TOPIC: ALGEBRAIC EQUATIONS							
LESSON 3							
TERM	2	WEEK		GRADE	9		
DURATION	1 hour	DATE					
CONCEPTS S	KILLS	Solve equations by	inspection				
RELATED CO	DNCEPTS / T	ERMS / VOCABU	LARY / EAC				
Substitution; Ec	quality; Consta	nt; Co-efficient					
PRIOR-KNOW	VLEDGE / B.	ACKGROUND KN	OWLEDGE				
Seeing equal sig	gn as represent	ting equivalence; Dis	stributive propert	y; Commutative a	and associative		
property; Invers	ses and inverse	e operations; The ide	a of balancing the	e equation			
RESOURCES							
Wits Maths Cor	nnect Supporti	ng Secondary Maths	(WMCS Equation	ons); Mathematic	s TODAY Grade 9		
learners' Book;	Mathematics	Grade 9 Examination	n Aid; Classroom	mathematics			
ERRORS/MIS	CONCEPTIO	DNS / PROBLEM A	AREAS				
Seeing equal sig	gn as used to n	nean " and the answe	er is" instead of s	aying "same as"			
METHODOLO	DGY						
Examples	-						
Solve the follow	wing equations	s by inspection					
1. $x - 4$	4 = 11						
2. $x + 1$	0 = 25						
3. 2x - 4	-3 = 24						
4. $2(x - x)$	-3) = 24						
5. $x+9$	9 = 12 + 3 - 9						
ACTIVITIES/A	ASSESSMEN						
Solve the follow $1 - 5x + 7 =$	ving equations	by inspection:					
1. $3x + 7 =$	= -3 9						
2. $0 - x = 1$	o - 50						
4 4(x-4)	= 50) = 60						
5 27 - 6x	, = 00 · ⊥ 3						
5. $27 = 6x$	- 11						
7. 3x = 12							
8. $\frac{3x}{4} + 5 =$	= 14						
4							
9. $\frac{x}{2} - 3 =$	9						
10. $\frac{x}{2} = 5 - \frac{1}{2}$	$-\frac{x}{3}$						
11. $x + 7 = 3$	3x - 15						
Question 10 and	11 was includ	ded for the purpose of	of preparing learn	ers for next lesso	on: solving		
equations using multiplicative and additive inverses.							

TOPIC: ALGEBRAIC EQUATIONS									
LESSON 4									
TERM		2	WEEK			GRADE	9		
DURATI	ON	1 hour	DATE						
CONCEP	TS and SI	KILLS	Solve Equation	s By u	sing Additive	and Multiplica	ative Inverses		
(equations with variables on one side)									
RELATED CONCEPTS / TERMS / VOCABULARY / EAC									
Constant.	Additive in	verse, multiplic	ative inverse, C	o-effic	ient, Distribu	tive law			
PRIOR-K		DGE / BACKG	ROUND KNO	WLEI	DGE	• • .•	I		
Seeing equ	ial sign as e	equivalence; Di	stributive proper	rty; Co	mmutative an	id associative p	roperty; Inverses		
RESOUD	crs	s; Addition of I	ike terms						
NESOUR	te Mathe C	onnoot Sunnort	ing Secondary N	Aaths(WMCS Equa	tions): Mathem	atics TODAY		
Gr	ade 9 learne	ers' Book Mat	nematics Grade (9 Exan	vination Aid	Classroom mat	hematics		
ERRORS		CEPTIONS / I	PROBLEM AR	EAS	initation / na,				
Inv	alid distrib	ution of bracke	ts: Deletion error	r; Tran	sposition erro	or; Sign errors;	Interference of		
nev	w/old know	ledge	,	,	1	<i>, , , , , , , , , ,</i>			
METHOI	OOLOGY	-							
Worked ex	amples								
Solve for	x:								
1. $x + 5 =$	= 7								
2. $2x+3$	= 7								
3. 11 = 3	x-4								
4. $4(x +$	5) = 40								
5. $3(x+1)$	(2) + 5 = 23								
Solutions	5								
1.	x + 5 = 7								
Step 1	Add -5, th	ie additive inve	rse of 5 on both	side o	f the equation	L			
a .	x + 5 + (-5)	(-5) = 7 + (-5)							
Step 2	Simplify	7 5							
Stan 3	x + 5 - 5 =	7-3							
Step 5	r = 2	terms							
	$\dots x - L$								
2	2x + 3 = 7								
Step 1	Subtract 3	to both sides of	the equation so	that co	onstant terms	sum to zero on	the left hand		
	Side		1						
	2x + 3 - 3	= 7 - 3							
	We get								
	2x = 4								
Step 2	We are loo	oking for x not	2x, therefore we	e multi	ply both sides	by the multipl	icative inverse		
	of 2								
	$2x \times \frac{1}{2} =$	$4 \times \frac{1}{2}$							
Step 3	∠ Simnlifv	Z V	$\therefore x = 2$						
	py	,							

