

**Category 1 Number Operations**

1. For which of the following expressions is it true that the value of the expression is the same for  $x = 587$  as for  $x = -587$ ?

- I.  $1 - 2x$
- II.  $1 - 2x^2$
- III.  $(1 - 2x)^2$

- (A) I only
- (B) II only
- (C) I and III only
- (D) II and III only
- (E) I, II, and III

2. If the numbers  $\frac{17}{24}$ ,  $\frac{1}{2}$ ,  $\frac{3}{8}$ ,  $\frac{3}{4}$ , and  $\frac{9}{16}$  were ordered from greatest to least, the middle number of the resulting sequence would be

- (A)  $\frac{17}{24}$
- (B)  $\frac{1}{2}$
- (C)  $\frac{3}{8}$
- (D)  $\frac{3}{4}$
- (E)  $\frac{9}{16}$

3. The sum  $\frac{7}{8} + \frac{1}{9}$  is between

(A)  $\frac{1}{2}$  and  $\frac{3}{4}$

(B)  $\frac{7}{8} + \frac{1}{9}$  and 1

(C) 1 and  $1\frac{1}{4}$

(D)  $1\frac{1}{4}$  and  $1\frac{1}{2}$

(E)  $1\frac{1}{2}$  and 2

4. Of the following, which is closest to  $\frac{1}{7}$ ?

(A) 0.200

(B) 0.172

(C) 0.167

(D) 0.143

(E) 0.140

5. For all integers  $a$ ,  $b$ ,  $c$ , and  $d$ ,  $*(a,b,c,d)$  is defined as  $a - b + c - d$ . What is the value of  $*(1,3,8,5)$ ?

(A) -1

(B) 0

(C) 1

(D) 2

(E) 3

6. The operation  $\#$  is defined by the equation  $x\#y = \frac{x-y}{2x-y}$ , where  $2x \neq y$ . The value of

which of the following is 0?

- (A)  $-2\#2$
- (B)  $2\#-2$
- (C)  $2\#2$
- (D)  $2\#1$
- (E)  $3\#2$

7. The number 0.756 is how much greater than  $\frac{3}{4}$ ?

- (A)  $\frac{6}{25}$
- (B)  $\frac{3}{125}$
- (C)  $\frac{3}{250}$
- (D)  $\frac{3}{500}$
- (E)  $\frac{1}{250}$

8. What number when multiplied by  $\frac{4}{7}$  yields  $\frac{6}{7}$  as the result?

- (A)  $\frac{2}{7}$
- (B)  $\frac{2}{3}$
- (C)  $\frac{3}{2}$
- (D)  $\frac{24}{7}$
- (E)  $\frac{7}{2}$

9. If the sum of 3 times  $n$ , 11 times  $n$ , and 111 times  $n$  is equal to 1,000, what is the value of  $n$ ?

- (A) 8
- (B) 12.5
- (C) 16
- (D) 25
- (E) 125

10. Which of the following is equal to 0.042?

- (A)  $\frac{4}{10} + \frac{2}{10}$
- (B)  $\frac{4}{10} + \frac{2}{100}$
- (C)  $\frac{4}{100} + \frac{2}{100}$
- (D)  $\frac{4}{100} + \frac{2}{1,000}$
- (E)  $\frac{4}{1,000} + \frac{2}{1,000}$

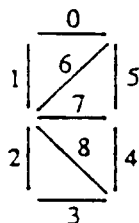
$$\begin{array}{r} \square 2 \square \\ + 2 \square 2 \\ \hline \triangle, 2 \ 2 \ \triangle \end{array}$$

11. In the addition problem above, if  $\square$  and  $\triangle$  each represent a digit, then  $\square$  represents

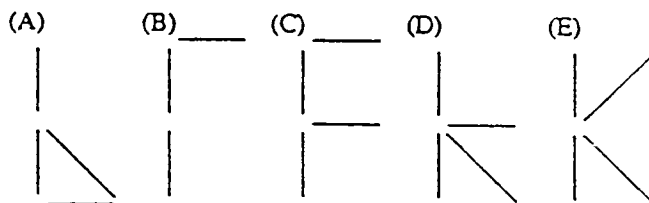
- (A) 9
- (B) 8
- (C) 5
- (D) 2
- (E) 0

$$\begin{array}{r} 7 \square 6 \\ -4 \square 9 \\ \hline 2 \square 7 \end{array}$$

