

# Real Numbers and their Properties

## MCQ Test, Set 09

Time: 30 minutes

Maximum marks: 25

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

- There are 25 questions. Each has exactly one correct answer: choose A, B, C or D.
- Each correct answer carries 1 mark. There is no negative marking.
- The key sheet and worked solutions are at the end of this test.

1. Which of the following is not a natural number?

- A. 9                                      B. 1                                      C. 0                                      D. 14

2. The integers between  $-3$  and  $3$  are

- A.  $-2, -1, 0, 1, 2, 3$                       B.  $-3, -2, -1, 0, 1, 2, 3$                       C.  $-2, -1, 0, 1, 2$                       D.  $-1, 0, 1, 2$

3. Which one of these numbers is a non terminating non recurring decimal?

- A.  $2.\bar{3}$                                       B.  $\sqrt{59}$                                       C.  $1.7$                                       D.  $\frac{16}{13}$

4.  $\sqrt{60} = 7.7459\dots$  is

- A. a non terminating non recurring decimal, so irrational  
 B. a non terminating recurring decimal, so rational  
 C. a terminating decimal, so rational  
 D. an integer

5.  $\sqrt{20}$  belongs to which of these sets?

- A.  $Q^*$  (irrational numbers)                      B.  $N$  (natural numbers)  
 C.  $Q$  (rational numbers)                      D.  $W$  (whole numbers)

6. Pick the false statement.

- A.  $-10 \in Z$                                       B.  $-7 \in Q$                                       C.  $4.\bar{8} \in Q$                                       D.  $0.\bar{3} \in W$

7. Add  $8\sqrt{11}$  and  $18\sqrt{11}$ .

- A.  $26\sqrt{22}$                                       B.  $144\sqrt{11}$                                       C.  $26\sqrt{11}$                                       D.  $-26\sqrt{11}$

8. Add  $-11 + 12\sqrt{15}$  and  $13 + 11\sqrt{15}$ .

- A.  $2 + \sqrt{15}$                                       B.  $25\sqrt{15}$                                       C.  $-24 + 23\sqrt{15}$                                       D.  $2 + 23\sqrt{15}$

9. Subtract  $-21\sqrt{10}$  from  $-6\sqrt{10}$ .

- A.  $-15\sqrt{10}$                                       B.  $15\sqrt{10}$                                       C.  $-27\sqrt{10}$                                       D.  $27\sqrt{10}$

