

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

101) If 2940 multiplied by k is a square of an integer, what is the smallest possible value of k ?

- A) 3
- B) 6
- C) 15
- D) 21
- E) cannot be determined.

102) If n is a positive integer and the product of all integers from 1 to n , inclusive, is a multiple of 990, what is the least possible value of n ?

- A) 10
- B) 11
- C) 12
- D) 13
- E) 14

103) n is a positive integer, and k is the product of all integers from 1 to n inclusive. If k is a multiple of 1440, then the smallest possible value of n is

- A) 8
- B) 12
- C) 6
- D) 18
- E) 24

104) If x^2 is divisible by 216, what is the smallest possible value for positive integer x ?

105) If k is a positive even integer, what is the smallest possible value

of k such that $3675 \cdot k$ is the square of an integer?

- A.3
- B.9
- C.12
- D.15
- E.20

106) If $n = 4p$, where p is a prime number greater than 2, how many different positive even divisors does n have, including n ?

- (A) Two
- (B) Three
- (C) Four
- (D) Six
- (E) Eight

107) If $N = 2^2 \cdot 3^3 \cdot 5^5$, How many factors of N are divisible by 5 but not divisible by 3.

- A)10
- B)12
- C)14
- D)15
- E)20

108) What is the greatest prime factor of $12!11! + 11!10!$?

- (A) 7
- (B) 11
- (C) 13
- (D) 17
- (E) 19

109) Data Sufficiency -> How many distinct factors does positive integer k have?

(1) k has more distinct factors than the integer 9 but fewer distinct factors than the integer 81.

(2) k is the product of two distinct prime numbers.

110) What is the greatest prime factor of $(2^{29}) - (2^{26})$?

- A) 2**
- B) 4**
- C) 7**
- D) 8**
- E) 3**

111) Data Sufficiency -> How many different prime factors does positive integer n have?

- (1) $44 < n^2 < 99$**
- (2) $8n^2$ has twelve factors**

112) What is the greatest prime factor of 9919?

- A) 7**
- B) 13**
- C) 17**
- D) 97**
- E) 109**

113) If $5x^2$ has two different prime factors, at most how many different prime factors does x have?

- (A) 1**
- (B) 2**
- (C) 3**
- (D) 4**
- (E) 5**

114) What is the greatest prime factor of $12!11! + 11!10!$?

- (A) 7**
- (B) 11**
- (C) 13**
- (D) 17**

(E) 19

115)Data Sufficiency->How many different prime numbers are factors of positive integer n ?

(1) 4 different prime numbers are factors of $2n$.

(2) 4 different prime numbers are factors of n^2 .

116)What is the greatest prime factor of $3^6 - 1$?

A. 2

B. 3

C. 7

D. 13

E. 17

117)Data Sufficiency->If m and n are different positive integers, then how many prime numbers are in set $\{m, n, m + n\}$?

(1) mn is prime.

(2) $m + n$ is even.

118)What is the greatest prime factor of $1+2+3+\dots+40$?

A. 17

B. 29

C. 31

D. 37

E. 41

119)Data Sufficiency->How many positive factors does positive integer N have?

1) N^2 has three positive factors.

2) $2N$ has four positive factors.

120)If $n=3*4*p$ where p is a prime number greater than 3, how many different positive non-prime divisors does n have, excluding 1 and n ?

(A) Six

- (B) Seven
- (C) Eight
- (D) Nine
- (E) Ten

121) Data Sufficiency -> How many divisors does the positive integer N have?

- (1) $27N^3$ has 16 factors.
- (2) $90 < N^3 < 200$

122) Data Sufficiency -> How many prime factors does positive integer n have?

- (1) $n/5$ has only a prime factor.
- (2) $3 \cdot n^2$ has two different prime factors.

123) What is the greatest prime factor of $2^{10} \cdot 5^4 - 2^{13} \cdot 5^2 + 2^{14}$?

- (A) 2
- (B) 3
- (C) 7
- (D) 11
- (E) 13

124) Data Sufficiency -> If p is a positive integer, is $2p + 1$ prime?

- (1) p is prime.
- (2) units digit of p is not prime.

125) What is the greatest prime factor of $6^8 - 3^8$?

- A) 3
- B) 11
- C) 17
- D) 19
- E) 31

126) Data Sufficiency -> If p is a positive integer, is p a prime number?

(1) p and $p+1$ have the same number of factors.

(2) $p-1$ is a factor of p .

