TGL

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YEAR 9

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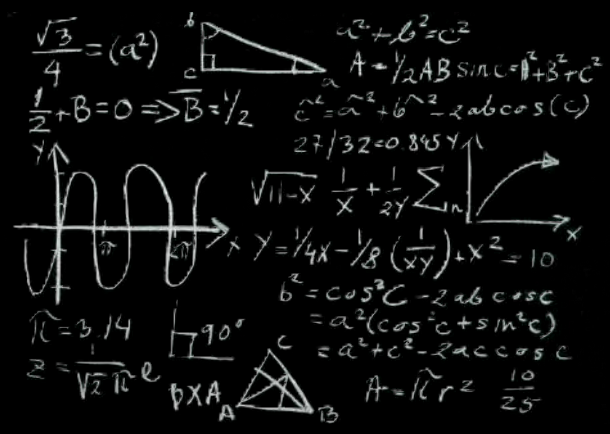

Work Book

For Year 9

BOOK 1

M.Nat

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Acknowledgements

First and foremost I would like to thank God who has given me the guidance and knowledge to make this series of book. My heartfelt thanks goes to my family for their tremendous support and encouragement throughout the making of this book.

I express my gratitude towards Nijeja , Sharugi who have provided their valuable time to proof read and design this book . Last but not least I express my gratitude towards my students for their inspiration and progressive feedback which has only led me to improve every maths book of mine..

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Year 9 Workbook

More than **500** questions included

Mr M. Nat

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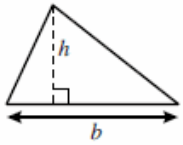
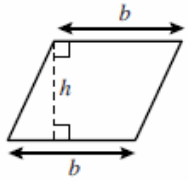
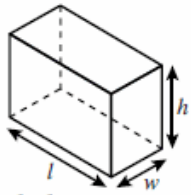
FORMULA SHEET



$A = \frac{1}{2}bh$

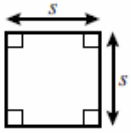


$A = bh$

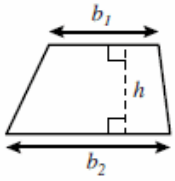


$V = lwh$
$S.A. = 2lw + 2lh + 2wh$

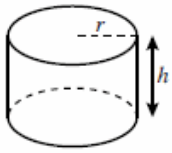
$V = \frac{1}{3}\pi r^2 h$
$S.A. = \pi rl + \pi r^2$



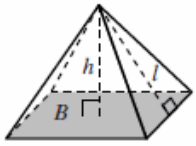
$p = 4s$
$A = s^2$



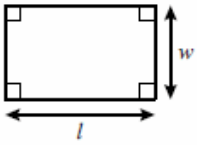
$A = \frac{1}{2}h(b_1 + b_2)$



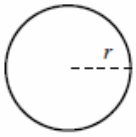
$V = \pi r^2 h$
$S.A. = 2\pi rh + 2\pi r^2$



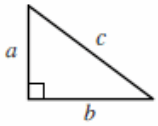
$V = \frac{1}{3}Bh$
$S.A. = \frac{1}{2}lp + B$



$p = 2l + 2w$
$A = lw$

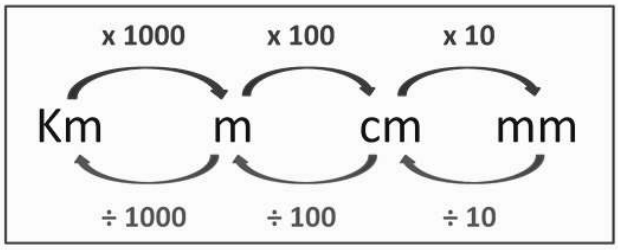


$C = 2\pi r$
$A = \pi r^2$

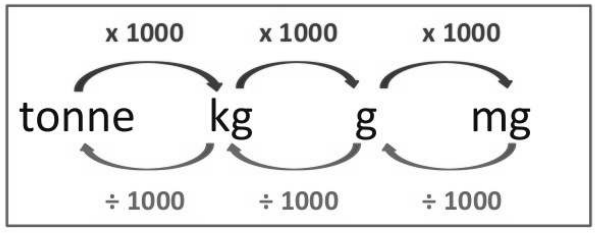


$c^2 = a^2 + b^2$

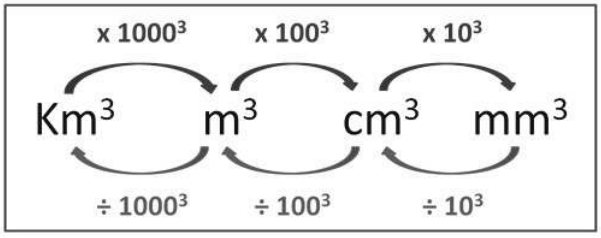
Length



Weight



Volume



Algebra

Chapter 1

Exercise 1A

Algebraic expressions

Q1 Write the algebraic expressions for the following questions.

a) The total of a and b _____

b) 5 more than x _____

c) How many centimetres there are in x metres _____

d) How many minutes there are in y hours _____

e) Four times of the sum of x and 3 _____

f) Half the number z minus 4 _____

g) Square root of, three times the number y _____

h) The product of six and y _____

i) X takes away from y _____

j) B more than 19 _____

Q2 Write the algebraic expressions for the following questions.

a) The cost of one book is x pence. How much will six books cost?

_____

b) A man has £p in his bank. He takes £ q out. How much is left?

_____

c) What is the cost, in pence, of four books if one costs £x each?

_____

d) Julie is 17 years old. How old will she be in x years?

_____

e) Peter is 40 years old. How old will he be in m years of time?

_____

f) Garden chairs cost £x each. What is the total cost of y chairs?

_____

Q3 Write the algebraic expressions for the following questions.

a) A number is doubled and 5 is added.

_____

b) A number is trebled and 7 is added.

_____

c) Peter has £y. John has £14 more than Peter.

_____

d) Three people go shopping. Siva spends £y. Peter spends twice as much as Siva. Mary spends three times as much as Peter.

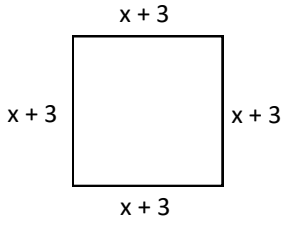
_____

e) A number is multiplied by 4 and 6 is taken away.

_____

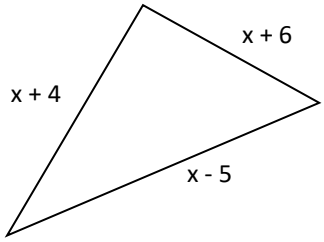
Q4 Write the algebraic expressions for the perimeter of each shape in the simplest form.

a)



_____

b)



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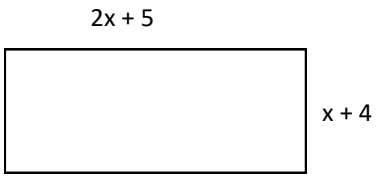
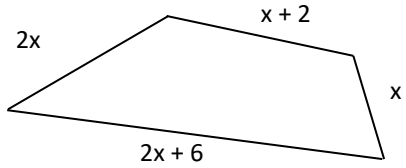
c)



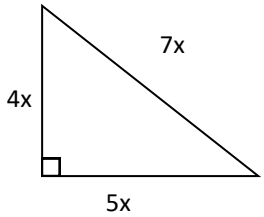
_____

d)



_____

e)



_____

Exercise 1B — Substitution

Q1 Use a = 3, b = 4 and c = 6 to calculate the value of the following.

