

Here is the list of questions posted on different Forums related to PS
(Problem Solving)

Age Question: on gmatclub.com posted by me & explained by Bunuel

1. Roy is now 4 years older than Erik and half of that amount older than Iris. If in 2 years, Roy will be twice as old as Erik, then in 2 years what would be Roy's age multiplied by Iris's age?

- (a) 8
- (b) 28
- (c) 48
- (d) 50
- (e) 52

Answer & Explanation:

Roy is now 4 years older than Erik --> $R = E + 4$

Roy is now ... half of that amount older than Iris --> $R = I + \frac{4}{2} = I + 2$ (half of the amount of 4)

In 2 years, Roy will be twice as old as Erik --> $R + 2 = 2(E + 2)$ (in 2 years for both Roy and Erik)

Then in 2 years what would be Roy's age multiplied by Iris's age --> $(R + 2)(I + 2) = ?$

Solving: $R = 6$ and $I = 4$ --> $(R + 2)(I + 2) = 48$

Posted by 'ritual' & 'Mohit' explained by 'TheGMATDoctor' → gmatclub.com

Question is - For every positive even integer n , the function $h(n)$ is defined to be the product of all the even integers from 2 to n , inclusive. If p is the smallest factor of $h(100) + 1$, then p is

- A. between 2 and 10
- B. between 20 and 10
- C. between 20 and 30
- D. between 30 and 40
- E. greater than 40

This question is testing the concept of coprimes.

2 positive integers are coprime when their greatest common factor (their only common factor) is 1.

Now note that two different prime numbers are always coprime.

For example, 3 and 7 are coprime. So are 13 and 19.

But the two integers need not be prime numbers in order to be coprime.

For example, 4 and 9 are coprime (1 is their only common factor).

Also, Important!

Two consecutive integers are always coprime. The question is testing you on this concept.

Let's solve it now:

$h(n) = 2*4*6*.....*n$. ----n is even.

$h(100) = 2*4*6*..... 94*96*98*100$.

$h(100) = (2^{50})*(1*2*3*.....47*48*49*50)$. Note:I have pooled together all the 2s from all the even integers from 2 to 100; that's how I got 2^{50} . Now, the largest prime number involved in the above factorization is 47. All the prime from 2 to 47 are also involved in the above factorization. Actually, 47 is the greatest prime factor of $h(100)$.

Since $h(100)$ and $h(100) + 1$ are consecutive integers, they are necessarily coprime (see above). $h(100)$ and $h(100) + 1$ have no common factor except 1, so they have no common prime factor either. The smallest prime factor of $h(100) + 1$ must then be greater than 47.

Clearly, this prime factor is greater than 40.

Now explained by Bunuel → [gmatclub.com](https://www.gmatclub.com)

$$h(100)+1 = 2*4*6*...*100+1 = 2^{50}*(1*2*3*...*50)+1 = 2^{50}*50!+1$$

Now, two numbers $h(100) = 2^{50}*50!$ and $h(100)+1 = 2^{50}*50!+1$ are consecutive integers.

Two consecutive integers are co-prime, which means that they don't share ANY common factor but 1.

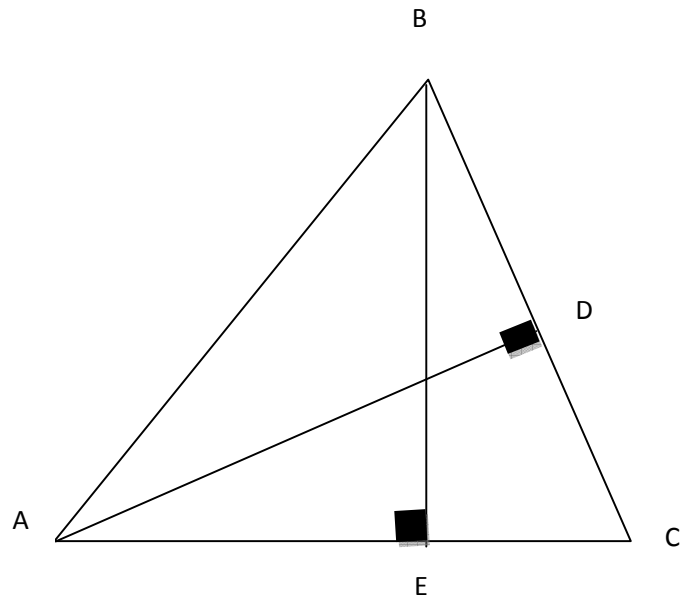
For example 20 and 21 are consecutive integers, thus only common factor they share is 1.

As $h(100) = 2^{50}*50!$ has all numbers from 1 to 50 as its factors, according to above

$h(100)+1 = 2^{50}*50!+1$ won't have ANY factor from 1 to 50. Hence $p(>1)$, the smallest factor of $h(100)+1$ will be more than 50.

Answer: E.

Posted by melifox → gmatclub.com



In the figure above, what is the product of the lengths of AD and BC?

- (1) The product of the lengths of AC and BE is 60
- (2) The length of BC is 8

Explained by chix475ntu → gmatclub.com

$$\frac{1}{2} * AD * BC = \text{area of } ABC (\frac{1}{2} * \text{base} * \text{height})$$

$$\text{st 1) } AC * BE = 60$$

$$\frac{1}{2} * AC * BE = \text{area of } ABC. \text{ so } AD * BC = 60$$

Sufficient

$$\text{st 2) } BC=8$$

Not sufficient

So answer is A

Posted by Bunuel → qmatclub.com:

7. THE DISTANCE BETWEEN THE CIRCLE AND THE LINE:

What is the least possible distance between a point on the circle $x^2 + y^2 = 1$ and a point on the line $y = \frac{3}{4}x - 3$?

- A) 1.4
- B) $\sqrt{2}$
- C) 1.7
- D) $\sqrt{3}$
- E) 2.0

Bunuel's Explanation:

This is tough:

First note that min distance from the circle to the line would be: length of perpendicular from the origin to the line (as the circle is centered at the origin) - the radius of a circle (which is 1).

Now we can do this by finding the equation of a line perpendicular to given line $y = \frac{3}{4}x - 3$ (we know it should cross origin and cross given line, so we can write the formula of it), then find the cross point of these lines and then the distance between the origin and this point. But it's very lengthy way.

There is another, shorter one. Though, I've never seen any GMAT question requiring the formula used in it.

We know the formula to calculate the distance between two points (x_1, y_1) and (x_2, y_2) :

$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$ BUT there is a formula to calculate the distance between the point (in our case origin) and the line:

DISTANCE BETWEEN THE LINE AND POINT:

Line: $ax + by + c = 0$, point (x_1, y_1)

$$d = \frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}}$$

DISTANCE BETWEEN THE LINE AND ORIGIN:

As origin is $(0, 0)$ →

$$d = \frac{|c|}{\sqrt{a^2 + b^2}}$$

$$d = \frac{|-3|}{\sqrt{1^2 + (\frac{3}{4})^2}} = \frac{12}{5} = 2.4$$

So in our case it would be:

So the shortest distance would be: $2.4 - 1(\text{radius}) = 1.4$

Answer: A.

