Algebra

Student Book - Series H-2

$7(4x - y) = ___$
Algebra

Student Book - Series H 2

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Practice Tests

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Author of The Topics and Topic Tests: AS Kalra
Algebra

Topic 1: Algebraic expressions

**QUESTION 1** Write an expression for the following.

a. The sum of $2a$ and $3b$ = ______________________

b. 8 less than $5a$ = ______________________

c. The double of $6x$ = ______________________

d. The difference between $x$ and $y$ = ______________________

e. Two thirds of $x$ = ______________________

**QUESTION 2** Write an algebraic expression for the following.

a. Nine times the number $n$ minus 3 = ______________________

b. The sum of $3x$ and 56 = ______________________

c. The sum of $2l$, $5m$ and $3n$ = ______________________

d. The product of $3x$ and $6y$ = ______________________

e. The average of $4a$ and $8a$ = ______________________

**QUESTION 3** If $x$ represents any number, write an algebraic expression for the following.

a. Nine times the number plus 5 = ______________________

b. One fifth of the number minus seven = ______________________

c. The sum of the number and 15 = ______________________

d. The difference between the number and 9 = ______________________

e. Five more than the number = ______________________

**QUESTION 4** Show the sum of each of the following.

a. $15$ and $x$ = ______________________

b. $5m$ and $3n$ = ______________________

c. $2x$, $3y$ and $5z$ = ______________________

d. $8a$, $5b$ and $7c$ = ______________________

e. $15l$, $12m$ and $4n$ = ______________________

**QUESTION 5** Write algebraic expressions for the following.

a. To the sum of $8x$ and $5y$, add 9z = ______________________

b. From the product of $2m$ and $3n$, take away 5 = ______________________

c. Divide $2m$ by $3n$ and then take away 10 = ______________________

d. Divide the sum of $x$ and $y$ by 20 = ______________________

e. 16 plus $y$, all divided by 7 = ______________________
Algebra

Topic 2: Simplifying algebraic expressions

QUESTION 1  Write down the coefficient for each of the following terms.

a 9a ____________  b 6y ____________  c 12t ____________  d 84x ____________

e 53y ____________  f 32m ____________  g 82c ____________  h 5y ____________

i 16n ____________  j 43a ____________  k 14b ____________  l 32m ____________

QUESTION 2  Circle the like terms.

a 3b, 5a, 9a ____________  b 4x, 5y, 6x ____________  c 9x, 3a, 5x ____________

 d 9a, 3d, 6a ____________  e 8y, 3a, 3y ____________  f 3l, 5m, 5l ____________

 g 3d, 2c, 5c ____________  h 9, 8x, 5x ____________  i 10y, y, x ____________

QUESTION 3  Simplify the following.

a 2x + 3x = ____________  b a + a + a + a = ____________  c y + y + y + y + y = _______

 d y + y + y + y = ____________  e m + m + m + m + m = _______  f c + c + c + c = ____________

 g 3d + 9d = ____________  h 9k + 3k + 7k = ____________  i 5a + 11a = ____________

QUESTION 4  Simplify the following expressions.

a 15x – 3x = ____________  b 27b – 18b = ____________  c 28a – 10a = ____________

 d 18a – 5a = ____________  e 18x – 7x = ____________  f 15a – 6a = ____________

 g 11b – 4b = ____________  h 15p – 6p = ____________  i 20y – y = ____________

QUESTION 5  Simplify the following.

a 8 × d = ____________  b 8 × a × c = ____________  c x × y × z = ____________

 d 5 × x × y = ____________  e 45 × m × n × l = ____________  f 5 × a × c = ____________

 g a × b × 14 = ____________  h 9 × 2 × m × n = ____________  i 15 × b × d × e = ____________

QUESTION 6  Write the following expressions in expanded form.

a 16xy = ________________  b 6abc = ________________

c 5ab = ________________  d 18xyz = ________________

e 9mnp = ________________  f 45mn² = ________________

 g 7abc = ________________  h 6a²b = ________________

 i 6xyz = ________________  j 5a³ = ________________

 k 15abc = ________________  l 12a²b² = ________________

 m 9m = ________________  n 18d³e³ = ________________

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Algebra

Topic 3: Collecting like terms

QUESTION 1     Collect like terms to simplify the following.

