

# STONECOLD'S MATH CHALLENGE - PS AND DS QUESTION COLLECTION.

1) If  $|x+3|=5$ , then what are the possible values of  $x$ ?

2) If  $x$  is a number such that  $-2 \leq x \leq 2$ , which of the following has the largest possible absolute value?

A.  $3x - 1$

B.  $x^2 + 1$

C.  $3 - x$

D.  $x - 3$

E.  $x^2 - x$

3) For what values of  $x$  is the expression  $|x^2 - 3|$  minimum?

4) If  $x$  is an integer and the units digit of  $x + x^2 + x^3$  is odd, which of the following must be even?

A.  $x$

B.  $x^2$

C.  $x^3$

D.  $3x$

E.  $x + x^2$

5) What is the units digit of  $789 + 4123 + 2666 + 842358$  ?

6) What is the units digit of  $1999 * 31452 * 600003 * 71456746$  ?

7) What is the units digit of  $2399 * 14352 + 90021003 * 918437986$  ?

A) 1

B) 2

C) 3

D) 4

**E)5**

**8)What is the remainder when  $104358+729$  is divided by 5?**

**A)4**

**B)3**

**C)2**

**D)1**

**E)0**

**9)If  $q = 40! + 1$ , which of the following cannot be a prime factor of  $q$ ?**

**I. 11**

**II. 19**

**III. 37**

**A. I only**

**B. III only**

**C. II and III**

**D. I and II**

**E. I, II, and III**

**10)If 10 and 8 are factors of  $Q$ , which of the following is the largest number that must divide evenly into  $Q$ ?**

**A. 12**

**B. 40**

**C. 50**

**D. 75**

**E. 100**

**11)Find the rightmost non-zero digit of the number 3456373003725?**

**A)1**

**B)3**

**C)5**

**D)7**

E)9

12)If  $x = 321$  and  $y = 655$ , what is the remainder when  $x*y$  is divided by 5?

A)0

B)1

C)2

D)3

E)4

13)If  $x = 321$  and  $y = 655$ , what is the remainder when  $2x+y$  is divided by 5?

A)0

B)1

C)2

D)3

E)4

14)If  $p$  is a positive integer, what is the units digit of  $Z$ , if  $Z = 1044p+1 * 277p+1 * 93p+2 * 3096p$ ?

A)0

B)2

C)4

D)6

E)8

15)Data Sufficiency->If  $p$  and  $q$  are positive integers and  $X=6p+7q+23$ , what is the units digit of  $X$ ?

(1)  $q=2p-11$

(2)  $q^2-10q+9=0$

16)Data Sufficiency->The number  $x$  is a positive odd integer. If the unit digit of  $x^3$  is subtracted from the unit digit of  $x^2$ , it results in 0. What is the unit digit of the number  $x+7$ ?

**(1) The unit digit of the product of 105 and x is 5.**

**(2) When x is divided by 5, it leaves no remainder.**

**17) Data Sufficiency -> If M and N are positive integers greater than 1, what is the remainder when the expression  $223M * 392N + 142(M+N)$  is divided by 5?**

