basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

MARKS: 140

Important Information

- This is a marking guideline. In instances where learners have used different but mathematically sound strategies to solve the problems they (learners) should be credited.

- Unless stated otherwise, learners who give a correct answer only, should be awarded full marks.

- Underline errors committed by learners and apply Consistent Accuracy (CA) marking. See answer for question 3.1.1.

- In questions 9, 10 and 11, penalise only once if learners leave out the angle or the degree notation.

This memorandum consists of 8 pages

KEY	
M	Method mark
CA	Consistent Accuracy mark
A	Accuracy mark

QUESTION 1

1.	1.1	**B**	1.2	**A**	1.3	**D**	1.4	**B**	1.5	**D**	Give 1 mark for each correct answer.	
	1.6	**D**	1.7	**C**	1.8	**D**	1.9	**C**	1.10	**A**		**[10]**

QUESTION 2

2.1.1	2✓**A**	Answer: 1 mark	(1)
2.1.2	24✓**A**	Answer: 1 mark	(1)
2.2	HCF is 6✓**A**	Answer: 1 mark	(1)
2.3	$3,19$✓ $\times 10^{-7}$✓**A**	$3,19$: 1 mark 10^{-7}: 1 mark Answer only: 2 marks	(2)
2.4.1	$2^3 \times 2^1 \qquad$ or $\qquad 2^3 \times 2^1$ $= 2^4$✓**A** $\qquad\qquad = 8 \times 2$✓**A** $= 16$ ✓**CA** $\qquad\qquad = 16$✓**CA**	Calculation: 1 mark Answer: 1 mark Answer only: 2 marks	(2)
2.4.2	$\dfrac{3^2 \times 5^4}{5^3}$ $= 9 \times 5$✓**A** $= 45$✓**CA**	Calculation: 1 mark Answer: 1 mark Answer only: 2 marks	(2)
2.4.3	$2^{-2} + \left(\dfrac{1}{2}\right)^0$ $= \dfrac{1}{4} + 1$✓✓**A** $= 1\frac{1}{4}$✓**CA** or $\frac{5}{4}$✓**CA** or $1,25$✓**CA**	$\frac{1}{4}$ or $1,25$: 1 mark 1: 1 mark Answer: 1 mark Answer only: 3 marks	(3)
			[12]

QUESTION 3

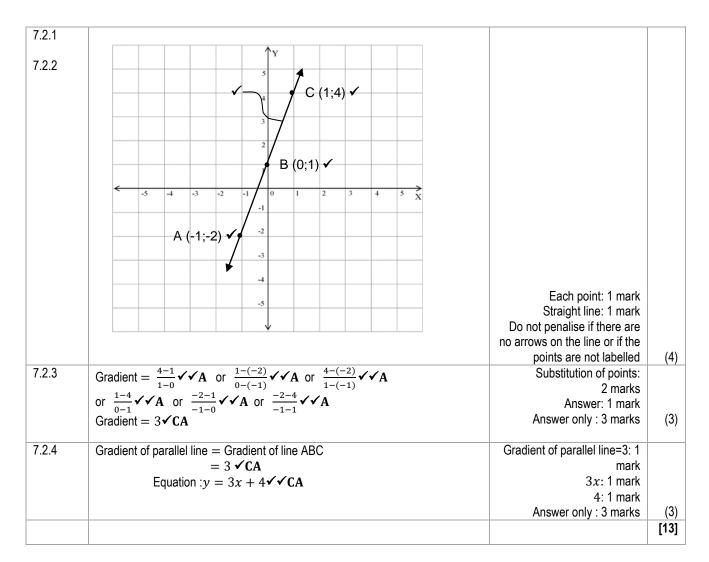| 3.1.1	$3(x-1) - 4(x-2)$ $= 3x - 3 - 4x + 8$✓✓**M** $= -x + 5$✓**CA** **NOTE IF:** $3x - 3$✓$- 4x - \mathbf{8}$ $= -x - \mathbf{5},$ give 1 mark out of 3 or $3x - 3$✓$- 4x - \mathbf{8}$ $-x - \mathbf{11}$✓, give 2 marks out of 3	$3x - 3$:1 mark $-4x + 8$: 1 mark Answer: 1 mark	(3)
3.1.2	$(x+3)^2 + 4$ $= x^2 + 6x + 9 + 4$✓✓✓**M** $= x^2 + 6x + 13$✓**CA**	x^2: 1 mark $6x$: 1 mark 9: 1 mark Answer: 1 mark	(4)
3.2.1	$\dfrac{5x^3 \times (2x)^2}{20x^4}$ or $\dfrac{5x^3 \times (2x)^2}{20x^4}$ $= \dfrac{5x^3 \times 4x^2}{20x^4}$✓**M** $= \dfrac{x^3 \times 4x^2}{4x^4}$✓**M** $= \dfrac{20x^5}{20x^4}$✓**CA** $= \dfrac{x^5}{x^4}$✓**CA** $= x$✓**CA** $= x$✓**CA**	$4x^2$: 1 mark Simplification: 1 mark Answer: 1 mark	(3)
3.2.2	$\dfrac{3x+2}{2} + \dfrac{3+x}{3} - \dfrac{7}{6}$ $= \dfrac{3(3x+2) + 2(3+x) - 7}{6}$✓**M** ✓**M** $= \dfrac{9x + 6 + 6 + 2x - 7}{6}$ ✓**CA** $= \dfrac{11x+5}{6}$ ✓**CA**	If no denominator: 0 marks Common denominator of 6: 1 mark Accept any multiple of 6 as a denominator. $3(3x + 2) + 2(3 + x) - 7$: 1 mark Simplification: 1 mark Answer: 1 mark	(4)
			[14]