a  \( x + x + x + y + y = \) ____________________________  
b  \( m + m + m + m + n + n + n = \) ____________________________  
c  \( a + a + a + a + a + b = \) ____________________________  
d  \( l + l + l + m + m + m = \) ____________________________  
e  \( e + e + f + f + f + f = \) ____________________________  
f  \( u + u + u + v + v + v + v + v = \) ____________________________

QUESTION 2     Simplify the following by collecting like terms.

a  \( 5x + 7 + 4x + 11 = \) ____________________________  
b  \( 9a + 15 + 6a + 13 = \) ____________________________  
c  \( 8a + 3b + 9a + 2b = \) ____________________________  
d  \( 8x + 2y + 6x = \) ____________________________  
e  \( 9m + 3n + 8m + 4n = \) ____________________________  
f  \( 2x + 3y + 9x + 10y = \) ____________________________

QUESTION 3     Simplify the following.

a  \( 18a - 7a - 2a + 3b = \) ____________________________  
b  \( 9x + 7y - 6x + 14y = \) ____________________________  
c  \( 8m + 9n + 6m - 3n = \) ____________________________  
d  \( 8p - 3p + 15q - 8q = \) ____________________________  
e  \( 17x + 42x + 15 = \) ____________________________  
f  \( 16abc - 12abc = \) ____________________________  
g  \( 18l - 6l + 8m + 20m - 6m = \) ____________________________  
h  \( 8x + 7y + 10x - 4y - 2y = \) ____________________________

QUESTION 4     Simplify the following.

a  \( 8x - x - 2x = \) ____________________________  
b  \( 6z - 4z + 9z = \) ____________________________  
c  \( 5x^2 + 8x^2 - 3x^2 = \) ____________________________  
d  \( 9a - 6a - 2a = \) ____________________________  
e  \( 5a - 6b - 7a - b = \) ____________________________  
f  \( x + 5x - 7x = \) ____________________________  
g  \( 8x + 7x - x = \) ____________________________  
h  \( 9h - h - 7h - 2h = \) ____________________________

QUESTION 5     Simplify the following.

a  \( 8b - b - 3b = \) ____________________________  
b  \( m^2 - 6m - m + 12 = \) ____________________________  
c  \( 8x - 6y - y = \) ____________________________  
d  \( p^2 - 4p + 6p - 7 = \) ____________________________  
e  \( 9a + b - 4b - 8a = \) ____________________________  
f  \( 4x + 9y + 6x - 3y = \) ____________________________  
g  \( xy + 5y + 4xy = \) ____________________________  
h  \( ab + 3b - 4ab + 9b = \) ____________________________

QUESTION 6     Collect like terms and simplify.

a  \( ab + bc - ab - bc + ac = \) ____________________________  
b  \( 9a^2b - 5ab^2 - 3ab^2 + 2a^2b = \) ____________________________  
c  \( 9x^2 + 10x^2 - 3x^2 = \) ____________________________  
d  \( 19xyz + 6y + 4xyz - 5y = \) ____________________________  
e  \( 18xyz + 15xyz - 4xy = \) ____________________________  
f  \( 36a^2 + 15b^2 - 14a^2 = \) ____________________________  
g  \( 8x^2y^2 + 9x + 4x^2y^2 + 6x = \) ____________________________  
h  \( 9a^3 + 8a^3 - 3b^3 + 6b^3 = \) ____________________________
Algebra

Topic 4: Algebraic abbreviations

QUESTION 1
a. Write $12 \times p$ in a shorter way. ___________________

b. Write $5 \times 3 \times y$ in a shorter way. ___________________

c. Write $9 \times x \times x \times x$ in another way. ___________________

d. Write $8ab$, showing multiplication signs. ___________________

e. What is the difference between $36x$ and $3 \times 6 \times x$? ___________________

QUESTION 2
Write the following expressions without multiplication or division signs.