10. Subtract  $(5 + 7\sqrt{3})$  from  $(1 - 8\sqrt{3})$ .  
**A.**  $6 - 15\sqrt{3}$       **B.**  $4 + 15\sqrt{3}$       **C.**  $-4 - \sqrt{3}$       **D.**  $-4 - 15\sqrt{3}$
- 
11.  $7\sqrt{7} \times (-7\sqrt{11}) =$   
**A.**  $49\sqrt{77}$       **B.**  $-49\sqrt{77}$       **C.**  $-49\sqrt{18}$       **D.**  $-3773$
- 
12.  $\sqrt{2} \times \sqrt{7} =$   
**A.**  $2\sqrt{7}$       **B.**  $14$       **C.**  $\sqrt{14}$       **D.**  $7\sqrt{2}$
- 
13.  $-15\sqrt{21} - 11\sqrt{21} + 10\sqrt{21} =$   
**A.**  $-16\sqrt{21}$       **B.**  $16\sqrt{21}$       **C.**  $-15\sqrt{21}$       **D.**  $-36\sqrt{21}$
- 
14.  $2003\sqrt{14} - 611303\sqrt{14} + 60520\sqrt{14} =$   
**A.**  $548780\sqrt{14}$       **B.**  $-548880\sqrt{14}$       **C.**  $-548780\sqrt{14}$       **D.**  $-673826\sqrt{14}$
- 
15.  $-5\sqrt{44} \times (-5\sqrt{99}) =$   
**A.**  $108900$       **B.**  $-1650$       **C.**  $-660$       **D.**  $1650$
- 
16.  $-3\sqrt{128} \times (-6\sqrt{72}) =$   
**A.**  $-864$       **B.**  $1728$       **C.**  $165888$       **D.**  $-1728$
- 
17.  $\frac{\sqrt{117}}{\sqrt{13}} =$   
**A.**  $\sqrt{104}$       **B.**  $3$       **C.**  $9$       **D.**  $\sqrt{130}$
- 
18.  $\frac{35}{\sqrt{35}} =$   
**A.**  $\sqrt{35}$       **B.**  $35\sqrt{35}$       **C.**  $1$       **D.**  $35$
- 
19.  $\sqrt{275} + \sqrt{44} =$   
**A.**  $\sqrt{319}$       **B.**  $7\sqrt{22}$       **C.**  $7\sqrt{11}$       **D.**  $29\sqrt{11}$
- 
20.  $\sqrt{63}$  in the simplest form is  
**A.**  $9\sqrt{7}$       **B.**  $3\sqrt{21}$       **C.**  $3\sqrt{7}$       **D.**  $7\sqrt{3}$
- 
21. If  $a = 0$  and  $b = -33$ , which of the following does not belong to  $R$ ?  
**A.**  $\frac{a}{b}$       **B.**  $\frac{b}{a}$       **C.**  $a + b$       **D.**  $a \times b$
- 
22. For  $a = -12$  and  $b = 15$ , which of the following is NOT true?  
**A.**  $a + 0 = a$       **B.**  $a \times b = b \times a$       **C.**  $a \times 1 = a$       **D.**  $a \div b = b \div a$
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23. For  $a = -48$ ,  $b = 12$  and  $c = 4$ , which of the following is true?  
**A.**  $a \times (b \times c) = (a \times b) \times c$       **B.**  $(a \div b) \div c = a \div (b \div c)$   
**C.**  $a - (b - c) = (a - b) - c$       **D.**  $a - b = b - a$
- 
24.  $-6 \times \underline{\hspace{1cm}} = -6$ . The number in the blank is  
**A.**  $0$       **B.**  $-\frac{1}{6}$       **C.**  $-6$       **D.**  $1$
-

25. The multiplicative inverse of  $7\sqrt{10}$  is

A.  $\frac{1}{7\sqrt{10}}$

B. 1

C.  $-7\sqrt{10}$

D.  $-\frac{1}{7\sqrt{10}}$

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## Key sheet

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|              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|
| <b>1. C</b>  | <b>2. C</b>  | <b>3. B</b>  | <b>4. A</b>  | <b>5. A</b>  |
| <b>6. D</b>  | <b>7. C</b>  | <b>8. D</b>  | <b>9. B</b>  | <b>10. D</b> |
| <b>11. B</b> | <b>12. C</b> | <b>13. A</b> | <b>14. C</b> | <b>15. D</b> |
| <b>16. B</b> | <b>17. B</b> | <b>18. A</b> | <b>19. C</b> | <b>20. C</b> |
| <b>21. B</b> | <b>22. D</b> | <b>23. A</b> | <b>24. D</b> | <b>25. A</b> |

## Solutions

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1. Which of the following is not a natural number?

$$N = \{1, 2, 3, 4, \dots\}$$

0 is not a natural number (it is a whole number).

**Ans: (C) 0**

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2. The integers between  $-3$  and  $3$  are

$$Z = \{\dots, -2, -1, 0, 1, 2, 3, \dots\}$$

So the integers between  $-3$  and  $3$  are  $-2, -1, 0, 1, 2$ .

**Ans: (C)  $-2, -1, 0, 1, 2$**

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3. Which one of these numbers is a non terminating non recurring decimal?

$\sqrt{59} = 7.6811\dots$  is a non terminating non recurring decimal, so it is irrational.

The other numbers can be written in the form  $\frac{p}{q}$ , so they are rational.

**Ans: (B)  $\sqrt{59}$**

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4.  $\sqrt{60} = 7.7459\dots$  is

$\sqrt{60} = 7.7459\dots$  is a non terminating non recurring decimal, so it is irrational.

**Ans: (A) a non terminating non recurring decimal, so irrational**

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5.  $\sqrt{20}$  belongs to which of these sets?