QUESTION 4

4.1	$x^2 - xy$ $= x(x - y)$✓✓**A**	x: 1 mark $x - y$: 1 mark	(2)
4.2	$2(x+y) - t(x+y)$ $= (x+y)(2 - t)$ ✓✓**A**	$(x+y)$:1 mark $(2-t)$:1 mark	(2)
4.3	$x^2 - 81$ $= (x-9)(x+9)$ ✓✓**A** or $(x+9)(x-9)$ ✓✓**A**	$(x-9)$:1 mark $(x+9)$:1 mark	(2)
4.4	$x^2 + 7x + 6$ $= (x+6)(x+1)$✓✓**A** or $(x+1)(x+6)$✓✓**A**	$(x+6)$:1 mark $(x+1)$:1 mark	(2)
			[8]

QUESTION 5

5.1	$2x + 6 = 0$ $\qquad 2x = -6$✔**M** $\qquad \therefore \ x = -3$✔**CA**	$2x = -6$: 1 mark Answer: 1 mark Answer only: 2 marks	(2)
5.2	$\dfrac{2x - 1}{3} + x + 2 = 0$ x by 3 $\qquad 2x - 1 + 3x + 6 = \ 0$✔**M** $\qquad\qquad 5x + 5 = \ 0$✔**CA** $\qquad\qquad\quad 5x = -5$✔**CA** $\qquad\qquad\qquad x = -1$✔**CA**	Multiplication by LCD: 1 mark Simplification: 1 mark $5x = -5$: 1 mark Answer: 1 mark	
	or $\quad \dfrac{2x-1}{3} + x + 2 = 0$ $\qquad\qquad \dfrac{2x-1}{3} = -x - 2$ ✔**M** $\quad \times 3 : \quad 2x - 1 = -3x - 6$✔**CA** $\qquad\qquad 5x = -5$✔**CA** $\qquad\qquad x = -1$✔**CA**	$RHS = -x - 2$: 1 mark Multiplication by LCD: 1 mark $5x = -5$: 1 mark Answer: 1 mark	(4)
5.3	$(x + 4)(x - 4) = 0$ $x + 4 = 0$ or $x - 4 = 0$✔✔**M** or $x^2 - 16 = 0$✔✔**M** $\quad x = -4$ of $\quad x = 4$✔✔**A** $\qquad x^2 = 16$ $\qquad\qquad\qquad\qquad\qquad\qquad\quad x = \pm 4$✔✔**A**	$x + 4 = 0$: 1 mark $x - 4 = 0$: 1 mark $x = -4$: 1 mark $x = 4$: 1 mark Answer only: 4 marks	(4)
5.4	$x^2 + x - 6 = 0$ $(x + 3)(x - 2) = 0$ ✔✔**M** $x + 3 = 0$ or $x - 2 = 0$ $\quad x = -3$ or $x = 2$✔✔**CA**	Factors: 2 marks $x = -3$: 1 mark $x = 2$: 1 mark	(4)
			[14]