a. $5 \times 4 \times p = $ ______________

b. $8 \times m \times 5 = $ ______________

c. $x + 4 \times y = $ ______________

d. $6 \times (2a + 3) = $ ______________

e. $2a + 3 = $ ______________

f. $x \times y \times z = $ ______________

g. $3 \times b \times 9 = $ ______________

h. $2p \times q \times q = $ ______________

i. $5 \times a \times 6 \times b = $ ______________

ej. $3 \times m - 6 = $ ______________

k. $5 + 8 \times x = $ ______________

l. $8 \times x + 5 \times y = $ ______________

m. $15 + x = $ ______________

n. $5x + 17 = $ ______________

o. $k + 15 = $ ______________

p. $(a + b) + 7 = $ ______________

q. $9a + (2a + 3) = $ ______________

r. $(9a + 7) + 4a = $ ______________

QUESTION 3
Write the following expressions by showing all multiplication or division signs.

a. $7m = $ ______________

b. $5x = $ ______________

c. $16y = $ ______________

d. $8n - 3 = $ ______________

e. $6m + 7 = $ ______________

f. $30 - 5a = $ ______________

g. $xy - 5 = $ ______________

h. $8k - 3l = $ ______________

i. $x^2yz = $ ______________

ej. $15xyz = $ ______________

k. $7a^2 + 3 = $ ______________

l. $m^3 - n^3 = $ ______________

QUESTION 4
Write the following in a shortened form.

a. $7 \times a \times b \times b \times c = $ ______________

b. $9 \times m \times m \times n \times n = $ ______________

c. $6 \times (a + 3) = $ ______________

d. $4 \times (x - 8) = $ ______________

e. $5 \times p \times (q + 3) = $ ______________

f. $3 \times 4 \times (a - 7) = $ ______________

g. $a \times b \times (c + 5) = $ ______________

h. $5 \times (8 \times a - 2) = $ ______________

i. $9 + (3 \times 6 + 3 \times a) = $ ______________

j. $7 \times (8 \times y - 3 \times z) = $ ______________

k. $(2x + 1) \times (x + 3) = $ ______________

l. $(6p + 5) \times (6p - 7) = $ ______________

m. $a \times 5 \times a \times a = $ ______________

n. $9 \times b \times b \times b \times 7 = $ ______________

o. $y \times y \times y \times x \times a \times a = $ ______________

p. $(2 \times x + 1) \times (3 \times x - 2) = $ ______________

q. $(n + 3) \times (2n + 5) = $ ______________

r. $(m - 3) \times (3m - 5) = $ ______________
Algebra

Topic 5: Substitution

**QUESTION 1** If \( a = 5 \), find the value of each expression.

a. \( 7a = \) 

b. \( 9a + 1 = \) 

c. \( 9a - 1 = \) 

d. \( a^2 = \) 

e. \( 5a^2 = \) 

f. \( (a + 1)(a - 1) = \) 

g. \( a^3 = \) 

h. \( a^2 - 2a = \) 

i. \( (2a + 7) \times 3a = \) 

j. \( 7a - 12 = \) 

k. \( 180 \div 6a = \) 

l. \( (a - 2) + 15 = \) 

**QUESTION 2** If \( a = 3 \), \( b = 5 \), \( c = 8 \) and \( d = 10 \), find the value of each of the following expressions.

a. \( a + b = \) 

b. \( a + b + c + d = \) 

c. \( abc - d^2 = \) 

d. \( abc = \) 

e. \( 2a + 3b + 4c = \) 

f. \( 3b + 5c - d = \) 

g. \( 16bc = \) 

h. \( 8c - d = \) 

i. \( 8d + b = \) 

j. \( 5a - a^2 = \) 

k. \( (c + d) - a^2 = \) 

l. \( b^2 + d^2 - abc = \) 

**QUESTION 3** Complete the following.

a. \( b = 2a + 1 \)

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

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c. \( m = 15 - 2l \)

d. \( y = 4x - 2 \)

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e. \( p = 5q + 7 \)

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**QUESTION 4** Complete the table.