a) $a + b + c$ _____

b) $2a + 3b + c$ _____

c) $2a + 3b$ _____

d) $6(a + c)$ _____

e) $ab - c$ _____

f) $\frac{32}{b}$ _____

g) $3a - 3c$ _____

h) $\frac{40}{b}$ _____

i) $b^2 + c$ _____

j) $a^2 + b^2 - c^2$ _____

k) $c^2 + b^2 - a^3$ _____

l) $ac^2 + ab^2$ _____

Q2 Evaluate the following expressions if x = 3, y = - 2 and z = 4.

a) $3(xy - yz)$ _____

b) $4(x^2 - y^2)$ _____

c) $2(x^2y^2 - z^2)$ _____

d) $\frac{16}{z} - \frac{10}{y}$ _____

e) $\frac{x}{y} + \frac{y}{x}$ _____

f) $\frac{4y}{z}$ _____

g) xyz _____ h) $8(xy - y)$ _____

i) $5(x + z)$ _____ j) $4(x + y)$ _____

k) $\frac{18}{y}$ _____ l) $3(yz - xz)$ _____

Q3 Find the value of the following.

a) $y = 5a - b$ a = 5, b = -2 _____

b) $y = \frac{1}{2}(a + b)$ a = -7, b = 12 _____

c) $x = \frac{1}{2}CD$ C = 4, D = 1 _____

d) $P = 3(a + b)$ a = - 11, b = -1 _____

e) $y = x^2 + z^2$ $x = -3$, $z = -4$ _____

f) $y = \frac{x}{100}$ $x = 500$ _____

g) $a = \frac{bh}{2}$ b = 3, h = 4 _____

h) $y = 30 + 2p$ p = 5 _____

i) $y = 3a + 2b$ a = -5, b = -6 _____

j) $y = \frac{ab}{2}$ a = 5, b = -4 _____

Exercise 1C — Collecting like terms

Q1 Simplify the following expressions by collecting like terms.

a) $4x + 6x =$ _____ b) $7x - 4x =$ _____

c) $9xy + 7xy =$ _____ d) $4x^2 + 7x^2 =$ _____

e) $5xp + 3xp =$ _____

f) $5m + 12m =$ _____

g) $14mn + 6mn =$ _____

h) $7x + 8x =$ _____

i) $14x - 11x =$ _____

j) $- 7pq - 3pq =$ _____

Q2 Simplify the following.

a) $2a + 5b + 7a + 4b =$ _____

b) $x + 7y + 4x - 3y =$ _____

c) $y + y + y - y =$ _____

d) $5y - y + 2x =$ _____

e) $7p + 2q - 6p + q =$ _____

f) $2a + 4b + 5a + 2b =$ _____

g) $8m + 7n - 3m + 5n =$ _____

h) $4x - 5y + 3p - 3q =$ _____

i) $5p + 3q + 3p - 3q =$ _____

j) $11p - 7q - 3p + 8q =$ _____

Q3 Simplify the following.

a) $y + 3y + y^2 + 2y^2 =$ _____

b) $5x^2y^2 + 3x^2y^2 - 4x^2y^2 =$ _____

c) $2a^3 + a^3 + 6a^2 + 3a^3 =$ _____

d) $6x + 2x^2 + 4x^3 + 10x =$ _____

e) $9a^3 - 5a^3 - a^4 - a =$ _____

f) $10x^3 - 7x^3 - 2x^4 - x =$ _____

g) $3x^3 + 5x^4 + 3x^5 - 2x^2 - 2a^3 =$ _____

h) $4xyz + 2xy^2z - 2xzy + xyz^2 =$ _____

i) $4xy + 4x - 3xy + 3x =$ _____

j) $ab + 3ab + b - ab =$ _____

k) $5a + a^2 + 3b^3 + 9a =$ _____

l) $5abc + 13 - 2abc - 17 =$ _____

Exercise 1D

Multiplication

Q1 Find the products of the following.

a) $7 \times 4x =$ _____

b) $6ab \times 3a \times 2b =$ _____

c) $-3x \times -3y =$ _____

d) $5a \times 4b =$ _____

e) $xy \times x^2y =$ _____

f) $-4x \times 6 =$ _____

g) $8xy \times 6xy =$ _____

h) $4x \times 3y =$ _____

i) $-9a \times -6a =$ _____

j) $-12a^2 \times 3a^2 =$ _____

Q2 Find the products of the following.

a) $(-8p) \times (-7p) =$ _____

b) $-x \times x \times -x =$ _____

c) (-2p) x 7 x (-3p) = _____

d) p x (-q) x 4 = _____

e) (-7m) x (-2n) x (-4m) = _____

f) 7a x 2b x 2a = _____

g) 2a x 2am = _____

h) (-3a) x 2am x (-a) = _____

i) $-4x \times 2y \times -3x =$ _____

j) -7a x -4a x -2b = _____

Q3 Find the products of the following.

a) $4xy \times \frac{x}{2}$ _____

b) $-18xy \times \frac{xy}{2}$ _____

c) $9t \times \frac{2}{3}$ _____

d) $\frac{8x}{3} \times 4x$ _____

e) $\frac{3x}{2} \times x$ _____

f) $\frac{1}{2mn} \times 9mn$ _____

g) $\frac{-ab}{11} \times -22ab$ _____

h) $\frac{-x}{8} \times 64$ _____

i) $\frac{-2x}{3} \times \frac{-3}{4x}$ _____

j) $\frac{1}{25} \times -5x$ _____

Exercise 1E

Division

Q1 Divide the following.

a) 18a ÷ 2 = _____

b) 24ab ÷ ab = _____

c) $9a^2b^2 \div ab =$ _____

d) $21x \div 7x =$ _____

e) $-15xy \div 5y =$ _____

f) $21a \div (-a) =$ _____

g) $72xy \div 9x =$ _____

h) $92ab \div 2ab =$ _____

i) $9x^2 \div 2x =$ _____

j) $22x^2y \div 11xy =$ _____

Q2 Simplify the questions below.

a) $\frac{8x^4}{x}$ _____

b) $\frac{12}{6x}$ _____

c) $\frac{12xy}{6x}$ _____

d) $\frac{8n^3}{4n}$ _____

e) $\frac{6n^4}{n^4}$ _____

f) $\frac{21y^3}{7y}$ _____

g) $\frac{30x^2}{6x}$ _____

h) $\frac{6y^5}{y^4}$ _____

i) $\frac{30y^5}{5y^2}$ _____

j) $\frac{20p^4}{p^3}$ _____

k) $\frac{x^4}{x^2}$ _____

l) $\frac{14p^4}{2p^3}$ _____

m) $\frac{8x^6}{x^4}$ _____

n) $\frac{15y^7}{3y^2}$ _____

Q3 Simplify the following.

a) $a \times b \div 4$ _____

b) $x^2y \times x \div x^3y$ _____

c) $p^4q^5 \div q^4 \times p^2$ _____

d) $4x^2y^2 \div (2x \times 5y)$ _____

e) $x \times y \div x^2$ _____

f) $9a^2b \div ab \times b$ _____

Exercise 1F

Brackets

Q1 Expand the following.

a) $2(x - y)$ _____

b) $4(4a + 2)$ _____

c) $3(5y - 2)$ _____

d) $3(f - 2)$ _____

e) $3(2a + 5b)$ _____

f) $5(3a - 2)$ _____

g) $4(3a + 5)$ _____

h) $2(2x + 13)$ _____

i) $4(5a - 3)$ _____

j) $4(4a - 3)$ _____

Q2 Expand and simplify the following.