**(1)  $M = 13$**

**(2)  $N = 14$**

**18) If  $Z = 1^1 * 2^2 * 3^3 * \dots * 8^8$ , what is the remainder when Z is divided by 10?**

**A) 0**

**B) 1**

**C) 2**

**D) 3**

**E) 4**

**19) If  $Z = 1^1 + 2^2 + 3^3 + \dots + 8^8$ , what is the remainder when Z is divided by 10?**

**A) 0**

**B) 2**

**C) 4**

**D) 6**

**E) 8**

**20) What is the units digit of  $3146732 * 9764523 * (321685 + 8652)479$  ?**

**A) 0**

**B) 1**

**C) 2**

**D) 5**

**E) 8**

**21) What will be the units digit, when the product of the first 10**

**natural numbers is divided by 100?**

- A)0**
- B)2**
- C)4**
- D)6**
- E)8**

**22)Find the product of  $57 \times 61 \times 39 \times 53$ .**

- A)7086751**
- B)7086953**
- C)7186959**
- D)7186965**
- E)7286977**

**23)Find the units digit of the product of all the prime numbers between 1 and  $13^{13}$ .**

- A)0**
- B)2**
- C)3**
- D)5**
- E)6**

**24)What is the rightmost non-zero digit of 9042?**

- A)9**
- B)7**
- C)5**
- D)3**
- E)1**

**25)Data Sufficiency->Find the units digit of  $53n+95m$  , where m and n are positive integers.**

**(1)m is an odd integer.**

**(2)n is an even integer.**

26) If  $a$  is a positive integer, and if the units digit of  $a^2$  is 9 and the units digit of  $(a+1)^2$  is 4, what is the units digit of  $(a+2)^2$ ?

- A) 1
- B) 3
- C) 5
- D) 6
- C) 14

27) If  $x$  is a positive integer, what is the units digit of  $(24)(2x+1)(33)(x+1)(17)(x+2)(9)(2x)$ ?

- A) 4
- B) 6
- C) 7
- D) 8
- E) 9

28) If the units digit of  $x^3$  is 6, what is the units digit of integer  $x$ ?

- A. 2
- B. 3
- C. 4
- D. 6
- E. 12

29) What is the unit's digit of  $775+6$ ?

- A. 1
- B. 3
- C. 5
- D. 7
- E. 9

30) What is the units digit of  $(5! \cdot 4! + 6! \cdot 5!)/31$ ?

- A. 4
- B. 3
- C. 2

D. 1

E. 0

31) What is the units digit of  $6^{15} - 7^4 - 9^3$ ?

A) 8

B) 7

C) 6

D) 5

E) 4

32) What is the units digit of  $3^{67}$ ?

A. 1

B. 3

C. 5

D. 7

E. 9

33) What is the units digit of  $18! + 4!$ ?

A. 0

B. 1

C. 2

D. 3

E. 4

34) What is the units digit of  $17^{381}$ ?

A. 1

B. 3

C. 5

D. 7

E. 9

35) What is the units digit of  $26! + 50! + 4! + 4!$ ?

A. 8

B. 6

C. 4

D. 2

E. 0

36) What is the units digit of  $(3^{11})(4^{13})$ ?

A. 2

B. 4

C. 6

D. 7

E. 8

37) What is the units digit of the expression  $14^7 - 18^4$ ?

(A) 0

(B) 3

(C) 4

(D) 6

(E) 8

38) What is the units' digit of the following expression  $(13)^5 * (15)^4 * (17)^5$ ?

A. 0

B. 1

C. 3

D. 5

E. 9

39) What is the unit's digit of 177?

A) 1

B) 3

C) 5

D) 7

E) 9

40) What is the units digit of 1327?

- A. 1
- B. 2
- C. 3
- D. 7
- E. 9

41) What is the units digit of  $18^{47}$  ?

- A. 0
- B. 2
- C. 4
- D. 6
- E. 8

42) What is the units digit of  $(23^6)(17^3)(61^9)$ ?

- A. 1
- B. 3
- C. 5
- D. 7
- E. 9

43) If  $x$  is a positive integer, what is the units digit of  $245 + 2x * 366 * 173$ ?

- (A) 2
- (B) 3
- (C) 4
- (D) 6
- (E) 8

44) What is the units digit of  $2222^{(333)} * 3333^{(222)}$ ?

- A. 0
- B. 2
- C. 4
- D. 6
- E. 8

**45) What is the units digit of  $6m \cdot (27+1)$  for a positive integer  $m$ ?**

- A. 1**
- B. 3**
- C. 4**
- D. 7**
- E. 0**

**46) Data Sufficiency -> If  $z$  is an integer, is  $z$  even?**

- (1)  $z/2$  is not an odd integer.**
- (2)  $z + 5$  is an odd integer.**

**47) Data Sufficiency -> If  $z$  is an integer, is  $z$  even?**

- (1)  $(z + 7)/3 = 2m + 1$ , where  $m$  is an integer.**
- (2)  $z^3$  is even.**