12. If  $\square$  represents a digit in the subtraction problem above,  $\square =$
- (A) 1                      (B) 5                      (C) 6                      (D) 7                      (E) 9



13. The figure above shows the arrangement and code numbers of 9 fluorescent tubes. If a tube is illuminated whenever its code number is received, which of the following shows the arrangement of tubes illuminated when the digits in the result of  $3,804 \div 3$  are received?



14. Of the following, which is the closest approximation of  $\frac{50.2 \times 0.49}{199.8}$ ?

- (A)  $\frac{1}{10}$                       (B)  $\frac{1}{8}$                       (C)  $\frac{1}{4}$                       (D)  $\frac{5}{4}$                       (E)  $\frac{25}{2}$

$$\frac{61.24 \times (0.998)^2}{\sqrt{403}}$$

15. The expression above is approximately equal to

- (A) 1
- (B) 3
- (C) 4
- (D) 5
- (E) 6

16.  $\frac{(2)(0.33)(15)}{(0.24)}$  is approximately equal to

- (A) 2
- (B)  $\frac{5}{2}$
- (C) 15
- (D) 36
- (E) 40

17. Of the following, which is the best approximation for  $\frac{0.01 \times 2.005 \times 32.98}{11.12 \times 0.04}$ ?

- (A) 0.015
- (B) 0.15
- (C) 1.5
- (D) 15
- (E) 150

18. Of the following, the closest approximation to  $\frac{8.097(0.8745)}{0.202}$  is
- (A) 40
  - (B) 35
  - (C) 30
  - (D) 4
  - (E) 3

*<High Level Questions>*

19. If a sequence of 8 consecutive odd integers with increasing values has 9 as its 7th term, what is the sum of the terms of the sequence?
- (A) 22
  - (B) 32
  - (C) 36
  - (D) 40
  - (E) 44
20. If  $w, x, y,$  and  $z$  are positive and  $\frac{w}{x} = \frac{y}{z}$ , which of the following is NOT always true?
- (A)  $wz = xy$
  - (B)  $\frac{x}{w} = \frac{z}{y}$
  - (C)  $\frac{x}{y} = \frac{z}{w}$
  - (D)  $\frac{w+x}{x} = \frac{y+z}{z}$
  - (E)  $\frac{x+w}{w} = \frac{z+y}{y}$

21. If  $d = \frac{a+b}{1+\frac{ab}{c^2}}$ ,  $a = \frac{c}{2}$ , and  $b = \frac{3c}{4}$ , what is the value of  $d$  in terms of  $c$ ?
- (A)  $\frac{10c}{11}$   
(B)  $\frac{5c}{2}$   
(C)  $\frac{10c}{3}$   
(D)  $\frac{10}{11c}$   
(E)  $\frac{5}{2c}$
22. Tamara saves \$35 each week. If she now has \$100 saved, in how many weeks can she first have enough saved to buy a lawn mower that costs \$250?
- (A) 2  
(B) 3  
(C) 4  
(D) 5  
(E) 6
23. If  $x > 3,000$ , then the value of  $\frac{x}{2x+1}$  is closest to
- (A)  $\frac{1}{6}$   
(B)  $\frac{1}{3}$   
(C)  $\frac{10}{21}$   
(D)  $\frac{1}{2}$   
(E)  $\frac{3}{2}$



24. A certain clock indicates 8 o'clock. If the clock runs accurately for the next 11,995 hours, what hour will it indicate at the end of that time?
- (A) 1 o'clock  
(B) 2 o'clock  
(C) 3 o'clock  
(D) 5 o'clock  
(E) 10 o'clock
25. If  $\frac{1}{2}$  the result obtained when 2 is subtracted from  $5x$  is equal to the sum of 10 and  $3x$ , what is the value of  $x$ ?
- (A)  $-22$   
(B)  $-4$   
(C)  $4$   
(D)  $18$   
(E)  $22$
26. A light-year is approximately  $6 \times 10^{12}$  miles. Approximately how many miles from Earth is a galaxy that is  $2 \times 10^6$  light-years away?
- (A)  $3.0 \times 10^6$   
(B)  $1.2 \times 10^{18}$   
(C)  $1.2 \times 10^{19}$   
(D)  $1.2 \times 10^{72}$   
(E)  $1.2 \times 10^{73}$