P.S. Also note that when we have $x^2 + y^2 = k$, we have circle (as we have x^2 and y^2), it's centered at the origin (as coefficients of x and y are 1) and the radius of that circle $r = \sqrt{k}$.

You can check the link of Coordinate Geometry

Gaddam506's Explanation:

@ Bunuel

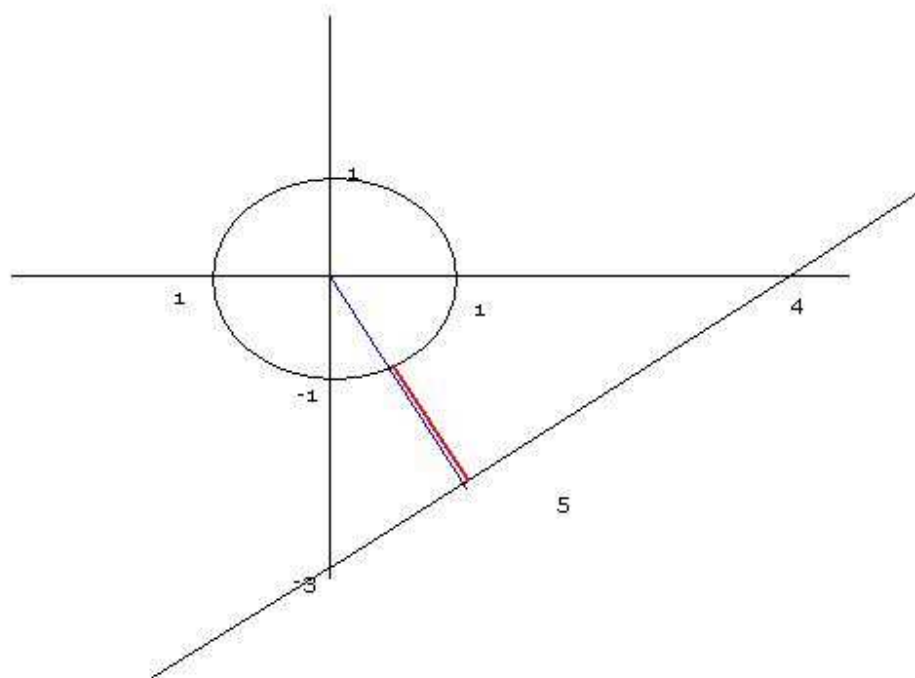
Q7 isn't that tough. we need a better approach.

Here is what I did.

Draw a circle with radius 1 and center as origin. Now draw the line $y = (3/4)x - 3$. This has y intercept -3 and x-intercept =4. Now draw a line(blue line) from (0,0) perpendicular to the line.

What we need is the length of red line. See the attached Diagram

Attachment:



Area of the right triangle with 3 as base is same as that with 5 as base

$(1/2)*3*4 = (1/2)*5*(\text{blue line}) \implies \text{blue line} = 2.4 \text{ units}$
 Hence red line = 2.4 - 1(radius of circle)
 = 1.4

Hope this helps.

Hitmans's Explanation:

Gents,

An easier way to solve this prob is thru basic geometry if anyone interested. An illustration will explain better but if you draw a (perpendicular) line between the center of the circle to the line $y = 3/4*x - 3$, you get a 3,4,5 right triangle where the longest edge is 4cm long. $4/5*3$ minus r of the circle (1) is equal to 1.4, the least possible distance. 😊

Vyacheslav's Explanation:

7. THE DISTANCE BETWEEN THE CIRCLE AND THE LINE:

I find useful to roughly draw such questions. You can instantly recognize that line $y = 3/4*x - 3$ and axes form a right triangle with sides 3 and 4, on Y-axis and X-axis respectively. The hypotenuse lies on the line $y = 3/4*x - 3$ and equals 5 (Pythagorean Triple). The closest distance from any point to line is perpendicular from that point to line. Perpendicular to the hypotenuse (from origin in this case) will always divide the triangle into two triangles with the same properties as the original triangle. So, let's perpendicular will x , then

$$\frac{x}{3} = \frac{4}{5} \text{ and } x = 3 * \frac{4}{5} = \frac{12}{5} = 2,4$$

To find distance from point on circle to line we should subtract length of radius from length of perpendicular: $2,4 - 1 = 1,4$

So, the answer is A.

Unfortunately, I cannot attach illustration. But if you draw this problem (even roughly), you will find it really easy to solve.

GMAT Tough Problem Solving - 1 (Numbers, Profit and Loss, Probability, Word Problems)

1. The sum of the even numbers between 1 and n is $79*80$, where n is an odd number, then $n = ?$

2. The price of a bushel of corn is currently \$3.20, and the price of a peck of wheat is \$5.80. The price of corn is increasing at a constant rate of $5x$ cents per day while the price of wheat is decreasing at a constant rate of x cents per day. What is the approximate price when a bushel of corn costs the same amount as a peck of wheat?

(A) \$4.50

(B) \$5.10

(C) \$5.30

(D) \$5.50

(E) \$5.60

3. How many randomly assembled people do u need to have a better than 50% prob. that at least 1 of them was born in a leap year?

4. In a basketball contest, players must make 10 free throws. Assuming a player has 90% chance of making each of his shots, how likely is it that he will make all of his first 10 shots?

5. $AB + CD = AAA$, where AB and CD are two-digit numbers and AAA is a three digit number; A, B, C, and D are distinct positive integers. In the addition problem above, what is the value of C?

(A) 1

(B) 3

(C) 7

(D) 9

(E) Cannot be determined

Solutions

1: First term $a=2$, common difference $d=2$ since even number therefore sum to first n numbers of Arithmetic progression would be $n/2(2a+(n-1)d) = n/2(2*2+(n-$

1)*2)=n(n+1) and this is equal to 79*80

therefore n=79 which is odd...

2. $320 + 5x = 580 - .41x$; $x = \#$ of days after price is same;

Solving for x ; x is approximately 48, thus the required price is $320 + 5 * 48 = 560$ cents = \$5.6

3. Prob. of a randomly selected person to have NOT been born in a leap yr = $3/4$.
Take 2 people, probability that none of them was born in a leap = $3/4 * 3/4 = 9/16$.

The probability at least one born in leap = $1 - 9/16 = 7/16 < 0.5$

Take 3 people, probability that none born in leap year = $3/4 * 3/4 * 3/4 = 27/64$.

The probability that at least one born = $1 - 27/64 = 37/64 > 0.5$

Thus min 3 people are needed.

