

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

	Natural	Integer	Rational	Irrational	Real	Imaginary
-3		✓	✓		✓	
4π				✓	✓	
$\sqrt{-7}$						✓
$\sqrt{36}$	✓	✓	✓		✓	

1 mark per line

/4/Question 2

2.1 60 ✓ (1)

2.2 $13,2$ ✓ (1)

2.3 6 ✓ (1)

2.4 -21 ✓ (1)

2.5 $1; 2; 3; 6; 9; 18.$ ✓ ✓ (2)

2.6 $\frac{10^7}{5 \times 10^4} = \frac{10^3}{5} \checkmark = 200 \checkmark$ (2)

2.7 $36 - 1 \checkmark = 35 \checkmark$ (2)

/10/Question 3

3.1

$$\begin{aligned}
 3.1.1 \quad & 1\frac{1}{2} + 3\frac{2}{3} \\
 & = \frac{3}{2} + \frac{11}{3} \checkmark \\
 & = \frac{9+22}{6} \checkmark \\
 & = \frac{31}{6} \checkmark
 \end{aligned}$$

(3)

$$\begin{aligned}
 3.1.2 \quad & 1\frac{5}{16} \div 2\frac{11}{12} \\
 & = \frac{21}{16} \div \frac{35}{12} \checkmark \\
 & = \frac{21}{16} \times \frac{12}{35} \checkmark \\
 & = \frac{9}{20} \checkmark
 \end{aligned}$$

(3)

3.2 C ✓ and D ✓ (2)

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Question 4

$$4.1 \quad \frac{3}{35} \times 385 \checkmark = 33 \checkmark \quad (2)$$

$$4.2 \quad 44 - 12 = 32 \checkmark$$
$$32 \div 8 = 4 \checkmark$$
$$4 \times 5 = 20 \checkmark$$

\therefore Charles peeled 20 potatoes (3)

$$4.3 \quad \frac{x}{z} = \frac{x}{y} \times \frac{y}{z}$$
$$\therefore \frac{x}{z} = \frac{2}{3} \times \frac{7}{5} \checkmark = \frac{14}{15} \checkmark$$
$$\therefore \frac{z}{x} = \frac{15}{14} \checkmark \quad (3)$$

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Question 5

$$5.1 \quad 3^{\text{rd}} \checkmark \quad (1)$$

$$5.2 \quad 2 \checkmark \quad (1)$$

$$5.3 \quad -1 \checkmark \quad (1)$$

$$5.4 \quad 0 \checkmark \quad (1)$$

$$5.5 \quad 2x^3 - 4x^2 + 3x - 1 \checkmark \quad (1)$$

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Question 6

$$6.1 \quad -4x + 6x - x = x \checkmark \quad (1)$$

$$6.2 \quad -6x^2 + x^2 = -5x^2 \checkmark \quad (1)$$

$$6.3 \quad -4(x + 2y) = -4x \checkmark - 8y \checkmark \quad (2)$$

$$6.4 \quad \sqrt[3]{27x^{27}} = 3 \checkmark x^9 \checkmark \quad (2)$$

$$6.5 \quad -3x^2y \times 4xy^3 = -12x^3y^4 \checkmark \checkmark \quad (2)$$

$$6.6 \quad -(2x^2)^3 = -8 \checkmark x^6 \checkmark \quad (2)$$

$$6.7 \quad \frac{4x^4}{16x^{16}} = \frac{1}{4x^{12}} \checkmark \checkmark \quad (2)$$

$$6.8 \quad 3x - x(2x + 1) = 3x - 2x^2 - x \checkmark = -2x^2 + 2x \checkmark \quad (2)$$

$$6.9 \quad \frac{6x^3 \times -4x^2}{-12x} - (2x)^4 = \frac{-24x^5 \checkmark}{-12x} - 16x^4 \checkmark = 2x^4 \checkmark - 16x^4 = -14x^4 \checkmark \quad (4)$$