Note: In example 1 we added negative 5. We could also have said "subtract 5" because adding a negative number" is the same as "subtracting a positive number". In example 2, we multiplied by the								
negative number is the same as subtracting a positive number . In example 2, we multiplied by the								
multiplicat	multiplicative inverse of 2 which is $\frac{1}{2}$. We could have also said "divide by 2" because dividing 2" is the							
same as "m	same as "multiplying by $\frac{1}{2}$ "							
3.	11 = 3x - 4							
Step 1	Add the additive inverse to both sides of the equations	11 + 4 = 3x - 4 + 4						
Step 3	Add the like terms	15 = 3x						
Step 4	Divide both side by 3	$\frac{15}{3} = \frac{3x}{3}$						
		2						
Step 5	Simplify	$\therefore 5 = x$						
4	4(x+5) = 40							
Step 1	Remove brackets by applying the distributive law	4x + 20 = 40						
Step 2	Add the additive inverse to both sides of the equation	4x + 20 - 20 = 40 - 20						
Step 3	Add the like terms	4x = 20						
Step 3	Divide both sides by 4	$\frac{4x}{4} = \frac{20}{4}$						
Step4	Simplify	$\therefore x = 5$						
Step								
2	(x + 2) + 5 - 23							
5. 5.	$(x + z) + 5 - z_5$ Bomove brackets by applying the distributive law	3r + 6 + 5 = 23						
Step 1 Step 2	Add like terms on the left hand side of the equation	3x + 11 = 23						
Step 4	Add the additive inverse of +11 to both side of the equat	tion $3x + 11 - 11 = 23 - 11$						
Step 5	Add the like terms	3x = 12						
Step 4	Divide by the 3 to both sides of the equation	$\frac{3x}{2} = \frac{12}{2}$						
Step 5	Simplify	3 3						
Sup 5	Simping							
ACTIVIT	IES/ASSESSMENTS							
1. Solv	ve for the variables in each of the following 6x + 1 = 17	$3 3\nu - 8 = 19$						
1.1	0x = 1 - 17 $12 2p + 3 - 13$							
1.4	17 = 3 + 3x 1.5 3 = -3 + 3x 1.	$6 - \frac{-x}{2} + 2 = 14$						
2. So	lve for x							
2.1	2(x+5) = 8 2.2 $4(x+3) = 32$ 2.	3 2(3x+1) = 14						
2.4	$3(2x-1) = 9 \qquad 2.5 2(x+1) + 3 = 9 \qquad 2.$	6 2(x-5) + 17 = 23						
1								

3. Solve for x
$$3.1 \quad 3(x+1) + 2(2x+3) = 23$$
 $3.2 \quad 2(3x+4) + 2x = 64$ $3.3 \quad 5x + 3(6-x) = 14$ $3.4 \quad 4x - 4 - 2(x+3) - 4 = 8$

TOPIC: ALGEBRAIC EQUATIONS							
LESSON 5							
TERM	2	WEEK		GRADE	9		
DUDATION	1 hour	DATE					
DUKATION	Thou	DATE			T		
CONCEPTS SE	alls s	olve Equations By a	using Additive and	Multiplicative	Inverses		
DELATED CO	NCEDTS / TED		ADV / FAC	5)			
Constant Additi	NCEPIS/IEN	inlicative inverse C	o-efficient Distrib	utive law			
PRIOR-KNOW	LEDGE / BAC	KGROUND KNO	WLEDGE				
• Seein	g equal sign as e	equivalence					
• Distri	ibutive property	1					
• Com	nutative and ass	ociative property					
• Inver	ses and inverse o	operations					
• Ident	ify and Addition	of like terms					
RESOURCES							
Wits Maths Con	nect Supporting	Secondary Maths(V	WMCS Equations)	; Mathematics	IODAY Grade 9		
learners' Book; I	Mathematics Gra	ade 9 Examination A					
ERRURS/MISC	CONCEPTION	e signs					
	iout changing th	c signs					
METHODOLO	GY						
1. Solve for x	•						
1.1 5x - 8 =	2x + 4						
1.2 2 - 3x =	=7-x						
1.2 3x + 5 =	1 - x						
1.4 $5(x-4)$	=3(x+2)+8						
	CORCOMENTS						
ACTIVITIES/A	SSESSMEN I S)					
1. 30100 101	*						
1.1 <i>x</i> +	7 = 3x - 15	1.2 15	-2x = 9x - 7	1.3	6x + 3 = x - 27		
1.4 7 <i>x</i> -	1.4 $7x-5 = 4x+16$ 1.5 $3x+6 = -10-5x$ 1.6 $3x-6 = x+2$						
2. Solve for	x						
1.1 x+	7 = 3x - 15	1.2 15	-2x = 9x - 7	1.3	6x + 3 = x - 27		
1.4 7 <i>x</i> -	-5 = 4x + 16	1.5 3.	x+6=-10-5x	1.6	3x - 6 = x + 2		