4. The probability of making all of his first 10 shots is given by

$(9/10) * (9/10) * (9/10) * (9/10) * (9/10) * (9/10) * (9/10) * (9/10) * (9/10) * (9/10)$
 $= (9/10)^{10} = 0.348 \Rightarrow 35\%$

5. $AB + CD = AAA$

Since AB and CD are two digit numbers, then AAA must be 111

Therefore $1B + CD = 111$

B can assume any value between 3 and 9

If $B = 3$, then $CD = 111 - 13 = 98$ and $C = 9$

If $B = 9$, then $CD = 111 - 19 = 92$ and $C = 9$

So for all B between 3 & 9, $C = 9$

Therefore the correct answer is D ($C = 9$)

GMAT Tough Problem Solving - 2 (Speed and Distance, Geometry and proportions)

6. A and B ran a race of 480 m. In the first heat, A gives B a head start of 48 m and beats him by $\frac{1}{10}$ th of a minute. In the second heat, A gives B a head start of 144 m and is beaten by $\frac{1}{30}$ th of a minute. What is B's speed in m/s?

- (A) 12
- (B) 14
- (C) 16
- (D) 18
- (E) 20

7. A certain quantity of 40% solution is replaced with 25% solution such that the new concentration is 35%. What is the fraction of the solution that was replaced?

- (A) $\frac{1}{4}$
- (B) $\frac{1}{3}$
- (C) $\frac{1}{2}$
- (D) $\frac{2}{3}$
- (E) $\frac{3}{4}$

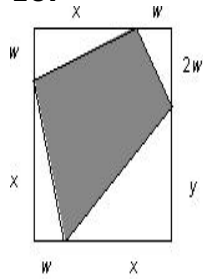
8. A bag contains 3 red, 4 black and 2 white balls. What is the probability of drawing a red and a white ball in two successive draws, each ball being put back after it is drawn?

- (A) $\frac{2}{27}$
- (B) $\frac{1}{9}$
- (C) $\frac{1}{3}$
- (D) $\frac{4}{27}$
- (E) $\frac{2}{9}$

9. What is the least possible distance between a point on the circle $x^2 + y^2 = 1$ and a point on the line $y = \frac{3}{4}x - 3$?

- A) 1.4
- B) $\sqrt{2}$
- C) 1.7
- D) $\sqrt{3}$
- E) 2.0

10.



In the square above, $12w = 3x = 4y$. What fractional part of the square is shaded?

- A) $\frac{2}{3}$
- B) $\frac{14}{25}$
- C) $\frac{5}{9}$
- D) $\frac{11}{25}$
- E) $\frac{3}{7}$

Solutions

6. race 1 :- $t_a = t_b - 6$ (because A beats B by 6 sec)

race 2 :- $T_a = t_b + 2$ (because A loses to B by 2 sec)

By the formula $D = S * T$

we get two equations

$$480/S_a = 432/S_b - 6 \text{ -----1)}$$

$$480/S_a = 336/S_b + 2 \text{ -----2)}$$

Equating these two equations we get $S_b = 12$

t_a, S_a stand for time taken by A and speed of A resp.

7. Let X be the fraction of solution that is replaced.

$$\text{Then } X * 25\% + (1 - X) * 40\% = 35\%$$

Solving, you get $X = 1/3$

8.Case I: Red ball first and then white ball

$$P1 = 3/9 * 2/9 = 2/27$$

Case 2: White ball first and then red ball

$$P2 = 2/9 * 3/9 = 2/27$$

Therefore total probability: $p1 + p2 = 4/27$

9.The equation of the line will be $3x - 4y - 12 = 0$.

This crosses the x and y axis at (0,-3) and (4,0)

The circle has the origin at the center and has a radius of 1 unit.

So it is closest to the given line when, a perpendicular is drawn to the line, which passes through the origin.

This distance of the line from the origin is $12 / \sqrt{9 + 16}$ which is 2.4

[Length of perpendicular from origin to line $ax + by + c = 0$ is

$$\text{mod } (c / \sqrt{a^2 + b^2})]$$

The radius is 1 unit.

So the shortest distance is $2.4 - 1 \text{ unit} = 1.4 \text{ units}$

10. Since $12w = 3x = 4y$,

$$w:x=3:12=1:4 \text{ and } x:y=4:3$$

$$\text{so, } w = 1$$

$$x = 4$$

$$y = 3$$

the fractional part of the square is shaded:

$$\{(w+x)^2 - [(1/2)wx + (1/2)wx + (1/2)xy + (1/2)w(2w)]\}/(w+x)^2$$

$$= \{(w+x)^2 - [wx + (1/2)xy + w^2]\}/[(w+x)^2]$$

$$=[(5^2) - (4+6+1)]/(5^2)$$

$$= (25 - 11)/25$$

= 14/25

GMAT Tough Problem Solving - 3 (Range, Permutations and Combinations and Train Problem)

11. The average of temperatures at noontime from Monday to Friday is 50; the lowest one is 45, what is the possible maximum range of the temperatures?

20 25 40 45 75

12. If n is an integer from 1 to 96, what is the probability for $n*(n+1)*(n+2)$ being divisible by 8? 25% 50% 62.5% 72.5% 75%

13. Kurt, a painter, has 9 jars of paint:

4 are yellow

2 are red

rest are brown

Kurt will combine 3 jars of paint into a new container to make a new color, which he will name accordingly to the following conditions:

Brun Y if the paint contains 2 jars of brown paint and no yellow

Brun X if the paint contains 3 jars of brown paint

Jaune X if the paint contains at least 2 jars of yellow

Jaune Y if the paint contains exactly 1 jar of yellow

What is the probability that the new color will be Jaune

a) 5/42

b) 37/42

c) $\frac{1}{21}$

d) $\frac{4}{9}$

e) $\frac{5}{9}$

14. TWO couples and a single person are to be seated on 5 chairs such that no couple is seated next to each other. What is the probability of the above??

15. An express train traveled at an average speed of 100 kilometers per hour, stopping for 3 minutes after every 75 kilometers. A local train traveled at an average speed of 50 kilometers, stopping for 1 minute after every 25 kilometers. If the trains began traveling at the same time, how many kilometers did the local train travel in the time it took the express train to travel 600 kilometers?

a. 300

b. 305

c. 307.5

d. 1200

e. 1236

Solutions

11.Soln The answer 25 doesn't refer to a temperature, but rather to a range of temperatures.

The average of the 5 temps is: $(a + b + c + d + e) / 5 = 50$

One of these temps is 45: $(a + b + c + d + 45) / 5 = 50$

Solving for the variables: $a + b + c + d = 205$

In order to find the greatest range of temps, we minimize all temps but one.

Remember, though, that 45 is the lowest temp possible, so: $45 + 45 + 45 + d = 205$
Solving for the variable: $d = 70$
 $70 - 45 = 25$

12.Soln:

Method 1:

$$E = n*(n+1)*(n+2)$$

E is divisible by 8, if n is even.

No of even numbers (between 1 and 96) = 48

E is divisible by 8, also when $n = 8k - 1$ ($k = 1, 2, 3, \dots$)

Such numbers total = 12(7, 15,)

Favorable cases = $48 + 12 = 60$.