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Algebra

Topic 6: Index notation

QUESTION 1  Write each of the following in simplest index notation.

a  \( p \times p \times p \times p \times p = \) 

b  \( \frac{1}{q} \times q \times q \times q \times q = \) 

c  \( x \times x \times x \times x \times x = \) 

d  \( a \times a \times b \times b \times b = \) 

e  \( m \times m \times m = \) 

f  \( c \times c \times c \times c \times d \times d = \) 

g  \( a \times a \times a \times a = \) 

h  \( y \times y \times y \times y \times y \times z \times z = \) 

QUESTION 2  Write each of the following in expanded form.

a  \( x^5 = \) 

b  \( m^6 = \) 

c  \( a^7 = \) 

d  \( n^8 = \) 

e  \( e^3 = \) 

f  \( p^{10} = \) 

g  \( y^4 = \) 

h  \( t^9 = \) 

QUESTION 3  Find the value of each of the following when \( x = 3 \) and \( y = 2 \)

a  \( x^2 = \) 

b  \( x^6 = \) 

c  \( xy^3 = \) 

d  \( x^3 = \) 

e  \( y^4 = \) 

f  \( x^2y^5 = \) 

g  \( y^3 = \) 

h  \( y^5 = \) 

i  \( 5xy = \) 

j  \( x^5 = \) 

k  \( x^2y^2 = \) 

l  \( 6xy^4 = \) 

QUESTION 4  Write each of the following in simplest index form.

a  \( 15 \times a \times a \times a = \) 

b  \( p \times p \times p \times p \times 5 \times p = \) 

c  \( m \times m \times 7 \times m = \) 

d  \( 6 \times m \times m \times 2 \times m \times m = \) 

e  \( 16 \times x \times x \times x \times x = \) 

f  \( h \times 3 \times h \times 5 \times h = \) 

g  \( 4 \times y \times 3 \times y \times y = \) 

h  \( 8 \times b \times b \times 2 \times b = \) 

QUESTION 5  Expand each of the following.

a  \( 6a^2 = \) 

b  \( 8x^3 = \) 

c  \( 9y^3 = \) 

d  \( 5m^7 = \) 

e  \( 15b^2 = \) 

f  \( 16y^5 = \) 

g  \( 7a^4 = \) 

h  \( 3a^2b^3 = \) 

QUESTION 6  Evaluate the following when \( a = 5 \) and \( b = 6 \)

a  \( a^2 + b = \) 

b  \( a^3b = \) 

c  \( a^2 + b^2 = \) 

d  \( ab^3 = \) 

e  \( a^3 + b^2 = \) 

f  \( a^7b^2 = \)
**Algebra**

**Topic 7: Index laws**

**QUESTION 1** Simplify the following, writing your answer in index form.

a. \( x^2 \times x^3 = \) ____________  
b. \( y^3 \times y^3 = \) ____________  
c. \( a^3 \times a^4 = \) ____________  
d. \( m^3 \times m^5 = \) ____________  
e. \( p^3 \times p^7 = \) ____________  
f. \( n^{10} \times n^3 = \) ____________  
g. \( a^2 \times a^3 \times a^4 = \) ____________  
h. \( x^5 \times x^2 \times x = \) ____________  
i. \( y^5 \times y^9 = \) ____________

**QUESTION 2** Simplify the following.

a. \( x^9 + x^3 = \) ____________  
b. \( x^{12} + x^4 = \) ____________  
c. \( x^7 + x = \) ____________  
d. \( y^7 + y^4 = \) ____________  
e. \( y^9 + y^2 = \) ____________  
f. \( a^9 + a = \) ____________  
g. \( m^{25} + m^{16} = \) ____________  
h. \( m^{12} + m^{10} = \) ____________  
i. \( m^{15} + m^{11} = \) ____________

**QUESTION 3** Simplify the following.

a. \( (a^3)^3 = \) ____________  
b. \( (b^5)^4 = \) ____________  
c. \( (a^6)^6 = \) ____________  
d. \( (x^3)^7 = \) ____________  
e. \( (b^2)^7 = \) ____________  
f. \( (x^7)^8 = \) ____________  
g. \( (3x^2)^2 = \) ____________  
h. \( (3x^2)^4 = \) ____________  
i. \( (3b^4)^3 = \) ____________