27. If it is 6:27 in the evening on a certain day, what time in the morning was it exactly 2,880,717 minutes earlier? (Assume standard time in one location.)
- (A) 6:22
  - (B) 6:24
  - (C) 6:27
  - (D) 6:30
  - (E) 6:32
28. If the sum of two positive integers is 24 and the difference of their squares is 48, what is the product of the two integers?
- (A) 108
  - (B) 119
  - (C) 128
  - (D) 135
  - (E) 143
29. On a certain scale of intensity, each increment of 10 in magnitude represents a tenfold increase in intensity. On this scale, an intensity corresponding to a magnitude of 165 is how many times an intensity corresponding to a magnitude of 125?
- (A) 40
  - (B) 100
  - (C) 400
  - (D) 1,000
  - (E) 10,000

30. In the formula  $V = \frac{1}{(2r)^3}$ , if  $r$  is halved, then  $V$  is multiplied by

- (A) 64      (B) 8      (C) 1      (D)  $\frac{1}{8}$       (E)  $\frac{1}{64}$

$$\begin{array}{r} 1\Delta \\ - \square \\ \hline 0 \end{array}$$

31. In the subtraction problem above, **D**,  $\Delta$ , and **0** represent different positive digits. If  $\Delta$  is 1 greater than **D**, what is the value of **0**?

- (A) 9  
(B) 7  
(C) 5  
(D) 3  
(E) 2

32. Which of the following procedures is always equivalent to adding 5 given numbers and then dividing the sum by 5?

- I. Multiplying the 5 numbers and then finding the 5th root of the product.  
II. Adding the 5 numbers, doubling the sum, and then moving the decimal point one place to the left.  
III. Ordering the 5 numbers numerically and then selecting the middle number.
- (A) None  
(B) I only  
(C) II only  
(D) III only  
(E) I and III





### Category 1 Number Operations

1. For which of the following expressions is it true that the value of the expression is the same for  $x = 587$  as for  $x = -587$ ?

- I.  $1 - 2x$
- II.  $1 - 2x^2$
- III.  $(1 - 2x)^2$

- (A) I only
- (B) II only
- (C) I and III only
- (D) II and III only
- (E) I, II, and III

$$x = 587, x = -587$$

$x$



(B)

2. If the numbers  $\frac{17}{24}$ ,  $\frac{1}{2}$ ,  $\frac{3}{8}$ ,  $\frac{3}{4}$ , and  $\frac{9}{16}$  were ordered from greatest to least, the middle number of the resulting sequence would be

- (A)  $\frac{17}{24}$
- (B)  $\frac{1}{2}$
- (C)  $\frac{3}{8}$
- (D)  $\frac{3}{4}$
- (E)  $\frac{9}{16}$

GRE

i)

ii)

$$\frac{3}{8} \quad \frac{3}{4}$$

가

가

$$\frac{3}{8} \quad \frac{3}{4}$$

$$\frac{17}{24}, \frac{1}{2}, \frac{3}{8}, \frac{3}{4}$$

$$\frac{3}{8} \left( = \frac{9}{24} \right), \frac{1}{2} \left( = \frac{12}{24} \right), \frac{17}{24}, \frac{3}{4} \left( = \frac{18}{24} \right)$$

$$\frac{9}{16}$$

### fractions(  $\frac{22}{19}, \frac{11}{9}$  )

$$\frac{22}{19} \quad \frac{11}{9}$$

cross-multiplying(  $22 \cdot 9, 11 \cdot 19$  )

$$22 \cdot 9 < 11 \cdot 19, \text{ so } \frac{22}{19} < \frac{11}{9}$$



(E)