Total cases = 96

$$P = 60/96 = 62.5$$

Method 2:

From 1 to 10, there are 5 sets, which are divisible by 8.

$(2*3*4) (4*7*6) (6*7*8)(7*8*9)(8*9*10)$

So till 96, there will be $12 * 5$ such sets = 60 sets so probability will be $60/96 = 62.5$

13.Soln: 1. This has at least 2 yellow meaning.

a> there can be all three Y => $4c3$

OR

b> 2 Y and 1 out of 2 R and 3 B => $4c2 \times 5c1$

Total 34

2.This has exactly 1 Y and remaining 2 out of 5 = $> 4c1 \times 5c2$

Total 40

Total possibilities = $(9!/3!6!) = 84$

Adding the two probabilities: probability = $74/84 = 37/42$

14.Soln:

Ways in which the first couple can sit together = $2*4!$ (1 couple is considered one unit)

Ways for second couple = $2*4!$

These cases include an extra case of both couples sitting together

Ways in which both couple are seated together = $2*2*3! = 4!$ (2 couples considered as 2 units- so each couple

can be arrange between themselves in 2 ways and the 3 units in $3!$ Ways)

Thus total ways in which at least one couple is seated together = $2*4! + 2*4! - 4!$
 $= 3*4!$

Total ways to arrange the 5 ppl = $5!$

Thus, prob of at least one couple seated together = $3*4! / 5! = 3/5$

Thus prob of none seated together = $1 - 3/5 = 2/5$

15.Soln: the answer is C: 307.5 km

Express Train:

600 km --> 6 hours (since 100 km/h) + stops * 3 min.

stops = $600 / 75 = 8$, but as it is an integer number, the last stop in km 600 is not a real stop, so it would be 7 stops

so, time = 6 hours + 7 * 3 min. = 6 hours 21 min

Local Train:

in 6 hours, it will make 300 km (since its speed is 50 km/hour)

in 300 km it will have $300 / 25$ stops = 12, 12 stops 1 min each = 12 min

we have 6 hours 12 min, but we need to calculate how many km can it make in 6 hours 21 min, so $21 - 12 = 9$ min

if 60 min it can make 50 km, 9 min it can make 7.5 km

so, the distance is $300 + 7.5 = 307.5$ km

GMAT Tough Problem Solving - 4 (Percentage, Permutation, Algebraic Expression)

16. Matt starts a new job, with the goal of doubling his old average commission of \$400. He takes a 10% commission, making commissions of \$100.00, \$200.00, \$250.00, \$700.00, and \$1,000 on his first 5 sales. If Matt made two sales on the last day of the week, how much would Matt have had to sell in order to meet his goal?

17. On how many ways can the letters of the word "COMPUTER" be arranged?

- 1) Without any restrictions.
- 2) M must always occur at the third place.
- 3) All the vowels are together.
- 4) All the vowels are never together.
- 5) Vowels occupy the even positions.

18. In the infinite sequence A, $A_n = X^{(n-1)} + X^n + X^{(n+1)} + X^{(n+2)} + X^{(n+3)}$

where x is a positive integer constant. For what value of n is the ratio of A_n to $x(1 + x(1 + x(1 + x(1 + x))))$ equal to x^5 ?

(A) 8

(B) 7

(C) 6

(D) 5

(E) 4

19. In how many ways can one choose 6 cards from a normal deck of cards so as to have all suits present?

a. $(13^4) \times 48 \times 47$

b. $(13^4) \times 27 \times 47$

c. $48C6$

d. 13^4

e. $(13^4) \times 48C6$

20. Each of the integers from 0 to 9, inclusive, is written on a separate slip of blank paper and the ten slips are dropped into a hat. If the slips are then drawn one at a time without replacement, how many must be drawn to ensure that the numbers on two of the slips drawn will have a sum of 10?

3

4

5

6

7

Solutions

16.Soln: The two sales on Matt's last day of the week must total \$33,500.

$$(100 + 200 + 250 + 700 + 1000 + x) / 7 = 800$$

$$x = 3350$$

since x is Matt's 10% commission, the sale is \$33,500.

17.Soln:

1) $8! = 40320$

2) $7 \times 6 \times 1 \times 5 \times 4 \times 3 \times 2 \times 1 = 5,040$

3) Considering the 3 vowels as 1 letter, there are five other letters which are consonants C, M, P, T, R CMPTR (AUE) = 6 letters which can be arranged in $6P6$ or $6!$ Ways and A, U, E themselves can be arranged in another $3!$ Ways for a total of $6! \times 3!$ Ways

4) Total combinations - all vowels always together

= what u found in 1) - what u found in 3)

= $8! - 6! \times 3!$

5) I think it should be 4×720 there are 4 even positions to be filled by three even numbers.

in $5 \times 3 \times 4 \times 2 \times 3 \times 1 \times 2 \times 1$ It is assumed that Last even place is NOT filled by a vowel. There can be total 4 ways to do that. Hence 4×720

18.Soln: The method I followed was to reduce the Q to $(x^6/x) \times (Y/Y)$

the eqn $A_n = (x^n - 1)(1 + x + x^2 + x^3 + \dots) \dots \dots \dots (1)$

and the eqn $x(1+x(1+x(1+x\dots)))$ which I call Z can be reduced to $x(1+x+x^2+x^3\dots) \dots \dots (2)$

from (1) and (2) we get $A_n / Z = x^{(n-1)} / x$ therefore for getting answer $x^5 (n-1) = 6$
therefore $n=7$

Ans: B

19.Soln: 52 cards in a deck -13 cards per suit

First card - let us say from suit hearts = $13C1 = 13$

Second card - let us say from suit diamonds = $13C1 = 13$

Third card - let us say from suit spade = $13C1 = 13$

Fourth card - let us say from suit clubs = $13C1 = 13$

Remaining cards in the deck = $52 - 4 = 48$

Fifth card - any card in the deck = $48C1$

Sixth card - any card in the deck = $47C1$

Total number of ways = $13 * 13 * 13 * 13 * 48 * 47 = 13^4 * 48 * 47$ ---> choice A

20.Soln:Ok consider this

$0 + 1 + 2 + 3 + 4 + 5 + 6$..Stop --> Don't go further. Why? Here's why.

At the worst the order given above is how u could pick the out the slips. Until u add the slip with no. 6 on it, no two slips before that add up to 10 (which is what the Q wants) the best u can approach is a sum of 9 (slip no. 5 + slip no. 4) but as soon as u add slip 6. Voila u get your first sum of 10 from two slips and that is indeed the answer = 7 draws

GMAT Tough Problem Solving - 5 (Multiples, Area, Set and Circular Permutation)

21. If P represents the product of the first 15 positive integers, then P is not a multiple of:

a) 99 b) 84 c) 72 d) 65 e) 57

22. The dimensions of a rectangular floor are 16 feet by 20 feet. When a rectangular rug is placed on the floor, a strip of floor 3 feet wide is exposed on all sides. What are the dimensions of the rug, in feet?