**QUESTION 4** Simplify the following.

a. \( 5x^4 \times x^3 = \) ____________  
b. \( 9x^5 \times x^2 = \) ____________  
c. \( a^{11} \times 3a^5 = \) ____________  
d. \( m^7 \times 5m^2 = \) ____________  
e. \( 8k^3 \times 7k^5 = \) ____________  
f. \( 5a^7 \times 8a^6 = \) ____________  
g. \( m^3n^2 \times m^5n^7 = \) ____________  
h. \( x^2y^4 \times x^5y^7 = \) ____________  
i. \( x^2y^2 \times x^4y^2 = \) ____________

**QUESTION 5** Simplify the following.

a. \( (a^3b^3)^3 = \) ____________  
b. \( (x^5y)^6 = \) ____________  
c. \( (m^3n^6)^3 = \) ____________  
d. \( x^5 \times x^6 \times x^7 = \) ____________  
e. \( x^8 + x^4 + x^3 = \) ____________  
f. \( a^6 \times a^7 + a^5 = \) ____________  
g. \( \frac{a^9 \times a^9}{a^5} = \) ____________  
h. \( \frac{a^{15} \times a^5}{a^7} = \) ____________  
i. \( \frac{b^{12} \times b^{12}}{b^{10}} = \) ____________

**QUESTION 6** Simplify the following.

a. \( \frac{x^6 + x^6}{x} = \) ____________  
b. \( x^{13} + x^8 = \) ____________  
c. \( x^{17} + x^{13} \times x^4 = \) ____________  
d. \( (2x^7)^3 = \) ____________  
e. \( x^6 \times x^4 + x^3 = \) ____________  
f. \( x^9 \times x^4 + x^7 = \) ____________  
g. \( a^4 \times a^5 + a^2 = \) ____________  
h. \( x^9 + x^2 = \) ____________  
i. \( a^7 \times a^8 + a^2 = \) ____________
Topic 8: Grouping symbols

QUESTION 1  Expand the following expressions.

a  $2(a + 3b) = \underline{\hspace{2cm}}$

b  $8(2a + b) = \underline{\hspace{2cm}}$

c  $3(5a + b) = \underline{\hspace{2cm}}$

d  $5(2m + 5n) = \underline{\hspace{2cm}}$

e  $7(5m - n) = \underline{\hspace{2cm}}$

f  $5(3x + 8y) = \underline{\hspace{2cm}}$

g  $6(x + 3y) = \underline{\hspace{2cm}}$

h  $9(6a - 5b) = \underline{\hspace{2cm}}$

i  $6(4a - 2b) = \underline{\hspace{2cm}}$

QUESTION 2  Expand.

a  $6(2a + 7) = \underline{\hspace{2cm}}$

b  $y(y + 7) = \underline{\hspace{2cm}}$

c  $10(3x - 8y) = \underline{\hspace{2cm}}$

d  $m(2m + 3) = \underline{\hspace{2cm}}$

b  $9(5x - y) = \underline{\hspace{2cm}}$

c  $2a(a + b) = \underline{\hspace{2cm}}$

g  $k(3k - 2) = \underline{\hspace{2cm}}$

d  $x(x + 15) = \underline{\hspace{2cm}}$

h  $3p(p - 7) = \underline{\hspace{2cm}}$

QUESTION 3  Remove the grouping symbols.

a  $a(a + 3) = \underline{\hspace{2cm}}$

c  $p(3p + 7) = \underline{\hspace{2cm}}$

b  $3m(2m - 9) = \underline{\hspace{2cm}}$

d  $9(5x - y) = \underline{\hspace{2cm}}$

e  $6p(4p - 1) = \underline{\hspace{2cm}}$

g  $m(4m - 7) = \underline{\hspace{2cm}}$

h  $5x(3x + 7) = \underline{\hspace{2cm}}$

i  $6a(3a - 9) = \underline{\hspace{2cm}}$

QUESTION 4  Expand.