a) $8(2x - 1) + 2x + 5$ _____

b) $3(3x - y) + 2x + 5y$ _____

c) $5(x - 1) + 17$ _____

d) $7(x - y) + 2x$ _____

e) $5x - 2(x + 7) + 5$ _____

f) $7x - 3(x - 5) + 3$ _____

g) $8x + 2(x + 3) - 5$ _____

h) $9x - 5(x - 5) - 7$ _____

i) $5(x - 7) - 9x$ _____

j) $2(x - 4) - 3x + y$ _____

Q3 Multiply out the brackets and simplify.

a) $6(2x + y) + 2(x - 3y)$ _____

b) $4d + 3e + 2(e - 3d)$ _____

c) $3(x + 4y) + 4(x - y)$ _____

d) $4x + 3y + 2(x - y)$ _____

e) $4(x + 2y + 3z) + 2(x - 4y + z)$ _____

f) $2(6p - 7) - 3(3q - 2p)$ _____

g) $3(2x - 3) - 2(x - 1) + 3(x - 5)$ _____

h) $x(y + 2) - 2x(x + y)$ _____

i) $x(x + y) - 2x(x^2 + y)$ _____

j) $7(x - 1) - 3(x - y)$ _____

Exercise 1G

Changing subject to a formula

Q1 Rearrange the equation to make the letter in the bracket as the subject.

a) $w = 3x + 2y$ (y) _____

b) $y = 2w$ (w) _____

c) $y = 3x - 2y$ (x) _____

d) $X = 0.5PQ$ (Q) _____

e) $y = \dfrac{32}{x}$ (x) _____

f) $p = \dfrac{ab}{c}$ (b) _____

g) p = 4 (b + c) (c) _____

h) y = ab + 3 (b) _____

i) $y = \frac{24}{c}$ (c) _____

j) $p = \frac{2q}{x}$ (x) _____

Q2 Answer the following questions.

a) Given that A = $\frac{1}{2}xy$. Find A if

i) $x = 12$ and $y = 4$ _____

ii) $x = 10$ and $y = 5$ _____

b) Given that A = 0.5 $ab\,(h + b)$, find A if

i) b = 5, h = 3, a = 2 _____

ii) b = 4, h = 5, a = 4 _____

c) If C = $\frac{5}{9}$ (F - 32). Find F if C = 10 _____

d) If $\frac{1}{v}+\frac{1}{u}=\frac{1}{f}$ then find f if $v = 4$ and $u = 2$ _____

e) If $\frac{1}{v}+\frac{1}{u}=\frac{1}{f}$ find v if u = 4 and f = 10. _____

f) If $p = \frac{ab}{80}$ find b when P = 10 and a = 4. _____

g) If F = ma, find m when a = 5m/s^2 and F = 40 N. _____

h) If E = mc^2, find c when m = 4 and E = 16. _____

i) If E = mc^2, find m when E = 10 and c = 2. _____

Indices

Chapter 2

Exercise 2A

Index notations

Q1 Write the following in expanded form.

a) 2^4 _____ b) 7^6 _____

c) 5^3 _____ d) 10^3 _____

e) 4^5 _____ f) 11^4 _____

g) 12^3 _____ h) $(-2)^4$ _____

i) 3^5 _____ j) 9^4 _____

Q2 Write the following in index form.

a) 2 x 2 x 2 x 2 _____

b) 7 x 7 x 7 _____

c) 4 x 4 x 4 x 4 x 4 x 4 _____

d) 1.5 x 1.5 x 1.5 x 1.5 _____

e) $\frac{1}{4}\times\frac{1}{4}\times\frac{1}{4}\times\frac{1}{4}$ _____

f) $a \times a \times x \times x \times x$ _____

g) 7 x 7 x 7 x a x a _____

h) $x \times x \times x \times x \times y \times y$ _____

i) $m \times m \times m \times m \times n \times n$ _____

j) $p \times p \times x \times x \times y \times y \times y$ _____

Q3 Find the value of each of the following where $x = 3$ and $y = -2$.

a) x^3y _____ b) x^2y^2 _____

c) $8x^2$ _____ d) $9y^3$ _____

e) $10x^2y$ _____ f) $x^3 + y^3$ _____

g) $x^3 + y^2$ _____ h) $4x^2 + 3y^3$ _____

i) $y^2 - x^2$ _____ j) $y^3 - x^2$ _____

Exercise 2B

Index Laws ($a^m \times a^n = a^{m+n}$)

Q1

Simplify the following by writing your answers in **index form**.

a) $a^3 \times a^4$ _____ b) $x^7 \times x^5$ _____

c) $a^{-4} \times a^8$ _____ d) $x^{10} \times x^{-5}$ _____

e) $p^7 \times p^2$ _____ f) $3^{12} \times 3^{10}$ _____

g) $5^4 \times 5^9$ _____ h) $7^8 \times 7^9$ _____

i) $6^7 \times 6^{-2}$ _____ j) $10^7 \times 10^2$ _____

Q2

Simplify the following by writing your answers in **index form**.

a) $a^5 \times a^6$ _____ b) $b^{-7} \times b^8$ _____

c) $p^8 \times p^6$ _____ d) $p^3 \times p^6$ _____

e) $x^{15} \times x^7$ _____ f) $q^4 \times q^7$ _____

g) $y^4 \times y^2$ _____ h) $a^9 \times a^{12}$ _____

i) $a^5 \times a^6 \times a^1$ _____ j) $x^{-2} \times x^7 \times x^{10}$ _____

Q3

Simplify the following by writing your answers in **index form**.

a) $4x^4 \times x^2$ _____ b) $9x^8 \times x^3$ _____

c) $3m^3 \times 7m^{-1}$ _____ d) $16x^2 \times 2x^5$ _____

e) $7x^2y^2 \times xy$ _____ f) $4x^2y^3 \times 2x^4y^6$ _____

g) $8x^3y^4z^2 \times 2x^{-3}y^3z$ _____ h) $8x^5 \times 2x^3$ _____

i) $8y^5 \times 6y$ _____ j) $7a^4 \times 3a^2$ _____

Q4

Simplify the following by writing your answers in **index form**.

a) $3^9 \times 3^4$ _____ b) $x^{3a} \times x^{2b}$ _____

c) $2^{3y} \times 2^{2x} \times 2^{2}$ _____ d) $e^{4x} \times e^{2x}$ _____

e) $4^{5y} \times 4^{2} \times 4^{y}$ _____

Q5 Find the missing term in each of the following.

a) $a^4 \times \square = a^{12}$ b) $\square \times 7x^2y = 14x^6y^2$

c) $\square \times 4x^4y = 16x^7y^2$ d) $x^2y \times \square = x^7y^2$

e) $x^{-3}y^4 \times \square = x^{10}y^{-1}$

Exercise 2C

Index Laws ($a^m \div a^n = a^{m-n}$)

Q1 Simplify the following and write your answers in **index form**.

a) $x^7 \div x^5$ _____ b) $5y^7 \div y^5$ _____

c) $8x^7 \div 2x^2$ _____ d) $3q^7 \div q^2$ _____

e) $x^{12} \div x^2$ _____ f) $9^{13} \div 9^4$ _____

g) $12^{10} \div 12^2$ _____ h) $4^{18} \div 4^{12}$ _____

i) $3^{12} \div 3^2$ _____ j) $3^{12} \div 3^3$ _____

Q2 Simplify and find the **values** of the following.

a) $2^7 \div 2^5$ _____ b) $10^5 \div 10^3$ _____

c) $8^7 \div 8^2$ _____ d) $7^9 \div 7^6$ _____

e) $5^8 \div 5^4$ _____ f) $3^7 \div 3^4$ _____

g) $2^7 \div 2^6$ _____ h) $11^8 \div 11^6$ _____

i) $4^9 \div 4^5$ _____ j) $6^6 \div 6^3$ _____

Q3 Simplify the following and write your answer in **index form**.