(A) 10 by 14 (B) 10 by 17 (C) 13 by 14 (E) (D) 13 by 17 (E) 14 by 16

23. How many different subsets of the set $\{10,14,17,24\}$ are there that contain an odd number of elements?

(a) 3 (b) 6 (c) 8 (d) 10 (e) 12

24. Seven men and seven women have to sit around a circular table so that no 2 women are together. In how many different ways can this be done?

a.24 b.6 c.4 d.12 e.3

25. If the sum of five consecutive positive integers is A, then the sum of the next five consecutive integers in terms of A is:

a) $A+1$

- b) $A+5$
- c) $A+25$
- d) $2A$
- e) $5A$

Solutions

21.Soln:

If P represents the product of the first 15 integers, P would consist of the prime numbers that are below 15.

2,3,5,7,11,13

Any value that has a prime higher than 13 would not be a value of P. $57 = 3 \times 19$. 19 is a prime greater than 13, so the answer is E.

22.Soln: The rug is placed in the middle of the room. The rug leaves 3m on either side of it both lengthwise and breadth wise. Now, the dimensions of the rug would be the dimensions of the room - the space that it does not occupy. With three 3 on either side, 6 m is not occupied by the rug in both dimensions.

So, rug size = $(16-6) \times (20-6) = 10 \times 14$

23.Soln: 8 is the answer. The different subsets are

10,

14,

17,

24,

10, 14, 17

14 17 24

17 24 10

24 10 14

24.Soln: I suggest to first arranging men. This can be done in $6!$ Ways. Now to satisfy above condition for women, they should sit in spaces between each man. This can be done in $7!$ Ways (because there will be seven spaces

between each man on round table)

Total ways = $6! \times 7!$

25.Soln: If you divide the sum obtained by adding any 5 consecutive numbers by '5', and then you will get the Center number of the sequence itself.

i.e. $1 + 2 + 3 + 4 + 5 = 15$, $15/5 = 3$. 1, 2, 3, 4, 5

so, sixth consecutive number will be '3' more than the 'Middle term'

i.e. $3+3=6$, similarly $3+4=7$

Hence going by this. Asked sum would be

$$[(A/5) + 3] + [(A/5) + 4] + [(A/5) + 5] + [(A/5) + 6] + [(A/5) + 7] = A + 25$$

GMAT Tough Problem Solving - 6 (Venn Diagram, Ratio , Probability and Triangles)

26. There are 8 students. 4 of them are men and 4 of them are women. If 4 students are selected from the 8 students. What is the probability that the number of men is equal to that of women?

A.18/35 B.16/35 C.14/35 D.13/35 E.12/35

27. The area of an equilateral triangle is 9.what is the area of it circumcircle.

A.10PI B.12PI C.14PI D.16PI E.18PI

28.A group of people participate in some curriculums, 20 of them practice Yoga, 10 study cooking, 12 study weaving, 3 of them study cooking only, 4 of them study both the cooking and yoga, 2 of them participate all curriculums. How many people study both cooking and weaving?

A.1 B.2 C.3 D.4 E.5

29. There 3 kinds of books in the library fiction, non-fiction and biology. Ratio of fiction to non-fiction is 3 to 2; ratio of non-fiction to biology is 4 to 3, and the total of the books is more than 1000?which one of following can be the total of the book?

A 1001 B. 1009 C.1008 D.1007 E.1006

30. In a consumer survey, 85% of those surveyed liked at least one of three products: 1, 2, and 3. 50% of those asked liked product 1, 30% liked product 2, and 20% liked product 3. If 5% of the people in the survey liked all three of the products, what percentage of the survey participants liked more than one of the three products?

- A) 5
- B) 10
- C) 15
- D) 20
- E) 25

Solutions

26.Soln: there has to be equal no of men & women so out of 4 people selected there has to be 2M & 2W.

Total ways of selecting 4 out of 8 is $8C4$

total ways of selecting 2 men out of 4 is $4C2$

total ways of selecting 2 women out of 4 is $4C2$

so probability is $(4C2 * 4C2) / 8C4 = 18/35$

27.Soln: area = $\frac{\sqrt{3}}{4} * (\text{side})^2 = 9$

so , $(\text{side})^2 = (9 * 4) / \sqrt{3}$

Height = $H = \frac{\sqrt{3}}{2} * (\text{side})$, so $H^2 = \frac{3}{4} * \text{Side}^2 = \frac{3}{4} * (9 * 4) / \sqrt{3}$

Radius of CircumCircle = $R = \frac{2}{3}$ of (Height of the Equilateral Triangle)

so , area of Circumcircle = $\pi * R^2$

=> $\pi * \frac{4}{9} * H^2$

=> $\pi * \frac{4}{9} * \frac{3}{4} * (9 * 4) / \sqrt{3}$

=> $\pi * 4 * \sqrt{3}$

28.Soln: We know there are 10 people who do cooking as an activity.

3 -> people who do only cooking

4 -> do cooking and Yoga

2 -> do all of the activities

x -> number of people doing cooking and weaving

When you sum all this up, we should have 10. So $3+4+2+x=10 \rightarrow x=10-9=1$

29.Soln: fiction : non-fiction = 3 : 2 = 6 : 4

non-fiction : biology = 4 : 3

fiction : non-fiction : biology = 6 : 4 : 3

$$6x + 4x + 3x = 1000$$

$$x = 76 \frac{12}{13}$$

if we add 1, 13 will divide evenly ($1001/13 = 77$)

$$1000 + 1 = 1001$$

30.Soln: $n(1 \cup 2 \cup 3) = n(1) + n(2) + n(3) - n(1 \cap 2) - n(2 \cap 3) - n(1 \cap 3) + n(1 \cap 2 \cap 3)$

$$85 = 50 + 30 + 20 - [n(1 \cap 2) - n(2 \cap 3) - n(1 \cap 3)] + 5$$

$$[n(1 \cap 2) - n(2 \cap 3) - n(1 \cap 3)] = 20$$

GMAT Tough Problem Solving - 7 (Cost , Discounts, Ratios, Percentage and Standard Deviation)

31. For a certain company, operating costs and commissions totaled \$550 million in 1990, representing an increase of 10 percent from the previous year. The sum of operating costs and commissions for both years was

(A) \$1,000 million

(B) \$1,050 million

(C) \$1,100 million

(D) \$1,150 million

(E) \$1,155 million

32. Fox jeans regularly sell for \$15 a pair and Pony jeans regularly sell for \$18 a pair. During a sale these regular unit prices are discounted at different rates so that a total of \$9 is saved by purchasing 5 pairs of jeans: 3 pairs of Fox jeans and 2 pairs of Pony jeans. If the sum of the two discounts rates is 22 percent, what is the discount rate on Pony jeans?