3. The sum  $\frac{7}{8} + \frac{1}{9}$  is between

(A)  $\frac{1}{2}$  and  $\frac{3}{4}$

(B)  $\frac{7}{8} + \frac{1}{9}$  and 1

(C) 1 and  $1\frac{1}{4}$

(D)  $1\frac{1}{4}$  and  $1\frac{1}{2}$

(E)  $1\frac{1}{2}$  and 2

$$\frac{7}{8} + \frac{1}{9} = \frac{71}{72}$$

1

(C),(D),(E)

$$\frac{3}{4} \left( = \frac{54}{72} \right) \quad \frac{71}{72}$$

(B)

$$\frac{7}{8} + \frac{1}{9}$$

(C),(D),(E)

$$\frac{7}{8}$$

1

$$\frac{1}{8}$$

$$\frac{1}{9}$$

$$\frac{1}{9} \quad \frac{1}{8}$$

$$\frac{7}{8} + \frac{1}{9} \quad 1$$

GRE

가



(B)

4. Of the following, which is closest to  $\frac{1}{7}$ ?

(A) 0.200

(B) 0.172

(C) 0.167

(D) 0.143

(E) 0.140

$$\frac{1}{7}$$

100



(D)

5. For all integers  $a$ ,  $b$ ,  $c$ , and  $d$ ,  $*(a,b,c,d)$  is defined as  $a - b + c - d$ . What is the value of  $*(1,3,8,5)$ ?

(A) -1

(B) 0

(C) 1

(D) 2

(E) 3

$*(a,b,c,d) = a - b + c - d$        $*(1,3,8,5)$

가

가



(C)

6. The operation  $\#$  is defined by the equation  $x\#y = \frac{x-y}{2x-y}$ , where  $2x \neq y$ . The value of

which of the following is 0?

- (A)  $-2\#2$   
 (B)  $2\#-2$   
 (C)  $2\#2$   
 (D)  $2\#1$   
 (E)  $3\#2$

$$x\#y = \frac{x-y}{2x-y} \quad 0 \quad .$$

가 0 가 0 .

 (C) .

7. The number 0.756 is how much greater than  $\frac{3}{4}$ ?


- (A)  $\frac{6}{25}$   
 (B)  $\frac{3}{125}$   
 (C)  $\frac{3}{250}$   
 (D)  $\frac{3}{500}$   
 (E)  $\frac{1}{250}$

$$0.756 - \frac{3}{4} \quad . \quad \frac{3}{4}$$

가 가 .  $3 \div 4$  ,

$$25 \quad \frac{75}{100} \quad . \quad \text{GMAT}$$

가 .

 (D) .

8. What number when multiplied by  $\frac{4}{7}$  yields  $\frac{6}{7}$  as the result?

- (A)  $\frac{2}{7}$  (B)  $\frac{2}{3}$  (C)  $\frac{3}{2}$  (D)  $\frac{24}{7}$  (E)  $\frac{7}{2}$

$$\frac{4}{7} \times \frac{3}{2} = \frac{6}{7} \quad \therefore x \times \frac{4}{7} = \frac{6}{7}$$

GRE



(C)

9. If the sum of 3 times  $n$ , 11 times  $n$ , and 111 times  $n$  is equal to 1,000, what is the value of  $n$ ?

- (A) 8 (B) 12.5 (C) 16 (D) 25 (E) 125

$$n \times 3 + n \times 11 + n \times 111 = 1,000 \quad n$$

$$(3n + 11n + 111n = 1,000)$$



(A)

10. Which of the following is equal to 0.042?

- (A)  $\frac{4}{10} + \frac{2}{10}$   
 (B)  $\frac{4}{10} + \frac{2}{100}$   
 (C)  $\frac{4}{100} + \frac{2}{100}$   
 (D)  $\frac{4}{100} + \frac{2}{1,000}$   
 (E)  $\frac{4}{1,000} + \frac{2}{1,000}$

$$\frac{4}{1000} + \frac{2}{1000} = \frac{6}{1000} = 0.006$$



(D)



$$\begin{array}{r}
 \square 2 \square \\
 + 2 \square 2 \\
 \hline
 \Delta, 2 \ 2 \ \Delta
 \end{array}$$