QUESTION 6

6.1	-13✔**A**	Answer: 1 mark	(1)
6.2	$y = -2x - 1$✔✔**A**	$-2x$: 1 mark -1: 1 mark	(2)
6.3	$-2x - 1 = -51$✔**CA** $\qquad -2x = -50$✔**CA** $\qquad \therefore x = \ 25$ ✔**CA**	CA from 6.2 Substitution : 1 mark $-2x = -50$: 1 mark Answer: 1 mark	(3)
			[6]

QUESTION 7

7.1	x	-1	0	3		
	y	-3✔**A**	-1✔**A**	5✔**A**	Each y value: 1 mark	(3)

7.2.1 7.2.2		Each point: 1 mark Straight line: 1 mark Do not penalise if there are no arrows on the line or if the points are not labelled	(4)

7.2.3	Gradient $= \dfrac{4-1}{1-0}$ ✓✓**A** or $\dfrac{1-(-2)}{0-(-1)}$ ✓✓**A** or $\dfrac{4-(-2)}{1-(-1)}$ ✓✓**A** or $\dfrac{1-4}{0-1}$ ✓✓**A** or $\dfrac{-2-1}{-1-0}$ ✓✓**A** or $\dfrac{-2-4}{-1-1}$ ✓✓**A** Gradient $= 3$✓**CA**	Substitution of points: 2 marks Answer: 1 mark Answer only : 3 marks	(3)
7.2.4	Gradient of parallel line $=$ Gradient of line ABC $= 3$ ✓**CA** Equation : $y = 3x + 4$✓✓**CA**	Gradient of parallel line=3: 1 mark $3x$: 1 mark 4: 1 mark Answer only : 3 marks	(3)
			[13]

QUESTION 8

8.1	Cost of 9 books $= R135$ Cost of 1 book $= R135 \div 9$ $\qquad\qquad = R15$ ✓**M** Cost of 15 books $= 15 \times R15$✓**CA** $\qquad\qquad\quad = R225$✓**CA**	$R135 \div 9 = R15$: 1 mark Calculation: 1 mark Answer: 1 mark	
	or		
	<table><tr><td>No. of books</td><td>Cost in R</td></tr><tr><td>9</td><td>135</td></tr><tr><td>15</td><td>x</td></tr></table> $\dfrac{x}{135} = \dfrac{15}{9}$ ✓**M** $x = \dfrac{15 \times 135}{9}$ ✓**CA** $x = 225$✓**CA**	$\dfrac{x}{135} = \dfrac{15}{9}$: 1 mark $\dfrac{15 \times 135}{9}$: 1 mark Answer: 1 mark	(3)

8.2	Percentage $= \frac{48}{60} \times \frac{100}{1}$ ✓**M** or fraction $= \frac{48}{60} = \frac{4}{5}$ ✓**M** $= 80\%$ ✓**A** Percentage $= 80\%$ ✓**A**	$\frac{48}{60} \times \frac{100}{1}$: 1 mark Answer: 1 mark Answer only : 2 marks	(2)

8.3	Increased amount $= R1\,200 + \left(\frac{20}{100} \times R1\,200\right)$ $\qquad = R1\,200 + R240$ ✓**M** $\qquad = R1\,440$ ✓**CA**	R240: 1 mark Answer: 1 mark	
	or		
	Increased amount $= 120\%$ of $R1\,200$ $\qquad = \left(\frac{120}{100} \times R1\,200\right)$ ✓**M** $\qquad = R1\,440$ ✓**CA**	$\frac{120}{100}$: 1 mark Answer: 1 mark	
	or		
	20% of $R1\,200 = R240$ ✓**M** Increased amount $= R1\,200 + R240$ $\qquad\qquad = R1\,440$ ✓**CA**	$R240$: 1 mark Answer: 1 mark Answer only : 2 marks	(2)