(A) 9%

(B) 10%

(C) 11%

(D) 12%

(E) 15%

33. There are 2 kinds of staff members in a certain company, PART TIME AND FULL TIME. 25 percent of the total members are PART TIME members others are FULL TIME members. The work time of part time members is $\frac{3}{5}$ of the full time members. Wage per hour is same. What is the ratio of total wage of part time members to total wage of all members.

A. $\frac{1}{4}$ B. $\frac{1}{5}$ C. $\frac{1}{6}$ D. $\frac{1}{7}$ E. $\frac{1}{8}$

34. If 75% of a class answered the 1st question on a certain test correctly, 55% answered the 2nd question on the test correctly and 20% answered neither of the questions correctly, what percent answered both correctly?

(A) 10%

(B) 20%

(C) 30%

(D) 50%

(E) 65%

35. A set of data consists of the following 5 numbers: 0, 2, 4, 6, and 8. Which two numbers, if added to create a set of 7 numbers, will result in a new standard deviation that is close to the standard deviation for the original 5 numbers?

A). -1 and 9

B). 4 and 4

C). 3 and 5

D). 2 and 6

E). 0 and 8

Solutions

31.Soln: 1998 = \$500 M

1999 = \$550 M

Sum = \$ 1050 M

Ans:B

32.Soln: Ans : B

Total discount is 22% = \$9

by back solving, in this case ,the discount percent for pony jeans should be less than 11% (22/2)because the price of this product is more.

take choice B

10% of 18= 1.8

total discount on 2 pony jeans= \$3.6

22%-10%=12%

12% of 15 = \$1.8

total discount on 3 fox jeans = \$5.4

3fox jeans discount +2 pony jeans discount =\$9

5.4 +3.6=9

so answer is B.

33.Soln: What is the ratio of total wage of part time members to total wage of all members.

You have calculated ratio of Part time-to-Full time.

$P = \frac{x}{4} \cdot \frac{3y}{5} \cdot \frac{3xy}{4} \cdot 5$

$A = \frac{3x}{4} Y + \frac{x}{4} \cdot \frac{3y}{5} \cdot \frac{18xy}{20}$

Ratio= $p/a = \frac{3xy}{18xy} = \frac{1}{6}$

34.Soln: This problem can be easily solved by Venn Diagrams

Lets think the total class consists of 100 students

so 75 students answered question 1

and 55 students answered question 2

Now 20 students not answered any question correctly

Therefore out of total 100 students only 80 students answered either question 1 or question 2 or both the questions...

So $75+55=130$ which implies $130-80=50\%$ are the students who answered both correctly and are counted in both the groups...that's why the number was 50 more..

35.Soln: $SD = \sqrt{\text{Sum}(X-x)^2/N}$

Since N is changing from 5 to 7. Value of $\text{Sum}(X-x)^2$ should change from 40(current) to 48. So that SD remains same.

so due to new numbers it adds 8. Choice D only fits here.

GMAT Tough Problem Solving - 8 (Divisibility, Area, Odd and Even numbers)

36. How many integers from 0 to 50, inclusive, have a remainder of 1 when divided by 3?

A.14 B.15. C.16 D.17 E.18

37. If $k=m(m+4)(m+5)$ k and m are positive integers. Which of the following could divide k evenly?

I.3 II.4 III.6

38. If the perimeter of square region S and the perimeter of circular region C are equal, then the ratio of the area of S to the area of C is closest to

(A) $\frac{2}{3}$

(B) $\frac{3}{4}$

(C) $\frac{4}{3}$

(D) $\frac{3}{2}$

(E) 2

39. Two people walked the same distance, one person's speed is between 25 and 45, and if he used 4 hours, the speed of another person is between 45 and 60, and if he used 2 hours, how long is the distance?

A.116 B.118 C.124 D.136 E.140

40. How many number of 3 digit numbers can be formed with the digits 0,1,2,3,4,5 if no digit is repeated in any number? How many of these are even and how many odd?

Solutions

36.Soln: if we arrange this in AP, we get

$$4+7+10+\dots+49$$

$$\text{so } 4+(n-1)3=49: n=16$$

C is my pick

37.Soln: The idea is to find what are the common factors that we get in the answer.

$m = 1$, $k = 30$ which is divisible by 1,2,3,5,6,10, 15 and 30

$m = 2$, $k = 84$ which is divisible by 1,2,3,4,6,

As can be seen, the common factors are 1,2,3,6

So answer is 3 and 6

38.Soln: and the answer would be B...here is the explanation...

Let the side of the square be s ..then the perimeter of the square is $4s$

Let the radius of the circle be r ..then the perimeter of the circle is $2\pi r$

it is given that both these quantities are equal..therefore

$$4s=2\pi r$$

$$\text{which is then } s/r=\pi/2$$

Now the ratio of area of square to area of circle would be

$$s^2/\pi r^2$$

$$(1/\pi) * (s/r)^2$$

$$= (1/\pi) * (\pi/2)^2 \text{ from the above equality relation}$$

$$\pi = 22/7 \text{ or } 3.14$$

the value of the above expression is approximate = 0.78 which is near to answer B

39.Soln: First person-- speed is between 25mph and 45mph

so for 4 hrs he can travel 100 miles if he goes at 25mph speed

and for 4 hrs he can travel 130 miles if he goes at 45 mph speed

similarly

Second person-- speed is between 45mph and 60mph

so for 2 hrs he can travel 90 miles if he goes at 45mph speed

and for 2 hrs he can travel 120 miles if he goes at 60 mph speed

So for the first person---distance traveled is greater than 100 and Less than 130

and for the second person---distance traveled is greater than 90 and less than 120

so seeing these conditions we can eliminate C, D, and E answers...

but I didn't understand how to select between 116 and 118 as both these values are satisfying the conditions...

40.Soln: Odd: fix last as odd, 3 ways 3

now, left are 5, but again leaving 0, 4 for 1st digit & again 4 for 2nd digit: 4 4 3 = 48
Odd.

$$100 - 48 = 52 \text{ Even}$$

GMAT Tough Problem Solving - 9(Numbers, Percentage , Profit and Loss)

41. How many 3-digit numerals begin with a digit that represents a prime and end with a digit that represents a prime number?

A) 16 B) 80 C) 160 D) 180 E) 240

42. There are three kinds of business A, B and C in a company. 25 percent of the total revenue is from business A; t percent of the total revenue is from B, the others are from C. If B is \$150,000 and C is the difference of total revenue and 225,000, what is t?

A.50 B.70 C.80 D.90 E.100

43. A business school club, Friends of Foam, is throwing a party at a local bar. Of the business school students at the bar, 40% are first year students and 60% are second year students. Of the first year students, 40% are drinking beer, 40% are drinking mixed drinks, and 20% are drinking both. Of the second year students, 30% are drinking beer, 30% are drinking mixed drinks, and 20% are drinking both. A business school student is chosen at random. If the student is drinking beer, what is the probability that he or she is also drinking mixed drinks?