**48) Data Sufficiency -> Is  $z$  an even integer?**

- (1)  $z/2$  is an even integer.**
- (2)  $3z$  is an even integer.**

**49) Data Sufficiency -> If  $z$  is an integer, is  $z$  even?**

- (1)  $z/2$  is even.**
- (2)  $3z$  is even.**

**50) Data Sufficiency -> The product of integers  $x$ ,  $y$ , and  $z$  is even, is  $z$  even?**

- (1)  $x/y = z$**
- (2)  $z = xy$**

**51) Data Sufficiency -> The product of integers  $x$ ,  $y$ , and  $z$  is even, is  $x$  even?**

- (1)  $x/y = z$**
- (2)  $z = xy$**

**52)Data Sufficiency->If, x, y, and z are integers, is x even?**

**(1)  $10^x = 4^y * 5^z$**

**(2)  $3^{(x + 5)} = 27^{(y + 1)}$**

**53)Data Sufficiency->If x, y, and z are all positive integers, is x + y + z even?**

**1)  $2x(y+z) = \text{odd}$ .**

**2)  $x24yz$  is an integer.**

**54)Data Sufficiency->If x,y,z and t are integers,is x+y-z+t even?**

**(1) $x+y+t$  is even.**

**(2) $t * z$  is odd.**

**55)If x is an integer, which of the following must be an even integer?**

**A:  $x^2-x-1$**

**B:  $x^2-4x+6$**

**C:  $x^2-5x+5$**

**D:  $x^2+3x+8$**

**E:  $x^2+2x+10$**

**56)Data Sufficiency->Is a even?**

**(1)  $2a$  is even.**

**(2)  $a\sqrt{a}$  is even.**

**57)Data Sufficiency->Is n an even?**

**1)  $3n=\text{even}$**

**2)  $5n=\text{even}$**

**58)Data Sufficiency-> Is the integer a even?**

**(1) a is divisible by 7.**

**(2) a is divisible by 14.**

**59)Data Sufficiency->Is n an even?**

**1)  $7n$  is even.**

2)  $28n$  is even.

60) Data Sufficiency -> If  $n$  is an integer, is  $n - 1$  even?

(1)  $n - 2$  is odd.

(2)  $n + 1$  is even.

61) Data Sufficiency -> Is  $N$  divisible by 4?

(1)  $N$  is a product of two even integers.

(2)  $N$  is a product of three consecutive integers.

62) Data Sufficiency -> Is positive integer  $n$  is divisible by 4 ?

1)  $n^2$  is divisible by 8.

2)  $\sqrt{n}$  is even integer.

63) Data Sufficiency -> If  $n$  is a positive integer, is  $n^3 - n$  divisible by 4?

(1)  $n = 2k+1$ , where  $k$  is an integer.

(2)  $n^2 + n$  is divisible by 6.

64) Data Sufficiency -> If  $n$  is an integer, is  $n$  even?

(1)  $2n$  is divisible by 4.

(2)  $n^2$  is even.

65) Data Sufficiency -> Is  $n$  an even number?

(1)  $n^2 = n$

(2)  $n^3 = n$

66) Data Sufficiency -> If  $n$  is an integer, is  $n$  even?

(1)  $n^2 - 1$  is an odd integer.

(2)  $3n + 4$  is an even integer.

67) Data Sufficiency -> If  $n$  and  $m$  are positive integers, is  $n + m$  even?

(1)  $5nm$  is odd.

(2)  $n - m$  is even.

**68) Data Sufficiency -> If  $n$  and  $m$  are positive integers, is  $m$  a factor of  $n$ ?**

**(1)  $n = 5(3^k)$ , for any positive integer  $k$ .**

**(2)  $m = 3^{(k-1)}$ , for any positive integer  $k$ .**

**69) If  $x$  is an integer, which of the following must be an odd integer?**

**A)  $x^2 - x - 12$**

**B)  $x^2 - 4x + 6$**

**C)  $x^2 - 5x + 5$**

**D)  $x^2 + 3x + 8$**

**E)  $x^2 + 2x + 10$**

**70) If  $x$  is an even number, then which of the following statements must be divisible by 8?**

**A)  $3x^2$**

**B)  $6x$**

**C)  $4x$**

**D)  $10x$**

**E)  $x^3/2$**