

# TEACHERS WITHOUT BORDERS PROGRAMME

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basic education

Department:  
Basic Education  
REPUBLIC OF SOUTH AFRICA

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In Bill Gates words, at the Mandela Day 'Living Together' address: "Maintaining the quality of this country's higher education system while expanding access to more students will not be easy. But it's critical to South Africa's future" – working together, we can help achieve this."

## Contributing schools to date:

Clifton School	Milnerton High	Rustenburg Girls' High	St Peter's
Durban Girls'	Northwood High	St Anne's DC	St Stithians
Fairmont High	Roedean	St John's DSG	Wynberg Boys' High
Herzlia High	Rondebosch Boys'	St Mary's DSG Kloof	Wynberg Secondary

Question 1.

1.1.  $6,79543 \times 10^{-10}$  ✓✓✓✓✓

(2)

1.2.  $0,000\ 234$  ✓✓✓✓✓

(2)

1.3.  $(5,123 \times 10^4) \times (2 \times 10^{-2})$

$= 10,246 \times 10^2$  ✓✓✓✓✓

OR  $1024,6$  (with calc)

$= 1,0246 \times 10^3$  ✓✓✓✓✓

(3)

1.4.1.  $-12a^7b^3$  ✓✓✓✓✓

(2)

1.4.2.  $8x^6y^{12}$  ✓✓✓✓✓

(2)

1.4.3.  $4a^8$  ✓✓✓✓✓

(2)

1.4.4.  $\frac{4x^6}{x^{-4}y^2} = \frac{4x^{10}}{y^2}$  ✓✓✓✓✓

(3)

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Question 2

2.1.1.  $a^2 - 2a - 3$  ✓✓✓✓✓

(2)

2.1.2.  $x^2 + 6x + 9 - (4x^2 - 1)$  ✓✓✓✓✓ Distribution ✓✓✓✓✓

$= x^2 + 6x + 9 - 4x^2 + 1$  ✓✓✓✓✓ signs ✓✓✓✓✓

$= -3x^2 + 6x + 10$  ✓✓✓✓✓

(4)

2.2.1.  $3pq(p + 5q - 4)$  ✓✓✓✓✓ MS fact ✓✓✓✓✓

(2)

2.2.2.  $3x(25x^2 - 4)$  ✓✓✓✓✓ MS fact ✓✓✓✓✓

$= 3x(5x+2)(5x-2)$  ✓✓✓✓✓ ✓✓✓✓✓

(3)

$$2.2.3 \quad 3x(x-3) - 2(x-3) \quad \begin{matrix} \text{LM} \\ \text{A} \end{matrix}$$

$$= (x-3)(3x-2) \quad \text{A} \quad (3)$$

$$2.2.4 \quad a(x+4) + b(x+4) \quad \begin{matrix} \text{LM} \\ \text{Group} \end{matrix}$$

$$= (x+4)(a+b) \quad \text{A} \quad (3)$$

$$2.3. \quad 2(-3)^2 + 5(-3) - 12 \quad \begin{matrix} \text{LM} \\ \text{Subs.} \end{matrix}$$

$$= 2(9) - 15 - 12$$

$$= -9 \quad \text{A} \quad (2)$$

$$2.4. \quad 5^{y+1}$$

$$= 5^y \cdot 5 \quad \begin{matrix} \text{LM} \\ \text{split} \end{matrix}$$

$$= 5^k \quad \text{A} \quad (3)$$

### Question 3

$$3.1.1. \quad \frac{24x^6y^6}{12x^5y^4} \quad \begin{matrix} \text{LM} \\ \text{multiply} \end{matrix}$$

$$= 2xy^2 \quad \text{A} \quad (4)$$

$$3.1.2. \quad \sqrt[3]{27x^3} - \sqrt{4x^2y^2} \quad \begin{matrix} \text{LM} \\ \text{Simplify fractions} \\ \text{Exponents.} \end{matrix}$$

$$= 3x - 2xy \quad \text{A} \quad (4)$$

$$3.1.3. \quad \frac{5m}{(m+5)(m-5)} \times \frac{(m+5)(m-3)}{m+3} \quad \begin{matrix} \text{LM} \\ \text{factorise} \end{matrix}$$

$$= \frac{5m(m-3)}{(m-5)(m+3)} \quad \text{A} \quad (4)$$

$$3.2.1 \quad 3x + 3 = 2x - 3$$

$$x = -6$$

(3)

$$3.2.2 \quad \left(\frac{2x+1}{3}\right) = \left(\frac{5}{1}\right) - \left(\frac{x}{2}\right) \quad \text{LCD} = 6$$

$$= 2(2x+1) = 30 - 3x$$

$$4x + \frac{2}{2} = 30 - 3x$$

$$7x = 28$$

$$x = \frac{28}{7}$$

$$= 4$$

(5)

$$3.2.3 \quad 2^{x+1} = 2^4$$

$$\therefore x+1 = 4$$

$$x = 3$$

(3)

$$3.2.4 \quad (3^{-2})^{x-2} = 3^4$$

$$3^{-2x+4} = 3^4$$

$$\therefore -2x + 4 = 4$$

$$-2x = 0$$

$$x = 0$$

(4)

$$3.3.1 \quad x + 4$$

(1)

$$3.3.2 \quad (x-7)^2 = x+4+1$$

$$x^2 - 14x + 49 = x + 5$$

$$x^2 - 15x + 44 = 0$$

(4)

$$3.3.3 \quad x^2 - 15x + 44 = 0$$

$$(x-11)(x-4) = 0$$

$$x = 11 \text{ or } x = 4$$

(3)

