1

7. If x is positive, which of the following could be the correct ordering of 1/x,2x and x^2 ?
I. x^2<2x<1/x
II. x^2<1/x<2x
III. 2x<x^2<1/x

(A) None
(B) I only
(C) III only
(D) I and II only
(E) I II and III

First note that we are asked "which of the following COULD be the correct ordering" not MUST be.

Basically we should determine relationship between x, $\frac{1}{x}$ and x^2 in three areas: $0<1<2<$.

$x>2$

$1<x<2$

$0<x<1$

When $x>2$ --> x^2 is the greatest and no option is offering this, so we know that x<2.
If $1<x<2$ --> $2x$ is greatest then comes x^2 and no option is offering this.

So, we are left with $0<x<1$:
In this case x^2 is least value, so we are left with:

I. $x^2<2x<\frac{1}{x}$ --> can $2x<\frac{1}{x}$? Can $\frac{2x^2-1}{x}<0$, the expression $2x^2-1$ can be negative or positive for $0<x<1$. (You can check it either algebraically or by picking numbers)

II. $x^2<\frac{1}{x}<2x$ --> can $\frac{1}{x}<2x$? The same here $\frac{2x^2-1}{x}>0$, the expression $2x^2-1$ can be negative or positive for $0<x<1$. (You can check it either algebraically or by picking numbers)

Answer: D.

Second condition: $x^2<\frac{1}{x}<2x$

The question is which of the following COULD be the correct ordering not MUST be.

Put 0.9 --> $x^2=0.81$, $\frac{1}{x}=1.11$, $2x=1.8$ --> $0.81<1.11<1.8$. Hence this COULD be the correct ordering.

http://gmatclub.com/forum/if-x-is-positive-which-of-the-following-could-be-correct-71070.html

2

In a room filled with 7 people, 4 people have exactly 1 sibling in the room and 3 people have exactly 2 siblings in the room. If two individuals are selected from the room at random, what is the probability that those two individuals are NOT siblings?

A. 5/21
B. 3/7
C. 4/7
D. 5/7
E. 16/21

As there are 4 people with exactly 1 sibling each: we have two pairs of siblings (1-2; 3-4).
As there are 3 people with exactly 2 siblings each: we have one triple of siblings (5-6-7).

Solution #1:

# of selections of 2 out of 7 - $C^2_7=21$;

# of selections of 2 people which are not siblings - $C^1_2*C^1_2$ (one from first pair of siblings*one from second pair of siblings)+ $C^1_2*C^1_3$ (one from first pair of siblings*one from triple)+ $C1_2*C^1_3$ (one from second pair of siblings*one from triple) $=4+6+6=16$.

$$P=\frac{16}{21}$$

Solution #2:

# of selections of 2 out of 7 - $C^2_7=21$;

# of selections of 2 siblings - $C^2_3+C^2_2+C^2_2=3+1+1=5$;

$$P=1-\frac{5}{21}=\frac{16}{21}.$$

Solution #3:

$$P=2*\frac{3}{7}*\frac{4}{6}+2*\frac{2}{7}*\frac{2}{6}=\frac{4}{7}+\frac{4}{21}=\frac{16}{21}.$$

Answer: E.

http://gmatclub.com/forum/in-a-room-filled-with-7-people-4-people-have-exactly-87550.html

3

As this is a COULD be true question then even one set of numbers proving that statement holds true is enough to say that this statement should be part of correct answer choice.

Given: $x>y^2>z^4$.

1. $x>y>z$ --> the easiest one: if $x=100$, $y=2$ and $z=1$ --> this set satisfies $x>y^2>z^4$ as well as given statement $x>y>z$. So 1 COULD be true.

2. $z>y>x$ --> we have reverse order than in stem ($x>y^2>z^4$), so let's try fractions: if $x=\frac{1}{5}$, $y=\frac{1}{4}$ and $z=\frac{1}{3}$ then again the stem and this statement hold true. So 2 also COULD be true.

3. $x>z>y$ --> let's make x some big number, let's say 1,000. Next, let's try the fractions for z and y for the same reason as above (reverse order of y and z): $y=\frac{1}{3}$ and $z=\frac{1}{2}$. The stem and this statement hold true for this set of numbers. So 3 also COULD be true.

Answer: E.

http://gmatclub.com/forum/if-x-y-2-z-4-which-of-the-following-statements-could-be-100465.html

4

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

--> $x^6(1+x(1+x(1+x(1+x))))=x^{(n-1)}+x^n+x^{(n+1)}+x^{(n+2)}+x^{(n+3)}$

--> take $x^{(n-1)}$ out of the brackets

--> $x^6(1+x(1+x(1+x(1+x))))=x^{(n-1)}(1+x+x^2+x^3+x^4)$

--> $x^6(1+x(1+x(1+x(1+x))))=x^{(n-1)}(1+x(1+x+x^2+x^3))$

--> $x^6(1+x(1+x(1+x(1+x))))=x^{(n-1)}(1+x(1+x(1+x+x^2)))$

--> $x^6(1+x(1+x(1+x(1+x))))=x^{(n-1)}(1+x(1+x(1+x(1+x))))$

--> $x^6=x^{(n-1)}$ --> $n-1=6$ --> $n=7$

Answer: B.

http://gmatclub.com/forum/in-the-infinite-sequence-a-an-x-n-1-x-n-x-n-1-x-92110.html

5

For me the best way to solve this problem is not use Venn diagram or formulas but to draw simple bars (note: each dash is 5):

Min overlap is 10:

---------------- ---- 80 phones;

----- --------------- 75 DVD's;

------- --------- ---- 55 MP3.