a) $\dfrac{2^{12}}{2^6}$ _____ b) $\dfrac{2^7}{2^5}$ _____

c) $\frac{4^{12}}{4^8}$ _____ d) $\frac{4^8}{4^3}$ _____

e) $\frac{11^{18}}{11^2}$ _____ f) $\frac{12^5}{12}$ _____

g) $\frac{7^9}{7^2}$ _____ h) $\frac{2^{12}}{2^2}$ _____

i) $\frac{20^{17}}{20^2}$ _____ j) $\frac{16^{12}}{16^2}$ _____

Q4 Simplify the following.

a) $x^7y^9 \div xy$ _____ b) $x^8y^2 \div x^2y$ _____

c) $a^7b^8 \div a^3b^7$ _____ d) $9^{7y} \div 9^{2y}$ _____

e) $2^{8x} \div 2^{4x}$ _____

Q5 Find the missing term in each of the following.

a) $a^7 \div \square = a^2$ b) $16x^7 \square \div = 2x^3$

c) $\frac{21a^8}{\square} = 3a^2$ d) $\square$ $48a^2b^2 \div = 4ab$

e) $28p^6 \div \square = 7p^2$

Exercise 2D **Index Laws ((a^m)^n = a^{mn})**

Q1 Simplify the following, leaving your answers in **index form**.

a) $(2^5)^3$ _____ b) $(2^7)^2$ _____

c) $(5^7)^8$ _____ d) $(8^4)^9$ _____

e) $(3^2)^4$ _____ f) $(4^5)^4$ _____

g) $(12^2)^5$ _____ h) $(11^5)^{10}$ _____

i) $(9^{10})^7$ _____ j) $(10^5)^{12}$ _____

Q2 Simplify the following.

a) $(x^{10})^{8}$ _____ b) $(m^{8})^{7}$ _____

c) $(p^{7})^{8}$ _____ d) $(q^{4})^{10}$ _____

e) $(2x^{4})^{3}$ _____ f) $(3x^{3})^{5}$ _____

g) $(a^{2}b^{2})^{4}$ _____ h) $(a^{3}b)^{7}$ _____

i) $(x^{4}y^{2})^{4}$ _____ j) $(x^{2}y)^{7}$ _____

Q3 Complete the following.

a) (_____)^{3} = $8x^{12}$ b) (_____)^{4} = $81p^{20}$

c) (_____)^{5} = $32p^{25}$ d) (_____)^{2} = $25x^{10}$

e) (_____)^{3} = $125x^{12}$

Q4 Simplify the following.

a) $(2^{8})^{a}$ _____ b) $(3^{4})^{2x}$ _____

c) $(4^{5})^{-2a}$ _____ d) $(3^{-2})^{2y}$ _____

e) $(4^{2x})^{9y}$ _____

Exercise 2E **Index Laws (Mixed Questions)**

Q1 Simplify the following.

a) $x^{7} \times x^{8}$ _____ b) $2^{10} \times 2^{6}$ _____

c) $5x^{2} \times 4x^{3}$ _____ d) $5x^{2}y \times 4x^{3}y^{3}$ _____

e) $9^{5} \times 9^{-4}$ _____ f) $8^{7} \times 8^{-6}$ _____

g) $a^{2}b \times a^{3}b$ _____ h) $a^{4}b \times a^{5}b$ _____

i) $8^{0} \times 5^{2}$ _____ j) $ax^{0} \times a^{2}x^{0}$ _____

k) $x^{2}y^{2}z^{0} \times x^{3}y^{4}z^{0}$ _____ l) $10^{0} \times 20^{0}$ _____

Q2 Simplify the following.

a) $a^9 \div a^3$ _____

b) $a^{10} \div a^7$ _____

c) $x^2y \div xy$ _____

d) $a^2b \div ab$ _____

e) $x^{10}y^2 \div x^2y$ _____

f) $\frac{m^7n^3}{m^2n^2}$ _____

g) $\frac{a^0x^5}{a^5x^0}$ _____

h) $\frac{m^7n^0o^5}{mno}$ _____

i) $p^2q^2r \div pqr$ _____

j) $m^{10} \div n^0$ _____

Q3 Simplify the following.

a) $9^3 \times 9^6$ _____

b) $(9^4)^6$ _____

c) $10^8 \div 10^2$ _____

d) $(8^4)^2$ _____

e) $(x^2y^2)^3$ _____

f) $(x^7y^8)^2$ _____

g) $(x^78^2)^3$ _____

h) $x^0y^2 + x^5y^0$ _____

Pythagoras Theorem

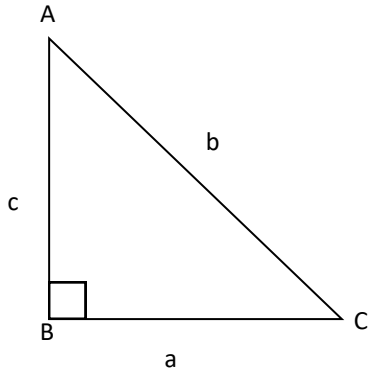
Chapter 3

Exercise 3A

Naming the Hypotenuse side

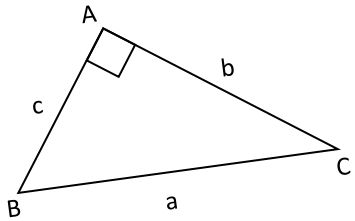
Q1 Write the letter which represents the hypotenuse.

a)



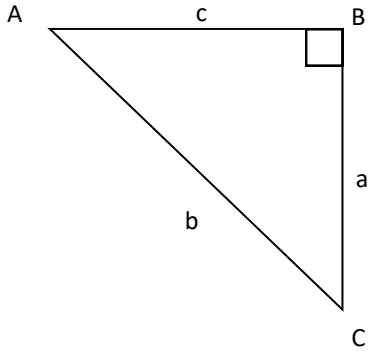
_____

b)



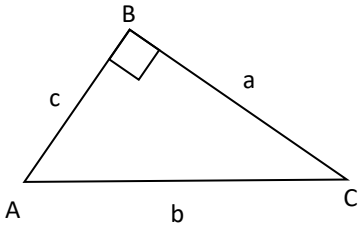
_____

c)



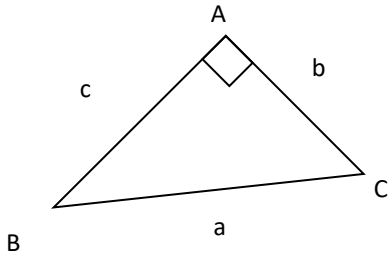
_____

d)



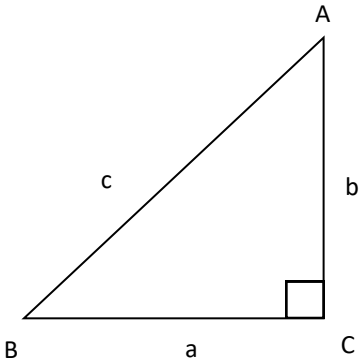
_____

e)



_____

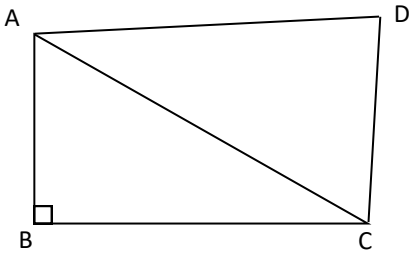
f)



_____

Q2 Name the side which represents the hypotenuse for the triangle.