a  $7(4y + 5) = \underline{\hspace{2cm}}$

b  $3(7a - 2b) = \underline{\hspace{2cm}}$

c  $9(x - 2y) = \underline{\hspace{2cm}}$

b  $9(8y - 2) = \underline{\hspace{2cm}}$

e  $5(5a - 3b) = \underline{\hspace{2cm}}$

f  $3(3a - 5b) = \underline{\hspace{2cm}}$

g  $6(3x - 4y) = \underline{\hspace{2cm}}$

h  $p(4p - 9) = \underline{\hspace{2cm}}$

i  $19(a + 2b) = \underline{\hspace{2cm}}$

QUESTION 5  Expand the following expressions.

a  $am(m^2 - 1) = \underline{\hspace{2cm}}$

b  $x(x^2 - 9) = \underline{\hspace{2cm}}$

c  $a(a^3 - 7) = \underline{\hspace{2cm}}$

d  $q(8q + 3p) = \underline{\hspace{2cm}}$

e  $3m(4m - 3n) = \underline{\hspace{2cm}}$

f  $9(5p - 6) = \underline{\hspace{2cm}}$

g  $7(6x - 10y) = \underline{\hspace{2cm}}$

h  $7p(3p - 4) = \underline{\hspace{2cm}}$

i  $10(5a - 9b) = \underline{\hspace{2cm}}$

QUESTION 6  Expand.

a  $2x(10x - 3y) = \underline{\hspace{2cm}}$

b  $x^3(x^2 - x^2) = \underline{\hspace{2cm}}$

c  $5a(6a - 7b) = \underline{\hspace{2cm}}$

d  $x^2(x^2 - 7) = \underline{\hspace{2cm}}$

b  $x^5(x - 3) = \underline{\hspace{2cm}}$

f  $6a^2(a^3 + 5) = \underline{\hspace{2cm}}$

g  $a^3(a^2 - a) = \underline{\hspace{2cm}}$

h  $x^7(x^2 - x) = \underline{\hspace{2cm}}$

i  $7a^3b^2(a^3 + b) = \underline{\hspace{2cm}}$

ej  $m(4m - 5n) = \underline{\hspace{2cm}}$

k  $xy(x^2 - y^2) = \underline{\hspace{2cm}}$

l  $8a^2b(a + b) = \underline{\hspace{2cm}}$

m  $6mn(3m - 2n) = \underline{\hspace{2cm}}$

n  $mn(m - n) = \underline{\hspace{2cm}}$

o  $9a(a^2 + b^2) = \underline{\hspace{2cm}}$
### Question 1
By substituting back into the equation, see if the given value of the pronumeral is correct or incorrect.

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>( x + 3 = 15 )</td>
<td>( x = 12 )</td>
<td></td>
<td>b</td>
<td>( y + 3 = 12 )</td>
<td>( y = 8 )</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>( a - 5 = 17 )</td>
<td>( a = 20 )</td>
<td></td>
<td>d</td>
<td>( b - 6 = 14 )</td>
<td>( b = 20 )</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>( p + 4 = 10 )</td>
<td>( p = 6 )</td>
<td></td>
<td>f</td>
<td>( q + 3 = 12 )</td>
<td>( q = 15 )</td>
<td></td>
</tr>
<tr>
<td>g</td>
<td>( m + 7 = 11 )</td>
<td>( m = 4 )</td>
<td></td>
<td>h</td>
<td>( n - 2 = 7 )</td>
<td>( n = 9 )</td>
<td></td>
</tr>
</tbody>
</table>

### Question 2
Solve the following equations.

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>( x + 3 = 10 )</td>
<td></td>
<td>b</td>
<td>( m + 5 = 16 )</td>
<td></td>
<td>c</td>
<td>( y + 9 = 15 )</td>
</tr>
<tr>
<td>d</td>
<td>( n + 9 = 27 )</td>
<td></td>
<td>e</td>
<td>( p + 7 = 21 )</td>
<td></td>
<td>f</td>
<td>( q + 7 = 7 )</td>
</tr>
<tr>
<td>g</td>
<td>( a + 5 = 13 )</td>
<td></td>
<td>h</td>
<td>( b + 8 = 24 )</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Question 3
Solve the following.