127) Data Sufficiency -> If p is a positive integer, is integer k prime?

(1) $3p + 3 = k$

(2) $7! + 3 = k$

128) Data Sufficiency -> k is a positive integer. Is k prime?

(1) At least one number in the set $\{1, k, k + 7\}$ is prime.

(2) k is odd.

129) Data Sufficiency -> What is the value of the integer p ?

(1) p is a prime number.

(2) $88 \leq p \leq 95$

130) Data Sufficiency -> If n is a positive integer, does n have four or more distinct factors?

(1) n is not prime

(2) $900 \leq n < 1100$

131) If x is an integer and x^2 is even, which of the following must be true?

I. x is odd.

II. x is even.

III. x^3 is odd.

(A) I only

(B) II only

(C) III only

(D) I and II only

(E) II and III only

132) Data Sufficiency -> If K is a positive 3-digit number, is K prime?

(1) The last digit of K is not even

(2) K is the smallest number possible where the hundreds digit is the

sum of the tens and units digit. Tens and units digits are equal.

133)Data Sufficiency->If x and y are positive integers, is y divisible by 3?

(1) $y = 2x^3 + 9x^2 - 5x$.

(2) x is an odd number

134)If x and y are positive integer and xy is divisible by 4, which of the following must be true?

A) If x is even then y is odd.

B) If x is odd then y is a multiple of 4.

C) If x+y is odd then y/x is not an integer.

D) If x+y is even then x/y is an integer.

E) xy is even.

135)If n is a prime number greater than 3, what is the remainder when n^2 is divided by 12 ?

(A) 0

(B) 1

(C) 2

(D) 3

(E) 5

136)Data Sufficiency->If x is a prime number, what is the value of x?

(1) $2x + 2$ is the cube of a positive integer.

(2) The average of any x consecutive integers is an integer.

137)The sum of prime numbers that are greater than 60 but less than 70 is

(A) 67

(B) 128

(C) 191

(D) 197

(E) 260

138)Data Sufficiency->If x , y , and z are positive integers, what is the greatest prime factor of the product xyz ?

(1) The greatest common factor of x , y , and z is 7.

(2) The lowest common multiple of x , y , and z is 84.

139)If $n=6p$, where p is a prime number greater than 2, how many different positive even divisors does n have, including n ?

A)2

B)3

C)4

D)6

E)cannot be determined.

140)Given that $N=a^3*b^4*c^5$ where a , b and c are distinct prime numbers, what is the smallest number with which N should be multiplied such that it becomes a perfect square, a perfect cube as well as a perfect fifth power?

A. $a^3*b^4*c^5$

B. $a^5*b^4*c^3$

C. $a^2*b^3*c^5$

D. $a^7*b^6*c^5$

E. $a^{27}*b^{26}*c^{25}$

141)Data Sufficiency->Is the integer b divisible by 6 ?

(1) $8b$ is divisible by 3.

(2) $9b$ is divisible by 12.

142)Data Sufficiency->If k is a positive integer, is k a prime number?

- (1) No integers between 2 and $k\sqrt{}$, inclusive divides k evenly.
(2) No integers between 2 and $k/2$ inclusive divides k evenly, and k is greater than 5.

143)The "prime sum" of an integer n greater than 1 is the sum of all the prime factors of n , including repetitions. For example , the prime sum of 12 is 7, since $12 = 2 \times 2 \times 3$ and $2 + 2 + 3 = 7$. For which of the following integers is the prime sum greater than 35 ?

- (A) 440
(b) 512
(C) 620
(D) 700
(E) 750

144)Data Sufficiency->If a and b are integers, is $a + b$ divisible by 15?

- (1) $a + b$ is divisible by 30.
(2) $a + b$ is divisible by 5

145)Data Sufficiency->If A and B are positive integers, is B divisible by A ?

- (1) $2B/A$ is an integer.
(2) B^2/A is an integer

146)Data Sufficiency->If n is a positive integer is $n-1$ divisible by 3 ?

- (1) n^2+n is not divisible by 6.
(2) $3n=3k+3$ where k is a positive multiple of 3

147)Data Sufficiency->If n is a positive integer, is $n - 1$ divisible by 3?

- (1) $n^2 + n$ is not divisible by 6.
(2) $3n=k+3$ where k is a positive multiple of 3.

148)Suppose x is the product of all the primes less than or equal to

59. How many primes appear in the set $\{x + 2, x + 3, x + 4, \dots, x + 59\}$?

- A) 0
- B) 17
- C) 18
- D) 23
- E) 24

149) The smallest prime factor of 899 is x . Which of the following is true of x ?