A. $\frac{2}{5}$

B. $\frac{4}{7}$

C. $\frac{10}{17}$

D. $\frac{7}{24}$

E. $\frac{7}{10}$

44. A merchant sells an item at a 20% discount, but still makes a gross profit of 20 percent of the cost. What percent of the cost would the gross profit on the item have been if it had been sold without the discount?

A) 20% B) 40% C) 50% D) 60% E) 75%

45. If the first digit cannot be a 0 or a 5, how many five-digit odd numbers are there?

A. 42,500

B. 37,500

C. 45,000

D. 40,000

E. 50,000

Solutions

41.Soln: The first digit can be 2, 3, 5, or 7 (4 choices)

The second digit can be 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9 (10 choices)

The third digit can be 2, 3, 5, or 7 (4 choices)

$$4 * 4 * 10 = 160$$

42.Soln: Let the total revenue be X.

$$\text{So } X = A + B + C$$

$$\text{which is } X = \frac{1}{4}X + 150 + (X - 225)$$

$$4X = X + 600 + 4X - 900$$

Solving for X you get $X = 300$

And 150 is 50% of 300 so the answer is 50 % (A)

43.Soln: The probability of an event A occurring is the number of outcomes that result in A divided by the total number of possible outcomes. The total number of possible outcomes is the total percent of students drinking beer. 40% of the students are first year students. 40% of those students are drinking beer. Thus, the first years drinking beer make up $(40\% * 40\%)$ or 16% of the total number of students.

60% of the students are second year students. 30% of those students are drinking beer. Thus, the second years drinking beer make up $(60\% * 30\%)$ or 18% of the total number of students.

$(16\% + 18\%)$ or 34% of the group is drinking beer.

The outcomes that result in A is the total percent of students drinking beer and mixed drinks.

40% of the students are first year students. 20% of those students are drinking both beer and mixed drinks. Thus, the first years drinking both beer and mixed drinks make up $(40\% * 20\%)$ or 8% of the total number of students. 60% of the students are second year students. 20% of those students are drinking both beer and mixed drinks. Thus, the second years drinking both beer and mixed drinks make up $(60\% * 20\%)$ or 12% of the total number of students. $(8\% + 12\%)$ or 20% of the group is drinking both beer and mixed drinks. If a student is chosen at random is drinking beer, the probability that they are also drinking mixed drinks is $(20/34)$ or $10/17$.

44.Soln: Lets suppose original price is 100.

And if it sold at 20% discount then the price would be 80

but this 80 is 120% of the actual original price...so 66.67 is the actual price of the item now if it sold for 100 when it actually cost 66.67 then the gross profit would be 49.99% i.e. approx 50%

45.Soln: This problem can be solved with the Multiplication Principle. The Multiplication Principle tells us that the number of ways independent events can occur together can be determined by multiplying together the number of possible outcomes for each event.

There are 8 possibilities for the first digit (1, 2, 3, 4, 6, 7, 8, 9).

There are 10 possibilities for the second digit (0, 1, 2, 3, 4, 5, 6, 7, 8, 9)

There are 10 possibilities for the third digit (0, 1, 2, 3, 4, 5, 6, 7, 8, 9)

There are 10 possibilities for the fourth digit (0, 1, 2, 3, 4, 5, 6, 7, 8, 9)

There are 5 possibilities for the fifth digit (1, 3, 5, 7, 9)

Using the Multiplication Principle:

$$= 8 * 10 * 10 * 10 * 5$$

$$= 40,000$$

GMAT Tough Problem Solving – 10 (Permutation and Combinations, Number Series)

From leo → f1gmat.com

46. A bar is creating a new signature drink. There are five possible alcoholic ingredients in the drink: rum, vodka, gin, peach schnapps, or whiskey. There are five possible non-alcoholic ingredients: cranberry juice, orange juice, pineapple juice, lime juice, or lemon juice. If the bar uses two alcoholic ingredients and two non-alcoholic ingredients, how many different drinks are possible?

- A. 100
- B. 25
- C. 50
- D. 75
- E. 3600

47. The sum of the even numbers between 1 and n is 79×80 , where n is an odd number. $N = ?$

48. A committee of 6 is chosen from 8 men and 5 women so as to contain at least 2 men and 3 women. How many different committees could be formed if two of the men refuse to serve together?

- (A) 3510
- (B) 2620
- (C) 1404
- (D) 700
- (E) 635

49. In how many ways can the letters of the word 'MISSISSIPPI' be arranged?

- a) 1260
- b) 12000
- c) 12600
- d) 14800
- e) 26800

50. Goldenrod and No Hope are in a horse race with 6 contestants. How many different arrangements of finishes are there if No Hope always finishes before Goldenrod and if all of the horses finish the race?

- (A) 720
- (B) 360
- (C) 120
- (D) 24
- (E) 21

Solutions

46.Soln: The first step in this problem is to calculate the number of ways of selecting two alcoholic and two non-alcoholic ingredients. Since order of arrangement does not matter, this is a combination problem.

The number of combinations of n objects taken r at a time is $C(n,r) = n!/(r!(n-r!))$

The number of combinations of alcoholic ingredients is

$$C(5,2) = 5!/(2!(3!))$$

$$C(5,2) = 120/(2(6))$$

$$C(5,2) = 10$$

The number of combinations of non-alcoholic ingredients is

$$C(5,2) = 5!/(2!(3!))$$

$$C(5,2) = 120/(2(6))$$

$$C(5,2) = 10$$

The number of ways these ingredients can be combined into a drink can be determined by the Multiplication Principle. The Multiplication Principle tells us that the number of ways independent events can occur together can be determined by multiplying together the number of possible outcomes for each event.

The number of possible drinks is

$$= 10 * 10$$

$$= 100$$

47.Soln: The sum of numbers between 1 and n is $= (n(n+1))/2$

$$1+2+3+.....+n=(n(n+1))/2 \text{ \{formula\}}$$

we are looking for the sum of the even numbers between 1 and n , which means:

$$2+4+6+.....+(n-1) \text{ } n \text{ is ODD}$$

$$=1*2+2*2+2*3+.....+2*((n-1)/2)$$

$$=2*(1+2+3+.....+*((n-1)/2))$$

from the formula we obtain :

$$=2*(((n-1)/2)*((n-1)/2+1))/2$$

$$=((n-1)/2)*((n+1)/2) = 79*80$$

$$\Rightarrow (n-1)*(n+1)=158*160$$

$$\Rightarrow n=159$$

48.Soln: $4W \ 2M == 5C_4.(8C_2-1) = 5.(27) = 135$

$$3W \ 3M == 5C_3.(8C_3-6) = 10.50 = 500$$

total 635

Max. number of possibilities considering we can choose any man $8C_2 * 5C_4 + 8C_3 * 5C_3 = 700$.

consider it this way.... from my previous reply max possible ways considering we can chose any man = 700

now we know that 2 man could not be together... now think opposite... how many ways are possible to have these two man always chosen together...

since they are always chosen together...