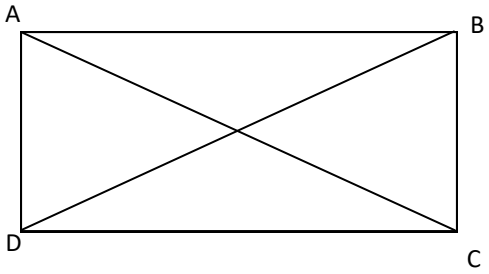
a)



Δ ABC

_____

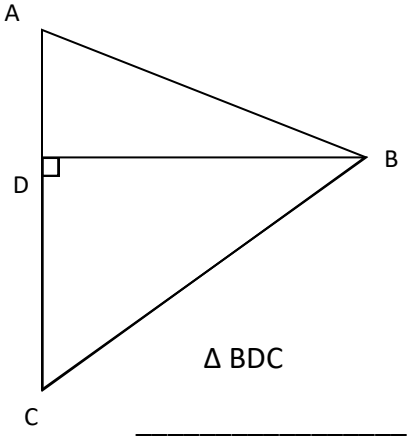
b)



Δ ACD

_____

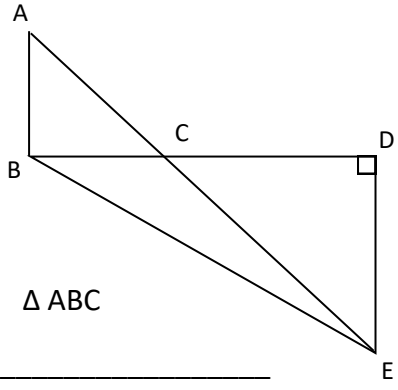
c)



Δ BDC

_____

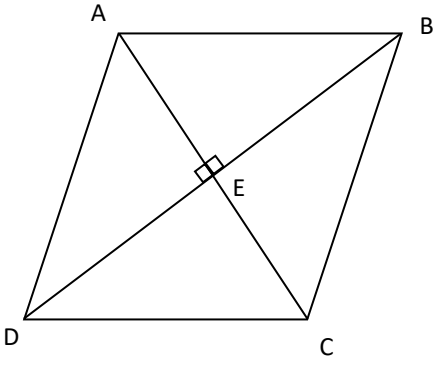
d)



Δ ABC

_____

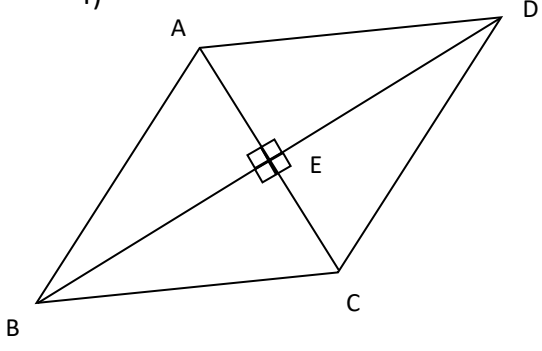
e)



Δ BEC

_____

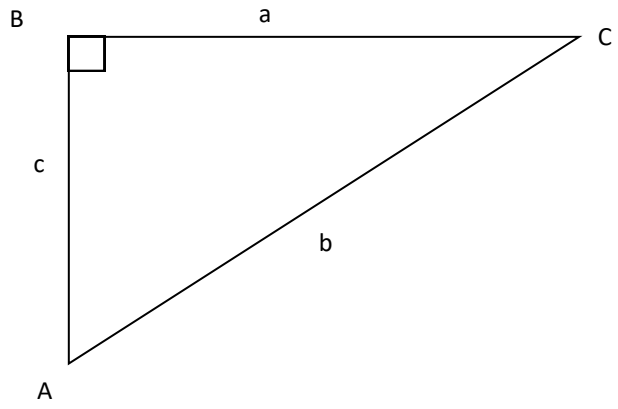
f)



Δ ADE

_____

Q3 Complete the following statements.



a) _____ is the length of the side opposite to angle A.

b) _____ is the side opposite to angle C.

c) _____ is the side adjacent to the angle A, other than hypotenuse.

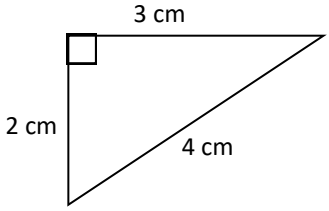
d) _____ is the length of the side adjacent to the angle C, other than hypotenuse.

Exercise 3B

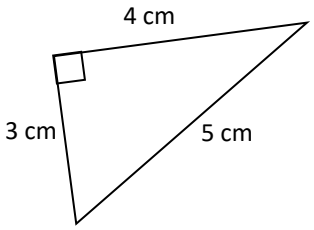
Investigating the Hypotenuse Law

Q1 For each of the following triangles, complete the table and verify that the square on the hypotenuse is equal to the sum of the squares of the other sides ($a^2 + b^2 = c^2$).

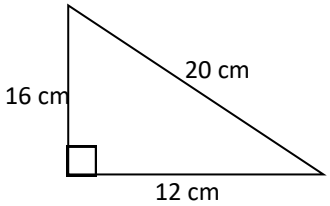
i)



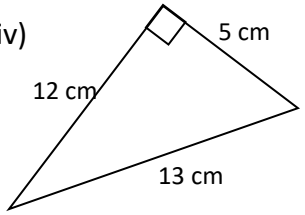
ii)



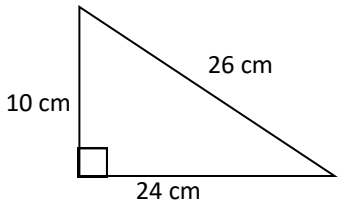
iii)



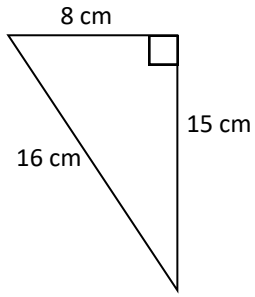
iv)



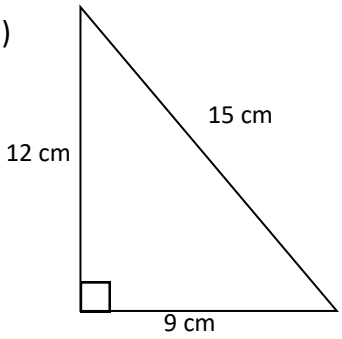
v)



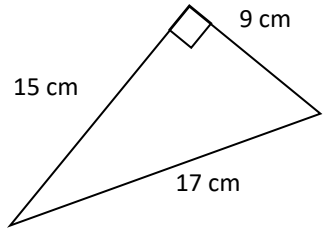
vi)



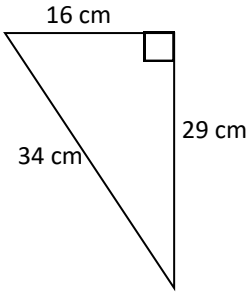
vii)



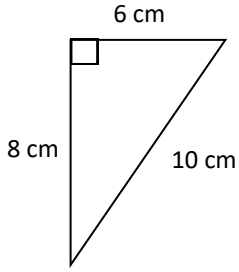
viii)



ix)



x)



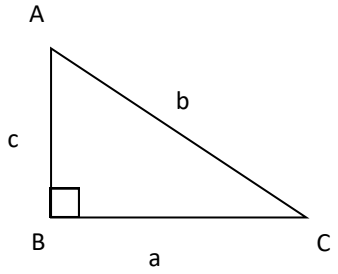
	a	b	c	a^2	b^2	c^2	$a^2 + b^2$	$a^2 + b^2 = c^2$ (Tick if true)
i								
ii								
iii								
iv								
v								
vi								
vii								
viii								
ix								
x								

Exercise 3C

Selecting the correct Pythagoras rule

Q1 In the following right angled triangles, circle the correct statement.

a)

