Year 9 Mathematics

End Term 1

50 marks

45 mins

Date

Instructions: 1. Answer all questions 2. Calculators permitted

Question 1 (15 marks - 1 mark each)

a) Write each of the following in index form:

i) $10\times10\times10\times10\times10$ **ii)** $x\times x\times x\times x$ **iii)** $^{-}3\times{}^{-}3\times{}^{-}3\times{}^{-}3\times{}^{-}3$

b) Use the Index Laws to simplify each of the following:

i) $2^5\times2^{-2}$ **ii)** $10^8\times10^{-5}$ **iii)** $x^6\times x^{-3}$ **iv)** $6x^5\times x^{-3}$

v) $3^3\div3^{-6}$ **vi)** $10^{-7}\div10^{-3}$ **vii)** $x^{-4}\div x^8$ **viii)** $9x^4\div3x^{-3}$

c) Use the Index Laws to simplify each of the following:

i) $(2^{-2})^3$ **ii)** $(3^{-2})^{-3}$ **iii)** $(b^2)^3$ **iv)** $(10^{-1})^{-4}$

Question 2 (12 marks - 1 mark each)

a) Simplify the following expressions:

i) $5x-7x$ **ii)** $^{-}3x^2\times{}^{-}5x$ **iii)** $12x\div4$ **iv)** $^{-}30x^5y^6z\div24x^3y^3$

b) Expand each of the following:

i) $5(x+3)$ **ii)** $^{-}4x(2y-4x)$

c) Simplify each of the following by expanding and then collecting like terms:

i) $2(x+1)+5(x+3)$ **ii)** $^{-}4b(3b-2)+{}^{-}2(b-1)$

iii) $(x+1)(x+3)$ **iv)** $(x+1)^2$

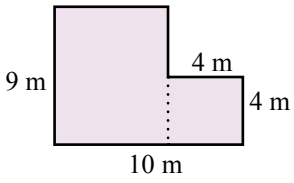
d) Factorise each of the following:

i) $5x+10$ **ii)** $24x^3-12x^2$

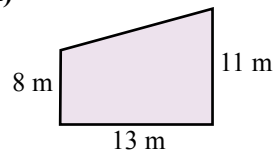
Question 3 (14 marks - 2 marks each)

a) Calculate the area of each of the following composite shapes:

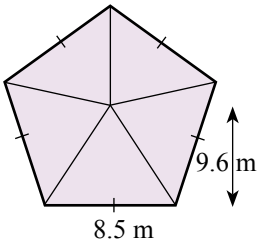
i)



ii)

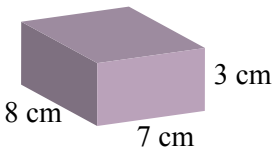


iii)

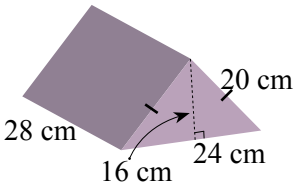


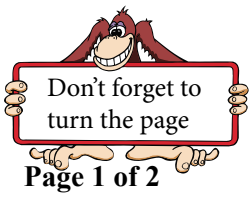
b) Find the surface area of each of the following prisms:

i)



ii)

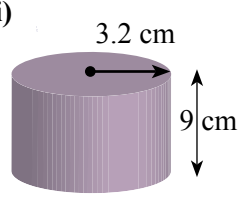




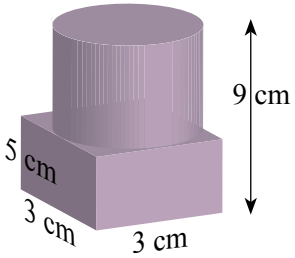
Question 3 continued

b) Find the surface area of each of the following prisms:

iii)



iv)



Question 4 (9 marks)

a) Write a rule for the following pattern:

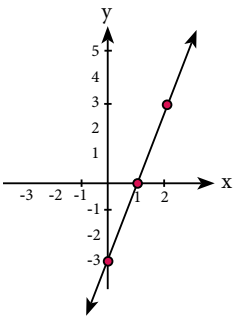
 (1)

b) Write a rule for the following table: (1)

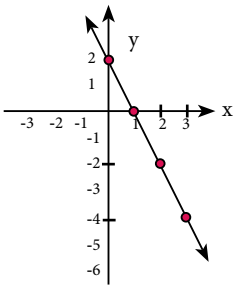
x	1	2	3	4	5	10	20
y	⁻5	⁻2	1	4	7	22	52

c) Write a rule for each of the following graphs: (1,1)

i)



ii)



d) Draw a sketch of: $y = 2x - 2$ (3)

e) Sketch $x^2 + y^2 = 9$. (2)

x	⁻3	⁻2	0	2	3
$x^2 + y^2 = 9$	0	$\sqrt{5}$ or $^-\sqrt{5}$	3 or ⁻3	$\sqrt{5}$ or $^-\sqrt{5}$	0

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Year 9 Mathematics

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Instructions: 1. Answer all questions 2. Calculators permitted