3.	Solve for x	
	2.1 $3(x+3) = 2(2x-3)$	2.2 $3(x-1) - 24 = 2(-1-x)$
	2.3 $6(x-1) - x = -2(x+1) + x - 1$	2.4 $3(x+2) = -3(x-1) + 9$
	2.5 $-4(x+3)+5=2(x-6)-1$	2.6 $(x-2)^2 + 3x - 2 = (x+3)^2$

TOPIC: ALGEBRAIC EQUATIONS									
		LES	SON 6						
TERM	3	WEEK	2	GRADE	9				
DURATION	1 hour	DATE			•				
CONCEPTS S	KILLS	Solve Equations By	using Additive	and Multiplicativ	e Inverses				
		(equations with fra	ctions)						
RELATED CONCEPTS / TERMS / VOCABULARY / EAC									
Constant. Addit Factor (HCF)	Constant. Additive inverse, multiplicative inverse, Co-efficient, Distributive law, Highest Common Factor (HCF)								
PRIOR-KNOW	VLEDGE / BA	ACKGROUND KN	OWLEDGE						
Seeing equal sig	gn as equivaler	nce; Distributive proj	perty; Commutat	ive and associativ	ve property;				
Inverses and inv	verse operation	ns; Addition of like to	erms						
RESOURCES									
Wits Maths Cor	nnect Supportin	ng Secondary Maths	(WMCS Equation	ons); Mathematic	s TODAY Grade 9				
learners' Book;	Mathematics	Grade 9 Examination	h Aid; Classroom	mathematics					
ERRORS/MIS	CONCEPTIC	ONS / PROBLEM A	REAS	~! T /	former of mount				
Invalid distribut old knowledge	ion of bracket	s; Deletion error; Tra	insposition error	; Sign errors; Inte	erference of new/				
METHODOLO	DGY								
1. Solve fo	r x				2 5				
1.1	$\frac{x}{4} + \frac{x}{2} = 3$	3		1.2	$\frac{p}{4} - \frac{2p}{3} = \frac{5}{6}$				
1.3	$\frac{y+3}{4}-\frac{y}{4}$	$\frac{x+2}{8} = \frac{y}{2} - 1$		1.4	$\frac{a+1}{2} - \frac{2a}{3} = 1$				
ACTIVITIES/	ASSESSMEN	TS							
1 Solve th	e following ed	Juations							
1. 50170 1		1							
1.1	$\frac{5x}{4} - \frac{10x}{3} = 15$		1.1	$\frac{5x}{3} + 3 = -\frac{2x}{5}$					
1.3	$\frac{3x}{2} - \frac{15}{2} = \frac{2x}{3}$	$-\frac{5}{3}$	1.4	$\frac{x}{5} = \frac{3}{35} + \frac{x+1}{7}$					
1.5	$\frac{3x}{2} + \frac{2}{3} = \frac{1}{2} + 3$	$x+\frac{7}{6}$							
2. Solve	for the unknov	vn variable in each o	f the following e	quations					

2.1
$$\frac{x+2}{3} - \frac{x+3}{2} = 5$$

2.2 $\frac{a+1}{2} - \frac{a+2}{3} = 2 + \frac{a+3}{4}$
2.3 $\frac{p+1}{3} - \frac{5p-1}{2} = \frac{2p-4}{2}$
2.4 $\frac{2k}{5} + \frac{2k-18}{3} + \frac{k}{3} = 3k-2$