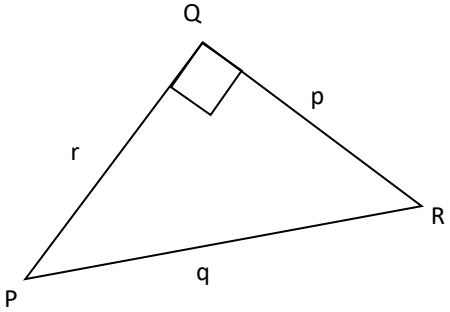


(i) $a^2 + c^2 = b^2$

(ii) $a^2 + b^2 = c^2$

(iii) $b^2 + c^2 = a^2$

b)

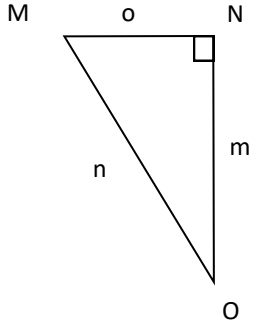


(i) $p^2 + q^2 = r^2$

(ii) $p^2 + r^2 = q^2$

(iii) $q^2 + r^2 = p^2$

c)

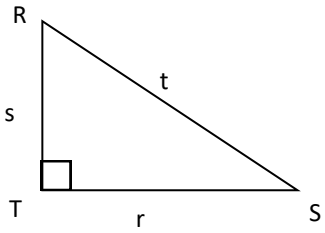


(i) $m^2 + n^2 = o^2$

(ii) $m^2 + o^2 = n^2$

(iii) $o^2 + n^2 = m^2$

d)

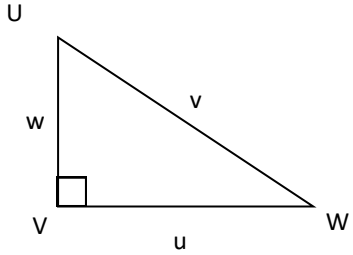


(i) $t^2 = s^2 + r^2$

(ii) $s^2 + t^2 = r^2$

(iii) $t^2 + r^2 = s^2$

e)



(i) $w^2 = v^2 + u^2$

(ii) $u^2 + w^2 = v^2$

(iii) $v^2 + u^2 = w^2$

Exercise 3D

Squares, Square Roots & Pythagoras Theorem

Q1 Use your calculator to find the following squares.

a) 24^2 _____ b) 28^2 _____ c) 18^2 _____

d) 32^2 _____ e) 48^2 _____ f) 54^2 _____

g) 10^2 _____ h) 81^2 _____ i) 98^2 _____

j) 99^2 _____ k) 17^2 _____ l) 27^2 _____

Q2 Use the square root key to find x.

a) $x^2 = 529$ _____ b) $x^2 = 676$ _____

c) $x^2 = 841$ _____ d) $x^2 = 1225$ _____

e) $x^2 = 576$ _____ f) $x^2 = 1521$ _____

g) $x^2 = 2304$ _____ h) $x^2 = 2401$ _____

i) $x^2 = 3844$ _____ j) $x^2 = 2601$ _____

Q3 Calculate and Determine which of the following are Pythagorean triples.

a) { 2, 3, 5 } _____ _____

b) { 3, 4, 5 } _____ _____

c) { 4, 5, 8 } _____ _____

d) { 6, 8, 10 } _____ _____

e) { 8, 15, 17 } _____ _____

f) { 19, 40, 41 } _____ _____

g) { 5, 13, 12 } _____ _____

h) { 4, 6, 10 } _____ _____

i) { 8, 40, 20 } _____ _____

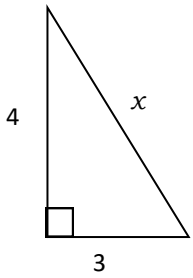
j) { 10, 11, 12 } _____ _____

Exercise 3E

Finding the length of a side

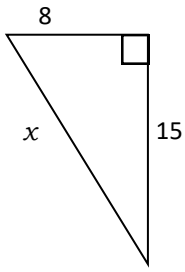
Q1 Find the length of the hypotenuse in each of the following. Give your answers to 2 decimal points.

a)



_____

b)



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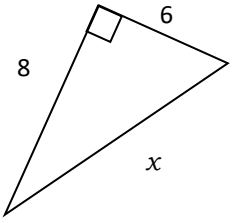
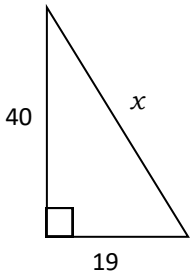
c)



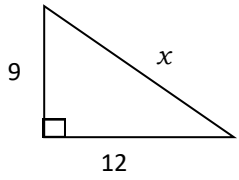
_____

d)



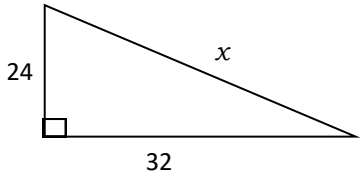
_____

e)



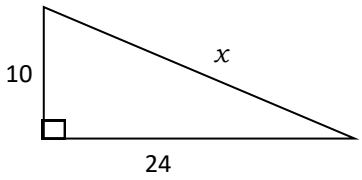
_____

f)



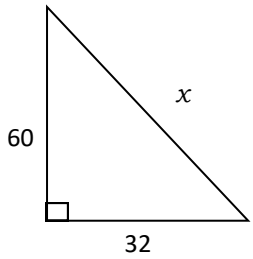
_____

g)



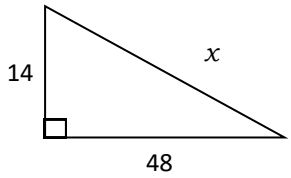
_____

h)



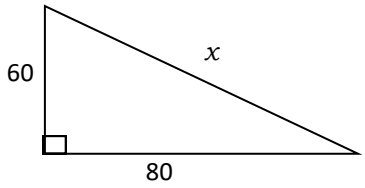
_____

i)



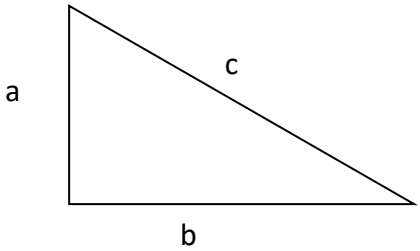
_____

j)



_____

Q2 Find the missing side using the following diagram and give your answers to 2 decimal points (Remember to include the units).



a) c = 25cm, b = 24cm, a = _____

b) c = 52cm, b = 48cm, a = _____

c) c = 58cm, b = 42cm, a = _____

d) c = 52cm, a = 15cm, b = _____

e) c = 78cm, a = 72mm, b = _____

f) c = 0.5cm, b = 0.3cm, a = _____

g) c = 78mm, a = 72mm, b = _____

h) c = 53cm, a = 28cm, b = _____

i) c = 91cm, b = 84cm, a = _____

j) c = 2m, b = $1\frac{3}{5}$ m, a = _____

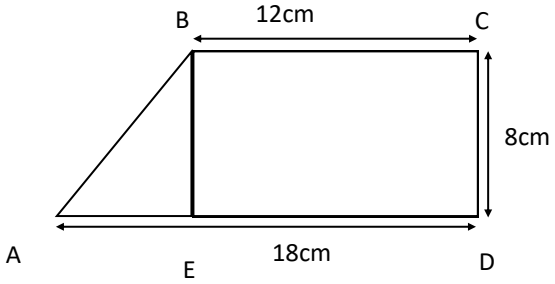
Exercise 3F

Harder Questions

Q1 Answer the following questions to 1 decimal point.

