 96 )</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>3  ( 3x + 10 = 5x - 2 )</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>4  ( 4(p + 7) = 30 )</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>5  I think of a number, double it, add 8 and the result is 42. By solving</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>the equation, find the number.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6  ( \frac{x}{4} = \frac{2}{3} )</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>7  ( \frac{5x}{3} + \frac{1}{2} = 4 )</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>8  ( 2x - 3 = 5 )</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>9  ( \frac{x - 2}{3} = 10 )</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>10 ( 3(x + 4) = x + 19 )</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>11 ( \frac{x + 6}{3} = \frac{2x + 4}{4} )</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>12 ( 4(2x - 5) = 0 )</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>13 ( \frac{x - 2}{3} + 5 = 9 )</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>14 ( 3(x - 1) = 9 )</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>15 ( 4x - 3 = 2x + 9 )</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

**Total marks achieved for PART B**  

15