8.4	$A = P(1+i)^n$ $\quad = R10\,000(1+0{,}065)^3$ ✓✓✓**M** $\quad = R10000(1{,}065)^3$ $\quad = R12\,079{,}50$ ✓**CA** $CI = A - P$ $\quad = R12\,079{,}50 - R10\,000$ $\quad = R2\,079{,}50$ ✓**CA**	P = R10 000: 1 mark $i = 0{,}065$: 1 mark $n = 3$: 1 mark Calculation of A: 1 mark Answer: 1 mark	
	or		
	$A = P\left(1 + \frac{r}{100}\right)^n$ $\quad = R10\,000\left(1 + \frac{6{,}5}{100}\right)^3$ ✓✓✓**M** $\quad = R10\,000(1{,}065)^3$ $\quad = R12\,079{,}50$ ✓**CA** $CI = A - P$ $\quad = R12\,079{,}50 - R10\,000$ $\quad = R2\,079{,}50$ ✓**CA**	P = R10 000: 1 mark $r = 6{,}5$: 1 mark $n = 3$: 1 mark Calculation of A: 1 mark Answer: 1 mark	
	or		

Year 1: Interest @ $6{,}5\%$	$R10\,000{,}00$ $+ R\ 650{,}00$ ✓**M**
Year 2: Interest @ $6{,}5\%$	$R10\,650{,}00$ $+ R\ 692{,}25$ ✓**M**
Year 3: Interest @ $6{,}5\%$	$R11\,342{,}25$ $+\ 737{,}25$ ✓**M**
Final Amount $= R12\,079{,}50$ ✓**CA**	

R650 : 1 mark

R692,25 : 1 mark

R737,25 : 1 mark

A = R12 079,50 : 1 mark

$CI = A - P$
 $\quad = R12\,079{,}50 - R10\,000$
 $\quad = R2\,079{,}50$ ✓**CA**
 $\qquad\qquad$ or
 $CI = R650{,}00 + R692{,}25 + R737{,}25$
 $\quad = R2\,079{,}50$ ✓**CA**

$CI = $ R2 079,50: 1 mark   (5)

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QUESTION 9

9.1.1	isosceles✓**A**	Answer: 1 mark	(1)
9.1.2	obtuse-angled ✓**A**	Answer: 1 mark	(1)
9.1.3	right-angled ✓**A**	Answer: 1 mark	(1)
9.1.4	similar✓**A**	Answer: 1 mark	(1)
9.2.1	$\hat{B}_1 = \hat{C}$✓**A**	Correct statement: 1 mark Penalise if the angle sign is left out	(1)
9.2.2	$\widehat{D}_2 = \hat{B}_2$ ✓**A**	Correct statement: 1 mark	(1)
9.3	$\hat{B} + 60° + 40° = 180°$✓**M** $\hat{B} = 80°$✓**A**	Statement : 1 mark $\hat{B} = 80°$: 1 mark Answer only: 2 marks Penalise if degree sign is left out	(2)

9.4			

Statement	Reason
$\hat{B}_1 = 180° - 118° = 62°$	$A\hat{B}C$ is a str. ∠ or ∠s on str. line or adj. suppl. ∠s ✓**A**
$\widehat{B}_1 + \hat{A} = 126°$ ✓**A**	ext. ∠ of Δ ✓**A**
$62° + \hat{A} = 126°$✓**CA**	
$\therefore \hat{A} = 64°$✓**CA**	

Reason: 1 mark

126°: 1 mark
Reason: 1 mark

Substitution: 1 mark
Answer: 1 mark (5)

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QUESTION 10

10.1	side, side, side ✓**A** or s s s ✓**A** side, included angle, side✓**A** or s∠ s ✓**A** or s a s ✓**A** angle, angle, side. ✓**A** or ∠∠s ✓**A** or a a s ✓**A** right angle, hypotenuse, side✓**A** or 90° H s ✓**A**	1 mark each	(4)

10.2			

Statement	Reason
In ΔABT and ΔACT $BT = TC$✓**A** $\hat{T}_1 = \hat{T}_2$✓**A** $AT = AT$✓**A** $\therefore \Delta ABT \equiv \Delta ACT$	given given $AT \perp BC$ common s∠s✓**A**

Correct statement:1 mark
Correct statement:1 mark
Correct statement :1 mark
Correct reason: 1 mark (4)

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QUESTION 11

11.1

Statement	Reason	
In $\triangle ABC$ and $\triangle ADE$		
11.1.1 $\quad \hat{A} = \hat{A}$ ✓**A**	common✓**A**	
11.1.2 $\quad \hat{B} = \hat{D}_2$ ✓**A**	corr. ∠s and $DE \parallel BC$✓**A**	
11.1.3 $\quad \hat{C} = \hat{E}_2$ ✓**A**	corr. ∠s and $DE \parallel BC$ or sum of ∠s of △ ✓**A**	
$\triangle ABC \parallel\parallel \triangle ADE$	11.1.4 $\quad \angle \angle \angle$ ✓**A**	

NB: Accept the statements in 11.1.1; 11.1.2 and 11.1.3 in any order.