$\sqrt{20} = 4.4721\dots$  is a non terminating non recurring decimal, so it is irrational.

So  $\sqrt{20}$  belongs to  $Q^*$ ; it does not belong to  $W$ ,  $N$  or  $Q$ .

**Ans: (A)  $Q^*$  (irrational numbers)**

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6. Pick the false statement.

$0.\overline{3}$  is a non terminating recurring decimal, so it is rational.

$$W = \{0, 1, 2, 3, 4, \dots\}$$

$0.\overline{3}$  is not in this set, so the statement is false.

The other three statements are true.

**Ans: (D)  $0.\overline{3} \in W$**

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7. Add  $8\sqrt{11}$  and  $18\sqrt{11}$ .

$$\begin{aligned} 8\sqrt{11} + 18\sqrt{11} &= (8 + 18)\sqrt{11} \\ &= 26\sqrt{11} \end{aligned}$$

**Ans: (C)  $26\sqrt{11}$**

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8. Add  $-11 + 12\sqrt{15}$  and  $13 + 11\sqrt{15}$ .

$$\begin{aligned} -11 + 12\sqrt{15} + 13 + 11\sqrt{15} &= (-11 + 13) + (12 + 11)\sqrt{15} \\ &= 2 + 23\sqrt{15} \end{aligned}$$

Only like terms are added: numbers with numbers,  $\sqrt{15}$  terms with  $\sqrt{15}$  terms.

**Ans: (D)  $2 + 23\sqrt{15}$**

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9. Subtract  $-21\sqrt{10}$  from  $-6\sqrt{10}$ .

$$\begin{aligned} -6\sqrt{10} - (-21\sqrt{10}) &= -6\sqrt{10} + 21\sqrt{10} \\ &= 15\sqrt{10} \end{aligned}$$

Ans: (B)  $15\sqrt{10}$

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10. Subtract  $(5 + 7\sqrt{3})$  from  $(1 - 8\sqrt{3})$ .

$$\begin{aligned} (1 - 8\sqrt{3}) - (5 + 7\sqrt{3}) &= 1 - 8\sqrt{3} - 5 - 7\sqrt{3} \\ &= -4 - 15\sqrt{3} \end{aligned}$$

The sign of every term of the bracket being subtracted changes.

Ans: (D)  $-4 - 15\sqrt{3}$

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11.  $7\sqrt{7} \times (-7\sqrt{11}) =$

$$\begin{aligned} 7\sqrt{7} \times (-7\sqrt{11}) &= 7 \times (-7) \times \sqrt{7 \times 11} \\ &= -49\sqrt{77} \end{aligned}$$

Ans: (B)  $-49\sqrt{77}$

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12.  $\sqrt{2} \times \sqrt{7} =$

$$\begin{aligned} \sqrt{a} \times \sqrt{b} &= \sqrt{a \times b} \\ \sqrt{2} \times \sqrt{7} &= \sqrt{14} \end{aligned}$$

Ans: (C)  $\sqrt{14}$

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13.  $-15\sqrt{21} - 11\sqrt{21} + 10\sqrt{21} =$

$$\begin{aligned} -15\sqrt{21} - 11\sqrt{21} + 10\sqrt{21} &= (-15 - 11 + 10)\sqrt{21} \\ &= -16\sqrt{21} \end{aligned}$$

Ans: (A)  $-16\sqrt{21}$

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14.  $2003\sqrt{14} - 611303\sqrt{14} + 60520\sqrt{14} =$

$$\text{Positive terms: } 2003\sqrt{14} + 60520\sqrt{14} = 62523\sqrt{14}$$

$$\text{Negative terms: } 611303\sqrt{14}$$

$$\begin{aligned} 2003\sqrt{14} - 611303\sqrt{14} + 60520\sqrt{14} &= 62523\sqrt{14} - 611303\sqrt{14} \\ &= -(611303 - 62523)\sqrt{14} = -548780\sqrt{14} \end{aligned}$$