	TOPIC: ALGEBRAIC EQUATIONS								
	LESSON 7								
TE	RM	3	WEEK	2	GRADE	9			
DU	RATION	1 hour	DATE						
CO	NCEPTS an	d SKILLS Sol	ve equations by u	sing laws of expo	nents				
RE	LATED CO	NCEPTS / TER	MS / VOCABUL	ARY / EAC		Et			
Con	stant. Additi	ve inverse, multip	olicative inverse, (Co-efficient, Distr	ibutive law, Base	, Exponent,			
Pow	/er								
PRI	OR-KNOW	LEDGE / BACK	KGROUND KNO	DWLEDGE					
Und	lerstanding o	f Prime Numbers;	; literal equations						
RES	SOURCES								
Calc	culator								
ERI	RORS/MISC	CONCEPTIONS	/ PROBLEM AF	REAS					
Con	fusing bases	with exponents							
ME	THODOLO	GY							
Exa	mples:								
Solv	e for the unk	nown							
1.1	$5^{x} = 25$	1	.4 $3^x + 3 = 83$	1.'	7 $2.3^x = 18$				
1.2	$a^2 = 49$	1.	$.5 v^3 = 1000$	1.8	$x^3 = 64$				
1.3	$2^{x-3} = 16$	1.	6 $3^{2x} = \frac{1}{27}$						
AC	FIVITIES/A	SSESSMENTS							
Solv	e for the unk	nown							
1.1	$2^m = 32$	1.	$6 3^x = 81$	1.	$11 5.5^x = 100$				
1.2	$m^2 = 225$	1.	7 $x^3 = 729$	1.	12 $3n^2 = 27$				
1.3	$2^{x+3} = 128$	1.	8 $3^{x-1} = 27$	1.	13 $3^{3x+1} = 81$				
1.4	$5^{-x} = \frac{1}{25}$	1.	9 $5^x = \frac{1}{125}$	1.	14 $x^2 = \frac{1}{64}$				
1.5	$9^{x} = 1$	1.	10 $7^{x+1} = 1$	1.	$15 13^{2x-1} = 1$				

TOPIC: ALGEBRAIC EQUATIONS							
LESSON 9							
TEDM	3	WFFK	2	GRADE	9		
	5	WEEK	2	GRADE	,		
DURATION	2 hours	DATE					
CONCEPTS SI	KILLS Sol	ve Equations of the	ne form : a produ	ct of factors $= 0$			
RELATED CO	NCEPTS / TER	MS / VOCABUL	ARY / EAC				
Equations							
PRIOR-KNOW	VLEDGE / BACH	KGROUND KNC	WLEDGE				
Multiplication;	Multiplication						
RESOURCES							
DBE Workbook							
ERRORS/MIS	CONCEPTIONS	/ PROBLEM A	REAS				
Confusion betwee	een Multiplication	l					
METHODOLO	OGY						
Examples							
Solve for x							
1. $(x+3)(x-7)$) = 0						
2. andDivision							
ACTIVITIES/A	ASSESSMENTS						
1. Solve fo	or x						
1.1 $(x-3)(x+$	(4) = 0	1.2 $(x-2)(x+3)$) = 0 1.3	(2x+3)(x+1) =	0		
		• • •					
2. Solve fo	or x						
2.1 $x(x-3) =$	0	2.2 $5x(x-1) = 0$	2.3	x(x+5) = 0			

TOPIC: ALGEBRAIC EQUATIONS							
LESSON 10							
TERM	3	WEEK	2	GRADE	9		
DURATION	1 hour	DATE					
CONCEPTS SI	KILLS Sol	ve equations of the	he form: a product	t of factors $= 0$			
RELATED CO	NCEPTS / TERM	MS / VOCABUL	ARY / EAC				
Multiplication							
PRIOR-KNOW	LEDGE / BACK	KGROUND KNO	OWLEDGE				
Common Factor							
DESOUDCES							
RESOURCES							
EDDODS/MIS	CONCEPTIONS	/ PROBLEM A	REAS				
Confusing Multi	plication and Div	ision					
Confusing Main							
METHODOLC	OGY						
Worked examp	les						
Solve for x							
1. $3x^2 - 18$	x = 0						
2. $x^2 - 3x - 3$	-10 = 0						
3. $x^2 + 2x$	= 24						
4. $x^2 - 25$	= 0						
ACTIVITIES/A	ASSESSMENTS						
1. Solve for	rx			2 -			
a) 2	$2x^2 + 10x = 0$	b) $x^2 -$	4x = 0	c) $x^2 + 3x$	= 0		
2. Solve for	r x						
<i>a</i>) 5(<i>x</i>	(-4) = 60	b) $x(x-1)$	+2(x-1)=0	c) $x^2 - 7x + 6$	$\mathbf{b} = 0$		
d) x^2	+x = 12	<i>e</i>) $5x^2 + 25$	5x = 30	f) $2x^2 - 10x =$	= 72		
σ) $3r^2$	+18x = -24	$h) x^2 = x + \frac{1}{2}$	⊦ 56	<i>i</i>) $21x - 72 =$	$-x^2$		
5, 51		,					