(The diagrams are not to scale)

a)



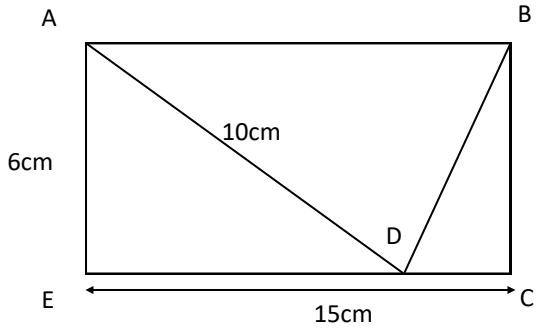
Find:

i) BE _____

ii) AC _____

iii) AB _____

b)



Find:

i) DE _____

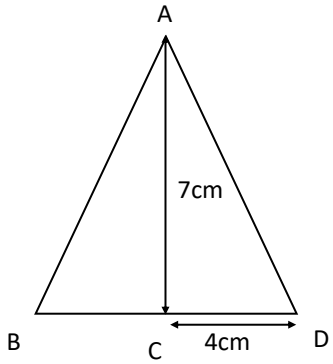
ii) DC _____

iii) DB _____

iv) AB _____

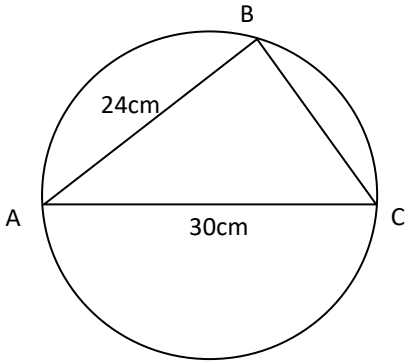
v) BC _____

c)



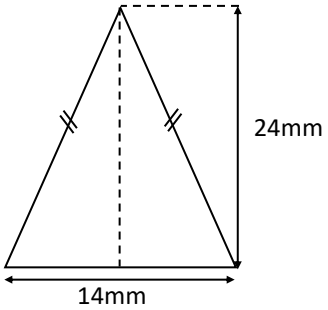
Find AD _____

d)



Find BC _____

e)



Find the length of one of the equal sides of the isosceles triangle.

_____

Ratio and Proportions

Chapter 4

Exercise 4A

Equivalent Ratios

Q1 Express the following ratios in the simplest form.

a) 4 : 6 _____ b) 8 : 12 _____

c) 12 : 16 _____ d) 3 : 18 _____

e) 15 : 20 _____ f) 4 : 16 _____

g) 24 : 32 _____ h) 25 : 30 _____

i) 17 : 34 _____ j) 22 : 33 _____

Q2 Express the ratios in the simplest form.

a) 20 : 30 : 40 _____ b) $\frac{1}{2} : \frac{7}{8}$ _____

c) $\frac{1}{2} : 2\frac{1}{2}$ _____ d) 0.15 : 0.20 _____

e) 0.3 : 0.8 _____ f) 0.14 : 0.07 _____

g) 15 : 25 : 45 _____ h) 28 : 56 : 98 _____

i) $\frac{1}{3} : \frac{2}{3}$ _____ j) 1.75 : 2.25 _____

Q3 Express as ratio in the simplest form

a) 10p : £2 _____ b) 1000g : 2Kg _____

c) 200p : 300p _____ d) 100cm : 2m _____

e) 4ml : 5l _____ f) 5m : 300cm _____

g) 25p : £3 _____ h) 10g : 1kg _____

i) 200m : 4km _____ j) 50m : 1km _____

Q4 Express these ratios in the form of 1 : n.

a) 2 : 3 _____

b) 2 : 4 _____

c) 9 : 10 _____

d) 4 : 20 _____

e) 12 : 4 _____

f) 4 : 1 _____

g) 4 : 12 _____

h) 20 : 36 _____

i) 2 : 15 _____

j) 7 : 3 _____

Exercise 4B

Using Ratios

Q1 Answer the following and express the ratios in the simplest form.

a) Two lengths are in the ratio 2:7. The second length is 84cm. Find the first length.

_____

b) Divide 145 in the ratio of 13:16.

_____

c) The ratio of boys to girls in a maths class is 2: 5. There are 30 girls in the class. How many boys are there?

_____

d) x: 9 = 4: 36 Find x.

_____

e) The ratio of the number of parrots to the number of pigeons owned by Peter is 5 : 3. There are 85 parrots. How many pigeons are there?

_____

f) 6 : x = 24:28. Find x.

_____

g) The speed of two boats is in the ratio of 4 : 3. the speed of the second boat is 21km/h. what is the speed of first boat?

_____

h) Every fourth person entering a netball ground is a female. During one afternoon there was 12680 males. How many females were there?

_____

i) $x : 7 = 12 : 42$, Find x.

_____

j) $1 : x = 2 : 18$, Find x.

_____

Exercise 4C

Proportions

Q1 Complete the following sentences.

a) 420km in 6 hours is a rate of _____ per hour.

b) 56 books bought for £ 1120 is at the rate of _____ per book.

c) If 1260 litres of water flows through a tap in 3 hours, it is a rate of _____ per minutes.

d) Peter works for 9 hours and is paid £1080. His rate of pay is _____ per hour.

Q2 Complete the equivalent rates.

a) 120km / h _____km / min

b) 20l / h _____l / day

c) 18m / min _____m / h

d) £5 / min £_____ / h

Q3 Answer the following questions.

a) Peter drives 240km in 5 hours. Find his average speed. _____

b) Change 90km / h into km / min. _____

c) Mary delivered 420 bottles of milk every morning between 6am to 9am. Find her hourly rate of delivery. _____

d) A car travels at the speed 40m / s. How many kilometres does it travel in 1 hour. _____

e) Peter drives 416km in 13 hours. Find his average speed. _____

f) A car uses petrol at the rate of 5.5l / 100km. How many litres would be used to travel 3000km?

_____

Exercise 4D

Conversions

Q1 Convert the following.

a) 4500g to kg _____

b) 170mm to cm _____

c) 7m to cm _____

d) 8.75km to m _____

e) $\frac{3}{4}$ l to ml _____

f) 8500mm to m _____

g) 7480kg to g _____

h) 170m to cm _____

i) 1.435l to ml _____

j) 450ml to l _____

Q2 Answer the following conversion questions.

a) A can contains a litres of paint thinner. Peter uses 640ml. How much is left? _____

b) The width of the room is 7.5 metres. How many centimetre is this? _____

c) How many 85mm lengths can be cut from 4 metres? _____

d) Richard always wanted to be 2 metres tall. At the present time he measures 1972mm. How much more does he need to grow? _____

e) Kerry measures the length of a room in two sections: 4.5m and 95cm. What is the total length of the room? _____

f) A printing department produces six hundred books per day. Each books weighs 5.2kg. What is the total weight, in tonnes, of one day's production. _____

g) A car is travelling at 210km/h. How many metres does it travel in one minute? _____

h) Around schools, speed is limited 20km / h. A driver is distracted for 5 seconds. What distance does he cover in this time travelling at this speed. _____

i) A car travels at the speed of 42 m/s. How many kilometres does it travels in three hours?

_____

j) A car uses diesel at the rate of 7.5l / 100km. How many litres would be used to travel 7500km.