For chosing 2 men and 4 women for the committee there is only 1 way of chosing 2 men for the committee since we know only two specific have to be chosen and

there are $5C_4$ ways of choosing women

$$1*5C_4 = 5$$

For choosing 3 men and 3 women for the committee there are exactly $6C_1$ ways choosing 3 men for the committee since we know two specific have to be chosen so from the remaining 6 men we have to chose 1 and there are $5C_4$ ways of choosing women

$$6C_1*5C_3 = 60$$

$$\text{So total number of unfavorable cases} = 5 + 60 = 65$$

Now since we want to exclude these 65 cases... final answer is $700-65 = 635$

49.Soln: Total # of alphabets = 10

so ways to arrange them = $10!$

Then there will be duplicates because 1st S is no different than 2nd S.

we have 4 Is 3 S and 2 Ps

Hence # of arrangements = $10!/4!*3!*2!$

50.Soln: two horses A and B, in a race of 6 horses... A has to finish before B

if A finishes 1... B could be in any of other 5 positions in 5 ways and other horses finish in 4! Ways, so total ways $5*4!$

if A finishes 2... B could be in any of the last 4 positions in 4 ways. But the other positions could be filled in 4! ways, so the total ways $4*4!$

if A finishes 3rd... B could be in any of last 3 positions in 3 ways, but the other positions could be filled in 4! ways, so total ways $3*4!$

if A finishes 4th... B could be in any of last 2 positions in 2 ways, but the other positions could be filled in 4! ways, so total ways... $2 * 4!$

if A finishes 5th .. B has to be 6th and the top 4 positions could be filled in 4! ways..

A cannot finish 6th, since he has to be ahead of B

therefore total number of ways

$$5*4! + 4*4! + 3*4! + 2*4! + 4! = 120 + 96 + 72 + 48 + 24 = 360$$

Challenge Problem of the week on manhttangmat.com

Skier Lindsey Vonn completes a straight 300-meter downhill run in t seconds and at an average speed of $(x + 10)$ meters per second. She then rides a chairlift back up the mountain the same distance at an average speed of $(x - 8)$ meters per second. If the ride up the mountain took 135 seconds longer than her run down the mountain, what was her average speed, in meters per second, during her downhill run?

[Answer This Week's Question for Prizes](#)

(A) 10

(B) 15

(C) 20

(D) 25

(E) 30

Answer

First, we set up two $RT = D$ equations, one for the downhill run and one for the ride back up the mountain.

Downhill run: $(x + 10)t = 300$

Ride back up: $(x - 8)(t + 135) = 300$

Technically, we just have to do some algebra & arithmetic from here on out. However, these equations are very difficult to solve in their current state. The tipoff for you is that the variable x does not represent, on its own, either the downhill or the uphill speed. Thus, the equations wind up being thorny (although still solvable).

However, we can reduce the complexity by creating a new variable, say r , that represents the speed on the ride back up. In other words, $r = x - 8$. We can rewrite this equation as $r + 8 = x$, and thus the downhill speed, $x + 10$, can be re-expressed as $r + 18$. As you'll see, this simplifies the algebra. In this sort of situation, when a variable such as x does not represent any real speed in the scenario, our instinct should be to replace x with another variable that does represent a real speed.

Downhill run: $(r + 18)t = 300$

Ride back up: $r(t + 135) = 300$

Now we can set the expressions on the left side equal to each other, since they both equal 300:

$$(r + 18)t = r(t + 135)$$

$$rt + 18t = rt + 135r$$

$$18t = 135r$$

$$2t = 15r$$

$$t = (15/2)r$$

Finally, we substitute back into either equation (we'll just pick the first). Since the numbers get large and we can see we're going to get a quadratic, we might want to leave certain numbers factored as we go.

$$(r + 18)(15/2)r = 300$$

$$(15/2)r^2 + 135r = 300$$

$$(15/2)r^2 + 135r - 300 = 0$$

Now divide by 15 and multiply throughout by 2.

$$r^2 + 18r - 40 = 0$$
$$(r + 20)(r - 2) = 0$$

Since r must be positive (it represents a speed), r must be 2. Thus, Lindsey's downhill speed, in meters per second, is $r + 18 = 20$.

The correct answer is (C).

Posted by shashank52 → gmaclub.com:

When 26854 and 27584 are divided by a certain two digit prime number, the remainder obtained is 47. Which of the following choices is a possible value of the divisor?

- (1) 61
- (2) 71
- (3) 73
- (4) 89

Solutions:

Bunuel's view

Vshaunak skipped some steps in solution, though it's correct.

Given:

$$27584 = pq_1 + 47$$
$$26854 = pq_2 + 47$$

Where p is the prime number (divisor) and q_1 and q_2 are the quotients (integers ≥ 0).

Subtract equations: $27584 - 26854 = pq_1 + 47 - pq_2 - 47 \rightarrow 730 = 2 \cdot 5 \cdot 73 = p(q_1 - q_2)$.

Product of two integers p , **two digit prime number** and $(q_1 - q_2)$ is $730 = 2 \cdot 5 \cdot 73$, as p is **two digit prime number**, it can be only **73** (2 and 5 are single digit).

Answer: 73.

Hope it's clear.

Mustdoit's view

Whenever you are struck with big numbers on Gmat, try using small ones...

Take 2 numbers like 13 and 23 which when divided by n leave a remainder of 3

whats n

obviously 10...how did we found that $23-13=10$ ans

similarly in the quesn we have $27584 - 26854 = 730$
Hence the divisor will be 73...

Hope this helps!!!

P.S. Nice tip!

Posted by hb05sv → gmatclub.com:

Can someone show me how to solve the following question?

The inside dimensions of a rectangular wooden box are 6 inches by 8 inches by 10 inches. A cylindrical canister is to be placed inside the box so that it stands upright when the closed box rests on one of its six faces. Of all such canisters that could be used, what is the radius, in inches, of the one that has the maximum volume?

- A) 3
- B) 4
- C) 5
- D) 6
- E) 8

Solution:

Kp1811's view

Let the face on which the cylinder is placed is 6 by 8. In this case the volume will be $\pi * 3^2 * 10 = 90\pi$ (here $r = 3$ inches)

If the cylinder is placed on the face having dimensions 8 by 10 then volume in that case will be $\pi * 4^2 * 6 = 96\pi$ (here $r = 4$ inches)

If the cylinder is placed on the face having dimensions 6 by 10 then volume in that case will be $\pi * 3^2 * 8 = 72\pi$ (here $r = 3$ inches)

so for $r = 4$ inches the cylinder will have maximum area.

So $B = 4$

BarneyStinson's reply

Nice explanation -

To be more specific, logically, for any face down of the cube, the smaller length only can be the

diameter of the cylindrical canister. So either ways, it is 6 or 8. The height will be either the shortest or the longest dimension accordingly.

Volume of cylinder is $\pi * r^2 * h$. The greater the value of $r^2 * h$, the greater the volume.