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Question 7

$$7.1 \quad -3a \checkmark \checkmark \quad (2)$$

$$7.2 \quad 4x \checkmark - y \checkmark - 2z \checkmark \quad (3)$$

$$7.3 \quad -20x^4y^2 \checkmark + 5x^2y^5 \checkmark \quad (2)$$

$$7.4 \quad -x^2 \checkmark + 3y^2 \checkmark \quad (2)$$

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Question 8

8.1

$$\begin{aligned} 8.1.1 \quad -\frac{12}{x} &= -3 \\ \therefore x &= 4\checkmark \end{aligned} \tag{1}$$

$$\begin{aligned} 8.1.2 \quad x^2 &= 25 \\ \therefore x &= \pm\sqrt{5}\checkmark \end{aligned} \tag{2}$$

$$\begin{aligned} 8.1.3 \quad 2x - 3 &= 5 \\ \therefore 2x &= 8\checkmark \\ \therefore x &= 4\checkmark \end{aligned} \tag{2}$$

$$\begin{aligned} 8.1.4 \quad -3(2x + 3) &= 4x - 4 \\ \therefore -6x - 9\checkmark &= 4x - 4 \\ \therefore -10x &= 5\checkmark \\ \therefore x &= -\frac{1}{2}\checkmark \end{aligned} \tag{3}$$

8.2

$$\begin{aligned} 8.2.1 \quad x - 5 + 2x &= -14 \\ \therefore 3x &= -9\checkmark \\ \therefore x &= -3\checkmark \end{aligned} \tag{2}$$

$$\begin{aligned} 8.2.2 \quad \sqrt[3]{2y + 1} - 5 + 2\sqrt[3]{2y + 1} &= -14 \\ \therefore \sqrt[3]{2y + 1} &= -3\checkmark \\ \therefore 2y + 1 &= -27\checkmark \\ \therefore 2y &= -28\checkmark \\ \therefore y &= -14\checkmark \end{aligned} \tag{4}$$

$$\begin{aligned} 8.3 \quad 3x - 7 &= 38 \\ \therefore 3x &= 45\checkmark \\ \therefore x &= 15 \text{ (Jonathan) } \checkmark \\ \text{But } x &= 9\checkmark \\ \therefore a.9 - 7 &= 38\checkmark \\ \therefore 9a &= 45 \\ \therefore a &= 5\checkmark \end{aligned} \tag{5}$$

Question 9

9.1

9.1.1 11; 8; 5; 2; **-1**✓ (1)

9.1.2 3; 6; 12; 24; **48**✓ (1)

9.1.3 4; 1; 6; 2; 8; 4; 10; 8; **12**✓ (1)

9.2 36✓✓ (2)

9.3 200×6 ✓ = 1200✓ (2)

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Question 10

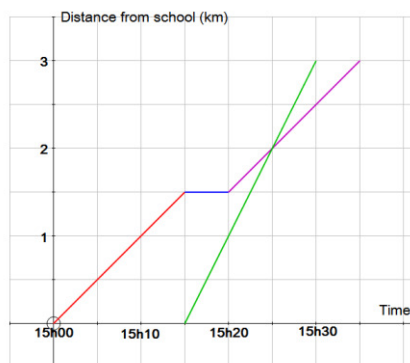
10.1 1 km ✓ (1)

10.2 5 minutes✓ (1)

10.3 15h25✓ (1)

10.4 3 km in 15 minutes✓

∴ 12 km/h✓



(1)

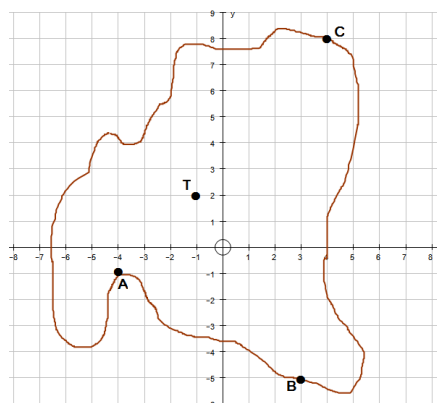
(1)

(1)

(2)

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Question 11



	Start	After first transformation	After second transformation
A	(-4; -1)	(1; -3)✓	(1; 3)✓
B	(3; -5)	(-5; -3)✓	(-2; 2)✓
C	(4; 8)	(1; 2)✓	(-1; 2)✓

C✓ reaches the treasure!

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