Correct statement:1 mark
Correct reason: 1 mark

Correct statement:1 mark
Correct reason: 1 mark
NB: Do not penalise if they leave out $DE \parallel BC$, because there is only one pair of parallel lines

Correct statement:1 mark
Correct reason: 1 mark

Correct reason: 1 mark

(7)

11.2

Statement	Reason
$\frac{KL}{DE}$ ✓ $= \frac{LM}{EF}$ ✓ $= \frac{KM}{DF}$ **M**	proportional sides of similar triangles
$\frac{LM}{7} = \frac{5}{2,5}$ ✓**M**	
$LM = \frac{7(5)}{2,5}$ cm ✓**M**	
$= 14 \, cm$✓**CA**	

or

Statement	Reason
$\frac{DE}{KL}$ ✓ $= \frac{EF}{LM}$ ✓ $= \frac{DF}{KM}$ **M**	proportional sides of similar triangles
$\frac{2,5}{5} = \frac{7}{LM}$ ✓**M**	
$LM = \frac{7(5)}{2,5}$ cm ✓**M**	
$LM = 14 \, cm$ ✓**CA**	

Correct ratio : 1 mark each

Substitution:1 mark

LM subject of the formula: 1 mark

Answer: 1 mark

(5)

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QUESTION 12

12.1.1	In ΔPQT: $PT^2 = PQ^2 - QT^2$ ✓**M**　　Pythagoras $PT^2 = 10^2 - 6^2\ cm^2$ ✓**M** $PT^2 = 64\ cm^2$ **CA**✓ $PT = \sqrt{64}\ cm$ $PT = 8\ cm$ ✓**CA**	Formula: 1 mark Substitution: 1 mark Calculation: 1 mark $PT = 8cm$: 1 mark Answer only: 4 marks	(4)
12.1.2	In ΔPTR: $PR^2 = PT^2 + TR^2$ ✓**M**　　Pythagoras $\quad = 8^2 + 15^2\ cm^2$ ✓**M** $\quad = 289\ cm^2$ ✓**CA** $PR = \sqrt{289}\ cm$ $PR = 17\ cm$ ✓**CA**	CA from 12.1.1 if $PT \neq 8$ Formula: 1 mark Substitution: 1 mark Calculation: 1 mark $PR = 17cm$: 1 mark Answer only: 4 marks	(4)
12.2	Area of a circle $= 120{,}7 cm^2$ $\qquad \pi r^2 = 120{,}7 cm^2$ ✓**M** $\therefore r^2 = \frac{120{,}7\ cm^2}{\pi}$ ✓**M** $\therefore r \approx 6{,}20\ cm$ ✓**A**	Substitution: 1 mark Dividing by π : 1 mark Answer: 1 mark Penalise for incorrect rounding off Answer only: 3 marks	(3)
12.3.1	Area of $\Delta ABC = \frac{BC \times AD}{2}$ $\qquad = \frac{24 \times 10}{2}\ cm^2$ ✓**M** $\qquad = 120\ cm^2$ ✓**A** or Area of $\Delta ABC = \frac{1}{2}(BC \times AD)$ $\qquad = \frac{1}{2}(24 \times 10)\ cm^2$ ✓**M** $\qquad = 120\ cm^2$ ✓**A**	Formula/ Substitution: 1 mark Answer: 1 mark Answer only: 2 marks	(2)
12.3.2	4 times ✓**A**	Answer: 1 mark	(1)
			[14]

QUESTION 13

	$2l + 2b = 46$ $l + b = 23$ $2x + 5 + x + 6 = 23$ ✓**M** $3x + 11 = 23$ $3x = 12$ $x = 4$ ✓**CA** Area $= l \times b$ $\qquad = 13 \times 10\ cm^2$ ✓**CA** $\qquad = 130\ cm^2$ ✓**CA**	Formula/ Substitution: 1 mark $x = 4$: 1 mark Formula/ Substitution: 1 mark Answer: 1 mark	(4)
			[4]

Total: 140