11. In the addition problem above, if  $\square$  and  $\Delta$  each represent a digit, then  $\square$  represents

- (A) 9      (B) 8      (C) 5      (D) 2      (E) 0

$\Delta$   
 $\Delta + 2 = 2$   
 $\Delta = 0$   
 $2 + \square = 2$   
 $\square = 0$   
 $9 + \square = 9$   
 $\square = 0$

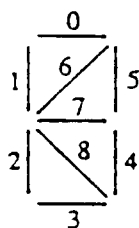
(A) 9

$$\begin{array}{r}
 7 \square 6 \\
 - 4 \square 9 \\
 \hline
 2 \square 7
 \end{array}$$

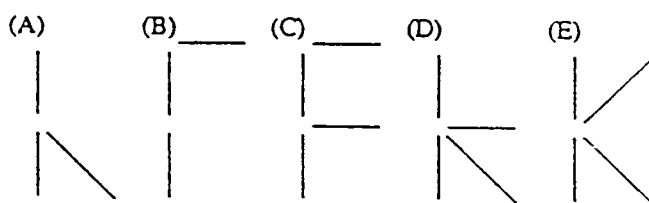
12. If  $\square$  represents a digit in the subtraction problem above,  $\square$  =

- (A) 1  
(B) 5  
(C) 6  
(D) 7  
(E) 9

(E) 9



13. The figure above shows the arrangement and code numbers of 9 fluorescent tubes. If a tube is illuminated whenever its code number is received, which of the following shows the arrangement of tubes illuminated when the digits in the result of  $3,804 \div 3$  are received?



가 9 fluorescent tube code tube가 3,804 ÷ 3 . Code tube

(D) .

14. Of the following, which is the closest approximation of  $\frac{50.2 \times 0.49}{199.8}$ ?

(A)  $\frac{1}{10}$  (B)  $\frac{1}{8}$  (C)  $\frac{1}{4}$  (D)  $\frac{5}{4}$  (E)  $\frac{25}{2}$

GRE 가 .

$$\frac{50 \times 0.5}{200} = \frac{1}{8}$$

(B) .

$$\frac{61.24 \times (0.998)^2}{\sqrt{403}}$$

15. The expression above is approximately equal to

- (A) 1
- (B) 3
- (C) 4
- (D) 5
- (E) 6

$$\frac{60 \times (1)^2}{20} = 3$$



(B) .

16.  $\frac{(2)(0.33)(15)}{(0.24)}$  is approximately equal to

- (A) (A) 2
- (B)  $\frac{5}{2}$
- (C) 15
- (D) 36
- (E) 40



(E) .

17. Of the following, which is the best approximation for  $\frac{0.01 \times 2.005 \times 32.98}{11.12 \times 0.04}$ ?

- (A) 0.015
- (B) 0.15
- (C) 1.5
- (D) 15
- (E) 150



(C) .

- 



[www.bcsourgoal.com.bd](http://www.bcsourgoal.com.bd)

20. If  $w, x, y$ , and  $z$  are positive and  $\frac{w}{x} = \frac{y}{z}$ , which of the following is NOT always true?

(A)  $wz = xy$

(B)  $\frac{x}{w} = \frac{z}{y}$

(C)  $\frac{x}{y} = \frac{z}{w}$

(D)  $\frac{w+x}{x} = \frac{y+z}{z}$

(E)  $\frac{x+w}{w} = \frac{z+y}{y}$

$$\frac{w}{x} = \frac{y}{z}$$

$$wz = xy, \quad (C)$$



(C)

21. If  $d = \frac{a+b}{1+\frac{ab}{c^2}}$ ,  $a = \frac{c}{2}$ , and  $b = \frac{3c}{4}$ , what is the value of  $d$  in terms of  $c$ ?

(A)  $\frac{10c}{11}$

(B)  $\frac{5c}{2}$

(C)  $\frac{10c}{3}$

(D)  $\frac{10}{11c}$

(E)  $\frac{5}{2c}$

$$d = \frac{a+b}{1+\frac{ab}{c^2}}$$

$$a = \frac{c}{2} \quad b = \frac{3c}{4} \quad d = \frac{a+b}{1+\frac{ab}{c^2}}$$



(A)

22. Tamara saves \$35 each week. If she now has \$100 saved, in how many weeks can she first have enough saved to buy a lawn mower that costs \$250?