Ans: (C)  $-548780\sqrt{14}$

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15.  $-5\sqrt{44} \times (-5\sqrt{99}) =$

$$\begin{aligned} -5\sqrt{44} \times (-5\sqrt{99}) &= -5 \times (-5) \times \sqrt{44 \times 99} \\ &= 25 \times \sqrt{4356} \end{aligned}$$

$$\begin{aligned} \text{Long division: } 6 \times 6 &= 36, \text{ remainder } 7; \text{ bring down } 56 \text{ to get } 756; 126 \times 6 = 756. \text{ So } \sqrt{4356} = 66 \\ &= 25 \times 66 = 1650 \end{aligned}$$

Ans: (D) 1650

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$$16. -3\sqrt{128} \times (-6\sqrt{72}) =$$

$$-3\sqrt{128} \times (-6\sqrt{72}) = -3 \times (-6) \times \sqrt{128 \times 72} \\ = 18 \times \sqrt{9216}$$

Long division:  $9 \times 9 = 81$ , remainder 11; bring down 16 to get 1116;  $186 \times 6 = 1116$ . So  $\sqrt{9216} = 96$   
 $= 18 \times 96 = 1728$

**Ans: (B) 1728**

$$17. \frac{\sqrt{117}}{\sqrt{13}} =$$

$$\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}} \\ \frac{\sqrt{117}}{\sqrt{13}} = \sqrt{9} = \sqrt{9} = 3$$

**Ans: (B) 3**

$$18. \frac{35}{\sqrt{35}} =$$

$$\frac{a}{\sqrt{a}} = \frac{\sqrt{a} \times \sqrt{a}}{\sqrt{a}} = \sqrt{a} \\ \frac{35}{\sqrt{35}} = \sqrt{35}$$

**Ans: (A)  $\sqrt{35}$**

$$19. \sqrt{275} + \sqrt{44} =$$

$$\sqrt{275} = \sqrt{25 \times 11} = \sqrt{25} \times \sqrt{11} = 5\sqrt{11} \\ \sqrt{44} = \sqrt{4 \times 11} = \sqrt{4} \times \sqrt{11} = 2\sqrt{11} \\ 5\sqrt{11} + 2\sqrt{11} = 7\sqrt{11}$$

**Ans: (C)  $7\sqrt{11}$**

$$20. \sqrt{63} \text{ in the simplest form is}$$

$$\sqrt{63} = \sqrt{9 \times 7} = \sqrt{9} \times \sqrt{7} = 3\sqrt{7}$$

**Ans: (C)  $3\sqrt{7}$**

$$21. \text{ If } a = 0 \text{ and } b = -33, \text{ which of the following does not belong to } R?$$

$$\frac{b}{a} = \frac{-33}{0} \text{ is not defined, so it does not belong to } R. \\ \frac{a}{b} = \frac{0}{-33} = 0 \in R.$$

**Ans: (B)  $\frac{b}{a}$**

$$22. \text{ For } a = -12 \text{ and } b = 15, \text{ which of the following is NOT true?}$$

$$a \div b = -\frac{4}{5}, b \div a = -\frac{5}{4} \\ \text{So } a \div b \neq b \div a.$$

**Ans: (D)  $a \div b = b \div a$**

$$23. \text{ For } a = -48, b = 12 \text{ and } c = 4, \text{ which of the following is true?}$$

$$-48 \times (12 \times 4) = -2304 = (-48 \times 12) \times 4$$

Real numbers are associative under addition and multiplication only.

**Ans: (A)  $a \times (b \times c) = (a \times b) \times c$**

24.  $-6 \times \underline{\hspace{1cm}} = -6$ . The number in the blank is  
 $a \times 1 = a$ : 1 is the multiplicative identity.

Ans: (D) 1

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25. The multiplicative inverse of  $7\sqrt{10}$  is  
Multiplicative inverse of  $a$  is  $\frac{1}{a}$ , since  $a \times \frac{1}{a} = 1$ .

$$7\sqrt{10} \times \frac{1}{7\sqrt{10}} = 1$$

Ans: (A)  $\frac{1}{7\sqrt{10}}$

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