Question 1 (15 marks - 1 mark each)

a) Write each of the following in index form:

i) $10\times10\times10\times10$ **ii)** $x\times x\times x\times x\times x\times x\times x$ **iii)** $^{-}5\times{}^{-}5\times{}^{-}5\times{}^{-}5\times{}^{-}5$

b) Use the Index Laws to simplify each of the following:

i) $3^6\times3^{-2}$ **ii)** $10^4\times10^{-5}$ **iii)** $x^7\times x^{-5}$ **iv)** $3x^5\times2x^{-3}$

v) $2^3\div2^{-6}$ **vi)** $10^{-4}\div10^{-7}$ **vii)** $x^{-2}\div x^8$ **viii)** $12x^5\div4x^{-3}$

c) Use the Index Laws to simplify each of the following:

i) $(2^{-2})^4$ **ii)** $(5^{-2})^{-4}$ **iii)** $(a^2)^3$ **iv)** $(10^{-2})^{-3}$

Question 2 (12 marks - 1 mark each)

a) Simplify the following expressions:

i) $5x-4x$ **ii)** $^{-}4x^2\times{}^{-}5x$ **iii)** $15x\div3$ **iv)** $^{-}20x^7y^3z\div5x^3y^2$

b) Expand each of the following:

i) $2(2x+3)$ **ii)** $^{-}5x(2y-x)$

c) Simplify each of the following by expanding and then collecting like terms:

i) $3(x+2)+4(x+1)$ **ii)** $^{-}2b(b-3)+{}^{-}2(b-1)$

iii) $(x+2)(x+1)$ **iv)** $(x+2)^2$

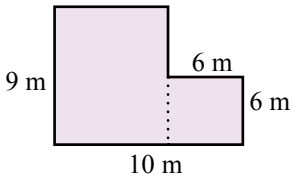
d) Factorise each of the following:

i) $4x+10$ **ii)** $21x^5-14x^2$

Question 3 (14 marks - 2 marks each)

a) Calculate the area of each of the following composite shapes:

i)



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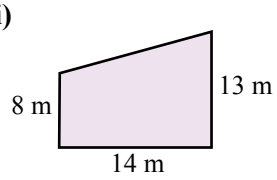
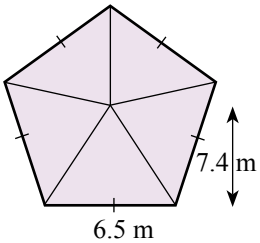
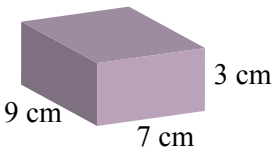


iii)

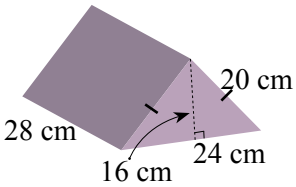


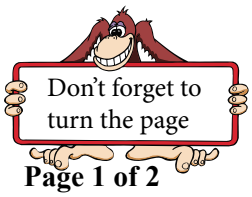
b) Find the surface area of each of the following prisms:

i)



ii)

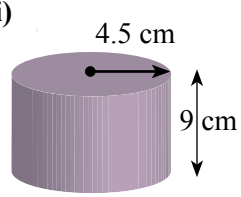




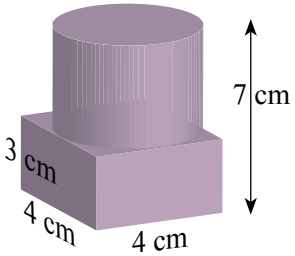
Question 3 continued

b) Find the surface area of each of the following prisms:

iii)

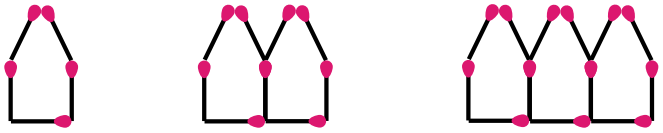


iv)



Question 4 (9 marks)

a) Write a rule for the following pattern:

 (1)

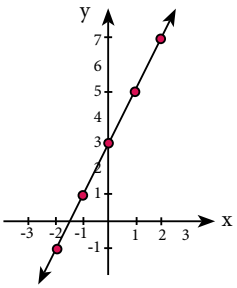
b) Write a rule for the following table:

x	1	2	3	4	5	10	20
y	⁻7	⁻3	1	5	9	29	69

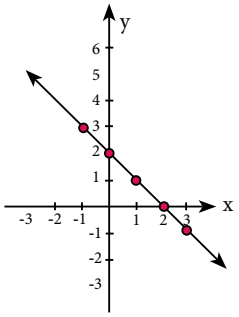
(1)

c) Write a rule for each of the following graphs: (1,1)

i)



ii)



d) Draw a sketch of: $y = 2x - 3$ (3)

e) Sketch $x^2 + y^2 = 9$.

x	⁻2	⁻1	0	1	2
$x^2 + y^2 = 5$	1 or ⁻1	2 or ⁻2	$\sqrt{5}$ or $-\sqrt{5}$	2 or ⁻2	1 or ⁻1

(2)

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