- A. $1 < x \leq 7$
- B. $7 < x \leq 14$
- C. $14 < x \leq 21$
- D. $21 < x \leq 28$
- E. $28 < x \leq 35$

150) Data Sufficiency -> If n is a positive integer, does n have four or more distinct factors?

- (1) n is not prime
- (2) $150 \leq n < 200$

151) Data Sufficiency -> If p is a positive integer, what is the value of p ?

- (1) $p/4$ is a prime number.
- (2) p is divisible by 3

152) Data Sufficiency -> If a and b are integers, is $(ab+2)(ab+3)(ab+4)$ divisible by 12?

- (1) $a = \text{even}$
- (2) $b = \text{odd}$

153) An integer n that is greater than 1 is said to be "prime-saturated" if it has no prime factor greater than or equal to \sqrt{n} .

Which of the following integers is prime saturated?

- A) 6

- B) 35
- C) 46
- D) 66
- E) 75

154) Data Sufficiency -> If p is a positive integer, is p^2 divisible by 96?

- (1) p is a multiple of 8.
- (2) p^2 is a multiple of 12

155) If x is a positive integer greater than 1, what is the sum of the multiples of x from x to x^2 , inclusive?

- (A) $x(x + 1)(x - 1)$
- (B) $x^2(x + 1)/2$
- (C) $x^2(x - 1)$
- (D) $(x^3 + 2x)/2$
- (E) $x(x - 1)^2$

156) Data Sufficiency -> Does $p^2 = q$ if p is a prime number?

- (1) $q^2 - p^2 = 0$
- (2) $p^2 = 49$

157) A number is said to be prime saturated if the product of all the different positive prime factors of n is less than the square root of n .

What is the greatest two digit prime saturated integer?

- A. 99
- B. 98
- C. 97
- D. 96
- E. 95

158) Data Sufficiency -> How many different prime factors does x have?

- 1) $5x^2$ has two different prime factors

2) $x > 1$

159) How many different prime factors does positive integer x have?

(1) $1 < x < 6$

(2) $5x^2$ has four factors.

160) Data Sufficiency -> If N is a positive integer, does N have exactly three factors?

(1) The integer N^2 has exactly five factors

(2) Only one factor of N is a prime number

161) Data Sufficiency -> What is the value of x ?

(1) x is the square of an integer.

(2) $577 < x < 675$

162) Data Sufficiency -> If x is a prime number, what is the value of x .

1) There are 4 prime numbers between 11 and x

2) There is no y such that $1 < y < x$ and y is the divisor of x .

163) Data Sufficiency -> If x is a prime number, what is the value of x .

1) There are 3 prime numbers between 11 and x

2) $x+1$ is a prime number

164) For how many positive integers is the number of positive divisors equal to the number itself?

A) none

B) one

C) two

D) three

E) cannot be determined

165) The positive integer 2000 has how many factors?

A) 2

B) 10

C)12

D)16

E)20

166)Data Sufficiency->If x is a perfect square greater than 1, what is the value of x ?

(1) x has exactly 3 distinct factors.

(2) x has exactly one positive odd factor

167)Data Sufficiency->How many factors does y have?

(1) y is the cube of an integer.

(2) y is the product of 2 distinct positive digits.

168)Data Sufficiency->If x , y and k are integers, is xy divisible by 3?

(1) $y = 2^{16} - 1$

(2) The sum of the digits of x equals 6^k

169)Data Sufficiency->If x is a prime number, what is the value of x ?

(1) x is less than 15

(2) $(x-2)$ is multiple of 5

170)Data Sufficiency->How many prime factors does positive integer n have?

(1) $n/7$ has only one prime factor.

(2) $3 \cdot n^2$ has two different prime factors.

171)If $x = 13y$, where y is a prime number greater than 2, how many different positive even divisors does x have, including x ?

A. 0

B. 1

C. 2

D. 3

E. It cannot be determined from the information given

172) Data Sufficiency -> If b is a positive integer, then b has how many distinct positive factors?

(1) all of b 's factors are also factors of 62.

(2) b is the product of one even prime number and one odd prime number.

173) Data Sufficiency -> How many different factors does the integer n have?

(1) $n = (a^4)(b^3)$ where a and b are different positive prime numbers.

(2) The only positive prime numbers that are factors of n are 5 and 7.