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>( a - 9 = 11 )</td>
<td></td>
<td>b</td>
<td>( x - 5 = 17 )</td>
<td></td>
<td>c</td>
<td>( b - 3 = 7 )</td>
</tr>
<tr>
<td>d</td>
<td>( t - 7 = 15 )</td>
<td></td>
<td>e</td>
<td>( y - 1 = 8 )</td>
<td></td>
<td>f</td>
<td>( x - 6 = 36 )</td>
</tr>
<tr>
<td>g</td>
<td>( m - 2 = 13 )</td>
<td></td>
<td>h</td>
<td>( n - 3 = 25 )</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Question 4
Find the solutions to the following.

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>( 3a = 21 )</td>
<td></td>
<td>b</td>
<td>( 2x = 20 )</td>
<td></td>
<td>c</td>
<td>( 5a = 35 )</td>
</tr>
<tr>
<td>d</td>
<td>( 5x = 55 )</td>
<td></td>
<td>e</td>
<td>( 4y = 32 )</td>
<td></td>
<td>f</td>
<td>( 8x = 64 )</td>
</tr>
<tr>
<td>g</td>
<td>( 8a = 48 )</td>
<td></td>
<td>h</td>
<td>( 6y = 42 )</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Question 5
Solve.

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>( \frac{x}{3} = 9 )</td>
<td></td>
<td>b</td>
<td>( \frac{x}{8} = 3 )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>( \frac{x}{5} = 7 )</td>
<td></td>
<td>d</td>
<td>( \frac{x}{5} = 15 )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>( \frac{m}{7} = 3 )</td>
<td></td>
<td>f</td>
<td>( \frac{a}{3} = 20 )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g</td>
<td>( \frac{x}{6} = 4 )</td>
<td></td>
<td>h</td>
<td>( \frac{m}{5} = 16 )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i</td>
<td>( \frac{x}{7} = 2 )</td>
<td></td>
<td>j</td>
<td>( \frac{n}{7} = 9 )</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Algebra