3.3.4 Not 11 ✓<sup>A</sup>

$$\therefore \text{Monica} = \frac{4}{10} \checkmark^A$$

$$\text{Sandra} = \frac{8}{10} \checkmark^A$$

(3)  
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### Question 4

4.1.1.  $a = 64 \checkmark^A$ ;  $b = 76 \checkmark^A$ ;  $c = 10 \checkmark^A$  (3)

4.1.2.  $T_n = a + (n-1)d$  ✓ correct formula  
 $= 16 + (n-1)12$  ✓ subs.  
 $= 16 + 12n - 12$   
 $= 12n + 4 \checkmark^A$  (3)

4.1.3.  $1228 = 12n + 4$  ✓ subs  
 $1224 = 12n$   
 $102 = n \checkmark^A$  (2)

4.2.1.  $512 \checkmark^A$ ;  $2048 \checkmark^A$  (2)

4.2.2.  $T_n = ar^{n-1}$  ✓ correct formula  
 $= 2 \cdot 4^{n-1}$  ✓ subs (3)

4.2.3.  $T_{10} = 2 \cdot 4^{10-1}$  ✓ subs  
 $= 2 \cdot 4^9 \checkmark^A$   
 $= 524288 \checkmark^A$  (3)

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## Question 5

$$5.1.1. \quad x = 104^\circ \quad \begin{array}{l} \text{A} \\ \text{Reason} \end{array} \quad (\text{Corr L's, } AB \parallel CD)$$

$$2y + 6 + 94 = 180 \quad \begin{array}{l} \text{State} \\ \text{Reason} \end{array} \quad (\text{Co-int L's, } AB \parallel CD)$$

$$2y = 180 - 100$$

$$= 80$$

$$y = 40^\circ \quad \text{A}$$

(5)

$$5.1.2. \quad B_1 = x \quad \begin{array}{l} \text{Reason} \\ \text{State} \end{array} \quad (\text{Isos } \triangle ABC)$$

$$x + x + 80 = 180 \quad \begin{array}{l} \text{Reason} \\ \text{State} \end{array} \quad (\text{Int } \angle \triangle = 180)$$

$$2x = 100$$

$$x = 50^\circ \quad \text{A}$$

$$25 + y = 50 \quad \begin{array}{l} \text{State} \\ \text{Reason} \end{array} \quad (\text{Ext } \angle \triangle)$$

$$y = 25^\circ \quad \text{A}$$

(8)

$$5.2. \quad a + 154 = 180 \quad \begin{array}{l} \text{Reason} \\ \text{State} \end{array} \quad (\text{Str line})$$

$$a = 26^\circ \quad \text{A}$$

$$b = 26^\circ \quad \begin{array}{l} \text{Reason} \\ \text{State} \end{array} \quad (\text{Alt L's, } ST \parallel PR)$$

$$c + 48 + 26 = 180 \quad \begin{array}{l} \text{State} \\ \text{Reason} \end{array} \quad (\text{Str line})$$

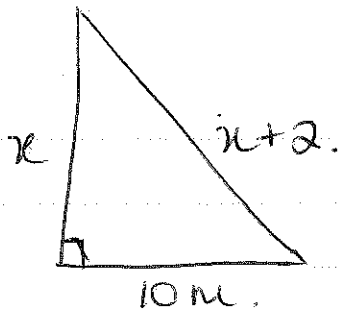
$$c + 74 = 180$$

$$c = 106^\circ \quad \text{A}$$

$$d = 48^\circ \quad \begin{array}{l} \text{Reason} \\ \text{State} \end{array} \quad (\text{Corr L's, } TS \parallel PR)$$

(9)

53



$$x^2 + 10^2 = (x+2)^2 \quad \text{LM Pyth}$$

$$x^2 + 100 = x^2 + 4x + 4 \quad \text{LM Dist}$$

$$96 = 4x \quad \text{LA}$$

$$\frac{96}{4} = x$$

$$24 = \text{LA}$$

$$\begin{aligned} \therefore \text{Ladder} &= 24 + 2 \quad \text{Lca} \\ &= 26\text{m}. \quad \text{Lca} \end{aligned}$$

(6)

[28]