174) Data Sufficiency -> If x and y are positive integers and $x + y = 3^x$, is y divisible by 6?

(1) x is odd.

(2) x is a multiple of 3.

175) Data Sufficiency -> If $x^3 - x = n$ and x is a positive integer greater than 1, is n divisible by 8?

(1) When $3x$ is divided by 2, there is a remainder.

(2) $x = 4y + 1$, where y is an integer.

176) If a positive odd integer N has p positive factors, how many positive factors will $2N$ have?

A) p

B) $2p$

C) $p+1$

D) $2p+1$

E) Cannot be determined

177)Data Sufficiency->Is the integer n odd?

(1) n is divisible by 3

(2) 2n is divisible by twice as many positive integers as n

178)If x is a prime number greater than 5, y is a positive integer, and $5y=x^2+x$, then y must be divisible by which of the following?

I. 5

II. 2x

III. x+1

A. I only

B. II only

C. III only

D. I and II only

E. II and III only

179)If P is a prime number greater than 5, what is the remainder when P^2 is divided by 8.

A) 4

B) 3

C) 2

D) 1

E) Cannot be determined

180)Data Sufficiency->Is positive integer N divisible by 3?

(1) $N^2/36$ is an integer

(2) $144/N^2$ is an integer

181)Data Sufficiency->If x is an integer, is x^3 divisible by 7?

(1) $3*x^{12}$ is divisible by 7

(2) $3*x^4$ is divisible by 7

182)Data Sufficiency->How many different prime factors does positive integer n have?

(1) $48 < n^2 < 99$

(2) $125n^2$ has twelve factors

183)Data Sufficiency->Is the integer k divisible by 6?

(1) $6k$ is divisible by 12.

(2) $9k$ is divisible by 12.

184)If $n = 3^8 - 2^8$, which of the following is NOT a factor of n?

(A) 97

(B) 65

(C) 35

(D) 13

(E) 5

185)Data Sufficiency->If n is a positive integer, is $n^3 - n$ divisible by 24 ?

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

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

186)For which of the following values of n is $(100+n)/n$ NOT an integer?

(A) 1

(B) 2

(C) 3

(D) 4

(E) 5

187)Data Sufficiency->Is $a*b*c$ divisible by 24?

(1) a, b, and c are consecutive even integers

(2) $a*b$ is divisible by 12

188)Data Sufficiency->If x is the product of integers a, b, c, and d, is x divisible by 128?

(1) a = 24

(2) a, b, c, and d are consecutive even integers

189)Data Sufficiency->How many positive factors does positive integer N have?

1) N^3 has Four positive factors

2) $5N$ has four positive factors

190)Which of the following statements must be true?

A)If n is even then n^3-n is divisible by 24.

B)The sum of first 1000 prime numbers is even.

C)The product of first 32 primes is odd.

D)2 and 3 are the only consecutive prime numbers.

E)If n is odd then n^3-n is always divisible by 24.

191)Which of the following is NOT a factor of $10!$?

A. 1440

B. 625

C. 160

D. 80

E. 50

192)How many prime factors does the positive integer N have?

A) N^3 has 5 prime factors.

B) $10N^3$ has 7 Prime factors.

193)Data Sufficiency->How many prime factors does N have?

(1) N is a factor of 7200.

(2) 180 is a factor of N.

194)Data Sufficiency->If F is the prime factorization of $N!$, how many

factors in F have an exponent of 1?

(1) $30 \leq N \leq 40$

(2) $25 \leq N \leq 35$

195)Data Sufficiency->Given that x is an integer and x is positive, is $210x$ also an integer??

(1) x is a prime number.

(2) $x < 8$

196)Which of the following is NOT a factor of the product of the first 50 positive multiples of 4 ?

A. 172

B. 114

C. 76

D. 4712

E. 2124

197)Data Sufficiency->Is the integer n odd?

(1) a is an integer and $n=a^7+a^5+a^3+a^2+2a+1$

(2) $2n$ is divisible by twice as many positive integers as n

198)If a positive integer n has 211 factors, then how many prime factors does n have?

A)one

B)two

C)three

D)Four

E)cannot be determined

199)If a positive integer N has p factors ; how many factors will $2N$ have ?

A) p

B) $2p$

C) $P+1$

D) $2p+1$

E) Cannot be determined

200) Data Sufficiency -> Is integer k a prime number?

(1) $k = 10! + m$, where $1 < m < 8$

(2) k is a multiple of 7