Topic 10: Problem solving with algebra

1. Find an expression for the perimeter of a square with side length of $2x$ units.

2. If a bag contains $3m$ marbles, how many marbles are in six similar bags?

3. A fence is $y$ metres long. A further $3y$ metres is added. How long is the fence now?

4. The sum of a number and 7 is 22. What is the number?

5. Maddy has $5y$ and gets $9x$ from the bank. How much does she have now?

6. The product of a number and 9 is 72. What is the number?

7. If a number is multiplied by 8, and 5 is added to the product, the result is 37. What is the number?

8. If 9 is subtracted from a number, the result is 23. What is the number?

9. The sum of a number and 12 is 36. What is the number?

10. If a number is divided by 15, the result is 6. What is the number?

11. If 7 is subtracted from the product of 5 and a number, the result is 43. What is the number?

12. A photograph is $2a$ cm long and $b$ cm wide. Find its area.

13. A room is $4x$ metres long and $5y$ metres wide. Find its area.

14. I walked $7x$ km on Monday and $8y$ km on Tuesday. How many kilometres did I walk altogether?

15. Find the perimeter of a rectangular block of land $9p$ metres long and $5q$ metres wide.
# Algebra

## 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>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$2x + 3x$ equals</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>A  $5x^2$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B  $6x^2$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C  $6x$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D  $5x$</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>If $3y = 15$ the $y$ equals</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>A  3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B  5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C  15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D  45</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>$3x + 4y$ equals</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>A  $x^3 + y^4$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B  $12xy$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C  $3x + 4y$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D  $7xy$</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>If $a = 2$ and $t = 6$ then $\frac{1}{2}at^2$ equals</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>A  72</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B  36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C  12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D  9</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>$a^2 + a^2$ equals</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>A  $a^6$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B  $a^9$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C  $2a^3$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D  $2a^6$</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>$3y^2 - 2y + 5y + 4y^2$ equals</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>A  $7y^2 + 3y$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B  $7y^2 - 7y$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C  $7y^2 + 3y$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D  $7y^2 - 7y$</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>$3ab^2$ equals</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>A  $3 \times a \times b \times b$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B  $3 \times a \times b \times 2$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C  $3 \times ab \times ab$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D  $3ab \times 3ab$</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>$7t^3 \times (-4t^2)$ equals</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>A  $3t^5$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B  $3t^6$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C  $-28t^6$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D  $-28t^6$</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>$\frac{1}{a} + \frac{1}{b}$ equals</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>A  $\frac{1}{ab}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B  $\frac{b}{a}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C  $\frac{a}{b}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D  $ab$</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$3(x + 4) - x =$</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>A  12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B  15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C  $2x + 4$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D  $2x + 12$</td>
<td></td>
</tr>
</tbody>
</table>
Algebra

Topic Test

PART A continued

11 \((4x^2)^2 =\)
   A \(4x^4\)  B \(4x^6\)  C \(16x^5\)  D \(16x^6\)

12 \(\frac{6a^2}{2ab}\) equals
   A \(3ab\)  B \(\frac{3a}{b}\)  C \(6b\)  D \(\frac{6}{b}\)

13 \(3ab - b + ab - 2b =\)
   A \(2ab - b\)  B \(2ab - 3b\)  C \(4ab - b\)  D \(4ab - 3b\)

14 \(\frac{x^4 \times x^6}{x^2} =\)
   A \(x^5\)  B \(x^8\)  C \(x^{12}\)  D \(x^{12}\)

15 \((\frac{m^6}{m^2})^2\) equals
   A \(m^5\)  B \(m^6\)  C \(m^8\)  D \(m^9\)

Total marks achieved for PART A

15
**TOPIC TEST PART B**

**Algebra**

**Chapter 6: Algebra**

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers only</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Simplify $5 \times m \times 9 \times p$</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>2. Simplify $12x + 7y - 3x - y$</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>3. Write in a shorter way: $8 \times 7(5 \times a - 3)$</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>4. If $a = 7$, find $3a^2$</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>5. If $x = 5$ and $y = 7$, find $5x + 7y$</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>6. Find the sum of $8x + 9y$ and 56</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>7. To the sum of $9x$ and $y$, add $6y$</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>8. Divide $6a$ by $5b$ and then add 10 to the result.</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>9. Write in a shorter way: 23 plus $y$, all divided by 9</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>10. Divide the difference of $a$ and $b$ by the sum of $a$ and $b$</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>11. What is the product of 6, $x$ and 9?</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>12. What is $8m$ subtracted from the product of $2m$ and $3n$?</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>13. Simplify $9x^3 \times 5x^2$</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>14. Simplify $\frac{a^5 \times a^4}{a^3}$</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>15. Expand $8(5x - 12)$</td>
<td></td>
<td>1</td>
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</table>

**Total marks achieved for PART B**

15
## Algebra

### Topic Test PART C

**Instructions**
- This part consists of 4 questions
- Each question is worth 5 marks
- Show all necessary working

**Time allowed: 20 minutes**

**Total marks = 20**

### Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Find the value of the expression if ( x = 3 ), ( y = 4 ) and ( z = 2 )</td>
<td>5</td>
</tr>
<tr>
<td>a ( 3x + 5y )</td>
<td></td>
</tr>
<tr>
<td><strong>2</strong> Solve the following equations.</td>
<td>5</td>
</tr>
<tr>
<td>a ( 9 + a = 28 )</td>
<td></td>
</tr>
<tr>
<td><strong>3</strong> Simplify the following.</td>
<td>5</td>
</tr>
<tr>
<td>a ( m^2 \times m^7 )</td>
<td></td>
</tr>
<tr>
<td><strong>4</strong> a The product of a number and 7 is 63. What is the number?</td>
<td></td>
</tr>
</tbody>
</table>

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**Total marks achieved for PART C**

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