(A) 2

(B) 3

(C) 4

(D) 5

(E) 6

\$100      \$250      lawn mower      가  
 \$100      \$150      \$35      4  
 \$140      \$240      5      가

 (D)

23. If  $x > 3,000$ , then the value of  $\frac{x}{2x+1}$  is closest to

- (A)  $\frac{1}{6}$       (B)  $\frac{1}{3}$       (C)  $\frac{10}{21}$       (D)  $\frac{1}{2}$       (E)  $\frac{3}{2}$

$\frac{x}{2x+1} = \frac{1}{2+\frac{1}{x}}$        $\frac{1}{x}$        $x$       3,001       $\frac{1}{x} = 0.00033322...$   
 1/2      가      .

 (D)

24. A certain clock indicates 8 o'clock. If the clock runs accurately for the next 11,995 hours, what hour will it indicate at the end of that time?

- (A) 1 o'clock  
 (B) 2 o'clock  
 (C) 3 o'clock  
 (D) 5 o'clock  
 (E) 10 o'clock

8      11,995      가      11,995  
 8      12,003 hours      가      24      3

 (C)

25. If  $\frac{1}{2}$  the result obtained when 2 is subtracted from  $5x$  is equal to the sum of 10 and  $3x$ ,

what is the value of  $x$ ?

- (A)  $-22$   
 (B)  $4$   
 (C)  $4$   
 (D)  $18$   
 (E)  $22$

$$\frac{1}{2}(5x - 2) = 10 + 3x$$

$$x = -22$$



(A)

26. A light-year is approximately  $6 \times 10^{12}$  miles. Approximately how many miles from Earth is a galaxy that is  $2 \times 10^6$  light-years away?

- (A)  $3.0 \times 10^6$   
 (B)  $1.2 \times 10^{18}$   
 (C)  $1.2 \times 10^{19}$   
 (D)  $1.2 \times 10^{72}$   
 (E)  $1.2 \times 10^{73}$

$$(\text{light-year}) \quad 6 \times 10^{12} \text{ miles} \quad , \quad 2 \times 10^6$$

$$\cdot 6 \times 10^{12} \times 2 \times 10^6 = 1.2 \times 10^{19}$$



(C)

27. If it is 6:27 in the evening on a certain day, what time in the morning was it exactly 2,880,717 minutes earlier? (Assume standard time in one location.)

- (A) 6:22      (B) 6:24      (C) 6:27      (D) 6:30      (E) 6:32

$$6:27 \quad , \quad 2,880,717 \text{ minutes}$$

$$\cdot 2,880,717 \text{ minutes} = (48,011 \times 60 \text{ minutes}) + 57 \text{ minutes.} \quad 57$$

$$6:30 \quad .$$



(D)

- (A) 108      (B) 119      (C) 128      (D) 135      (E) 143



- (A) 40  
(B) 100  
(C) 400  
(D) 1,000  
(E) 10,000



- (A) 64  
(B) 8  
(C) 1  
(D)  $\frac{1}{8}$   
(E)  $\frac{1}{64}$





$$\begin{array}{r} 1\Delta \\ - \square \\ \hline \bigcirc \end{array}$$

31. In the subtraction problem above, **D**, **E**, and **0** represent different positive digits. If **E** is 1 greater than **D**, what is the value of **0**?

(A) 9            (B) 7            (C) 5            (D) 3            (E) 2

$$= \Delta + 1 \quad \bigcirc$$

$\Delta = 1$  가  $= 2$ 가  $\bigcirc = 9$ 가 .

○ = 9가 .



(A)

- 32. Which of the following procedures is always equivalent to adding 5 given numbers and then dividing the sum by 5?**

**I. Multiplying the 5 numbers and then finding the 5th root of the product.**

**II. Adding the 5 numbers, doubling the sum, and then moving the decimal point one place to the left.**

### III. Ordering the 5 numbers numerically and then selecting the middle number.

**(A) None**

**(B) I only**

**(C) II only**

**(D) III only**

**(E) I and III**

5

5

D 5

10

5

5

2

10



(C)