_____

Algebraic Equations

Chapter 5

Exercise 5A

One step equations (Addition & Subtraction)

Q1 Solve the following equations.

a) $x + 7 = 9$ _____

b) $x - 8 = 12$ _____

c) $x + 2 = 12$ _____

d) $x - 5 = 10$ _____

e) $x + 3 = 14$ _____

f) $x + 7 = 12$ _____

g) $x - 7 = 10$ _____

h) $x + 9 = 21$ _____

i) $x + 1 = 7$ _____

j) $x + 3 = 15$ _____

Q2 Solve the following equations.

a) $7 + a = 11$ _____

b) $8 - a = -7$ _____

c) $a - 7 = -7$ _____

d) $a - 9 = -3$ _____

e) $a + 12 = -3$ _____

f) $x + 9 = 28$ _____

g) $x - 7 = 32$ _____

h) $x - 8 = 20$ _____

i) $x - 12 = 42$ _____

j) $x + 11 = 33$ _____

Q3 Solve the following equations.

a) $x - 4 = 26$ _____

b) $x - 3 = 23$ _____

c) $x - 5 = 15$ _____

d) $x + 9 = 31$ _____

e) $x + 11 = 32$ _____

f) $x - 10 = 30$ _____

g) $x - 22 = 32$ _____

h) $22 + x = 33$ _____

i) $34 + y = 44$ _____

j) $21 + p = 28$ _____

Q4 Solve the following equations.

a) $8 + p = 13$ _____

b) $11 + x = 44$ _____

c) $p + 2 = 42$ _____

d) $m + 1 = 41$ _____

e) $13 + m = 42$ _____ f) $14 + n = 46$ _____

g) $17 + m = 32$ _____ h) $23 + m = 44$ _____

i) $x - 42 = 62$ _____ j) $x - 44 = 72$ _____

Exercise 5B

One step equations (Multiplication & Division)

Q1 Solve the following equations.

a) $3x = 12$ _____ b) $4x = 20$ _____

c) $5x = 15$ _____ d) $7x = 42$ _____

e) $9x = 108$ _____ f) $12x = 144$ _____

g) $2x = 42$ _____ h) $4x = 72$ _____

i) $7x = 56$ _____ j) $11x = 121$ _____

Q2 Solve the following equations.

a) $\frac{x}{7} = 12$ _____ b) $\frac{x}{9} = 7$ _____

c) $\frac{x}{5} = 7$ _____ d) $\frac{x}{10} = 11$ _____

e) $\frac{x}{11} = 8$ _____ f) $\frac{x}{13} = 12$ _____

g) $\frac{x}{8} = 16$ _____ h) $\frac{x}{0.5} = 3$ _____

i) $\frac{x}{2.5} = 4$ _____ j) $\frac{x}{3.5} = 4$ _____

Q3 Solve the following equations.

a) $3x = 42$ _____ b) $7x = 28$ _____

c) $9x = 45$ _____ d) $\frac{x}{8} = 11$ _____

e) $8x = 96$ _____ f) $6x = 108$ _____

g) $\frac{x}{12} = 5$ _____ h) $\frac{x}{13} = 5$ _____

i) $12x = 72$ _____ j) $13x = 65$ _____

Exercise 5C

Two step equations

Q1 Solve the following equations.

a) $2x - 1 = 3$ _____ b) $3x - 1 = 14$ _____

c) $\frac{x}{5} + 1 = 6$ _____ d) $\frac{x}{7} - 1 = 6$ _____

e) $4x + 5 = 29$ _____ f) $6x - 1 = 35$ _____

g) $7x - 2 = 26$ _____ h) $8x + 3 = 11$ _____

i) $\frac{x}{11} + 1 = 20$ _____ j) $\frac{x}{6} - 1 = 7$ _____

Q2 Solve the following equations.

a) $4x + 7 = 43$ _____ b) $\frac{x}{3} + 7 = 12$ _____

c) $5a - 2.5 = 6.5$ _____ d) $\frac{x - 2}{3} = 8$ _____

e) $\frac{x - 5}{4} = 5$ _____ f) $\frac{x - 7}{3} = 4$ _____

g) $\frac{x}{7} - 1 = 28$ _____ h) $5x - 1 = 24$ _____

i) $\frac{x - 9}{3} = 6$ _____ j) $\frac{x - 8}{4} = 7$ _____

Q3 Solve these equations.

a) $2m - 7 = 17$ _____ b) $3p - 2 = 13$ _____

c) $8m - 2 = 14$ _____ d) $7y - 1 = 27$ _____

e) $x - 32 = 12$ _____ f) $x - 12 = 13$ _____

g) $2x - 5 = 17$ _____ h) $m - 20 = 30$ _____

i) $3y + 3 = 18$ _____ j) $7y + 1 = 29$ _____

Exercise 5D

Expressions on both sides

Q1 Solve the following equations.

a) $5x - 9 = 3x + 11$ _____ b) $6x + 9 = 2x - 7$ _____

c) $8m + 11 = 7m - 4$ _____ d) $6 - 5x = 9 - 2x$ _____

e) $6m - 13 = 9m - 15$ _____ f) $2m + 3 = m - 7$ _____

g) $4p + 10 = 7p - 2$ _____ h) $4x - 3 = 3x + 12$ _____

i) $5x - 4 = 3x + 12$ _____ j) $3x + 5 = x + 11$ _____

Q2 Solve the following equations.

a) $7m + 15 = -3 - 2m$ _____ b) $m - 13 = 2m - 12$ _____

c) $9m - 20 = 7m + 32$ _____ d) $9x - 6 = 7x + 10$ _____

e) $12x - 12 = 13x + 33$ _____ f) $3p + 1 = 2p - 4$ _____

g) $3x + 8 = 2x + 9$ _____ h) $5t - 7 = 4t + 8$ _____

i) $4t - 5 = 3t + 7$ _____ j) $t - 13 = 7t + 5$ _____

Q3 Solve the following equations.

a) $4x - 11 = 7x - 13$ _____ b) $10t - 5 = 7t - 2$ _____

c) $13p - 29 = 31 - 7p$ _____ d) $5x - 3 = 4x + 12$ _____

e) $t - 15 = 2t + 11$ _____

f) $2m - 20 = 9m - 6$ _____

g) $9x - 5 = 7x + 5$ _____

h) $5m - 4 = m + 12$ _____

i) $8x - 12 = 13x + 33$ _____

j) $7m - 1 = 5m + 13$ _____

Exercise 5E

Equations with brackets

Q1 Solve the following equations.

a) $2(2m + 3) = 18$ _____

b) $2(t + 3) = 18$ _____

c) $3(6y - 1) = 69$ _____

d) $2(3x - 4) = 28$ _____

e) $4(3m + 6) = 48$ _____

f) $4(x + 1) = 28$ _____

g) $5(4y + 1) = 65$ _____

h) $5(2x - 1) = 35$ _____

i) $3(4t - 7) = 39$ _____

j) $4(2x + 3) = 76$ _____

k) $3(7x + 5) = 57$ _____

l) $3(6x + 4) = 138$ _____

m) $5(3p + 2) = 55$ _____

n) $5(x - 2) = 0$ _____

Q2 Solve the following equations.

a) $2(x + 5) = 10$ _____

b) $2x + (x + 1) = 13$ _____

c) $6(m - 2) = 18$ _____

d) $-3(x + 1) = 12$ _____

e) $-2(2x - 1) = -18$ _____

f) $7(x - 2) = 21$ _____

g) $3(4x - 4) = 18$ _____

h) $8(2t - 1) = 64$ _____

i) $2(5m - 1) = 28$ _____

j) $4(x - 2) = 3(x + 2)$ _____

k) $6(y - 8) = 5(y - 1)$ _____

l) $5(2t + 3) = 25$ _____

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2	Non verbal Reasoning (Apple)	Published	M.Nat
3	Easy Going Verbal reasoning B1	Published	M.Nat
4	Easy Going Non Verbal reasoning	Published	M.Nat
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6	Easy Going Mathematics Book 2	Published	M.Nat
7	Easy Going Mathematics Book 3	Published	M.Nat
8	Easy Going Mathematics Book 4	Published	M.Nat
9	Easy Going Mathematics Book 5	In Print	M.Nat
10	Easy Going Mathematics Year 3	Published	M.Nat
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