Max overlap is 55:

---------------- ---- 80 phones;

----- --------------- 75 DVD's;

----- ----------- ---- 55 MP3.

55-10=45.

Answer: C.

http://gmatclub.com/forum/in-a-village-of-100-households-75-have-at-least-one-dvd-98257.html

6

6 inches = 1/2 feet (there are 12 inches in a foot.), so 60*25*1/2=750 feet^3 of water must be removed, which equals to 750*7.5=5625 gallons.

Answer: E.

http://gmatclub.com/forum/the-water-level-in-a-rectangular-swimming-pool-measuring-110553.html

7

I. 0 < t < h. That is always correct, as the time needed for both fixtures leaking (working) together to fill the bucket, t, must always be less than time needed for either of fixture leaking (working) alone to fill the bucket;

II. c < t < h. That cannot be correct: t, the time needed for both fixtures leaking (working) together to fill the bucket, must always be less than time needed for either of fixture leaking (working) alone to fill the bucket. So $c<t$ not true.

III. c/2 < t < h/2. To prove that this is always correct we can use pure logic or algebra.

Logic:

If both fixtures were leaking at identical rate then $\frac{c}{2}=\frac{h}{2}=t$ but since $c<h$ then $\frac{c}{2}<t$ (as the rate of cold water is higher) and $t<\frac{h}{2}$ (as the rate of hot water is lower).

Algebraic approach would be:

Given: $c<h$ and $t=\frac{ch}{c+h}$

$\frac{c}{2}<\frac{ch}{c+h}<\frac{h}{2}$? break down: $\frac{c}{2}<\frac{ch}{c+h}$? and $\frac{ch}{c+h}<\frac{h}{2}$?

$\frac{c}{2}<\frac{ch}{c+h}$? --> $c^2+ch<2ch$? --> $c^2<ch$? --> $c<h$? Now, this is given to be true.

$\frac{ch}{c+h}<\frac{h}{2}$? --> $2ch<ch+h^2$? --> $ch<h^2$? --> $c<h$? Now, this is given to be true.

So III is also always true.

Answer: E.

http://gmatclub.com/forum/in-a-certain-bathtub-both-the-cold-water-and-the-hot-water-127878.html

8

Please don't reword the questions. Original question is:

If $x=\frac{3}{4}$ **and** $y=\frac{2}{5}$**, what is the value of** $\sqrt{x^2+6x+9}-\sqrt{y^2-2y+1}$ **?**

A. 87/20
B. 63/20
C. 47/20
D. 15/4
E. 14/5

Note that $\sqrt{x^2}=|x|$

Answer: B.

As for your question:

The point here is that **square root function can not give negative result** --> $\sqrt{some\ expression}\geq 0$, for example $\sqrt{x^2}\geq 0$ --> $\sqrt{25}=5$ (not +5 and -5). **In contrast, the equation** $x^2=25$ **has TWO solutions, +5 and -5,** because both 5^2 and (-5)^2 equal to 25.

About $\sqrt{x^2}=|x|$: from above we have that $\sqrt{x^2}\geq 0$. But what does $\sqrt{x^2}$ equal to?

Let's consider following examples:
If $x=5$ --> $\sqrt{x^2}=\sqrt{25}=5=x=positive$;
If $x=-5$ --> $\sqrt{x^2}=\sqrt{25}=5=-x=positive$.

So we got that:
$\sqrt{x^2}=x$, if $x\geq 0$;
$\sqrt{x^2}=-x$, if $x<0$.

What function does exactly the same thing? The absolute value function: $|x|=x$, if $x\geq 0$ and $|x|=-x$, if $x<0$. That is why $\sqrt{x^2}=|x|$.

http://gmatclub.com/forum/if-x-3-4-and-y-2-5-what-is-the-value-of-110071.html

9

Given: $-12\leq y\leq 12$ and $2x+y=12$ --> $y=12-2x=2(6-x)=even$, (as x must be an integer). Now, there are 13 even numbers in the range from -12 to 12, inclusive each of which will give an integer value of x.

Answer: D.

http://gmatclub.com/forum/for-how-many-ordered-pairs-x-y-that-are-solutions-of-the-110687.html

10

Many approaches are possible. For example:

Consider numbers from 0 to 999 written as follows:
1. 000
2. 001
3. 002
4. 003
...
...
...
1000. 999

We have 1000 numbers. We used 3 digits per number, hence used total of 3*1000=3000 digits. Now, why should ANY digit have preferences over another? We used each of 10 digits equal # of times, thus we used each digit (including 7) 3000/10=300 times.

Answer: D.

http://gmatclub.com/forum/how-many-times-will-the-digit-7-be-written-99914.html

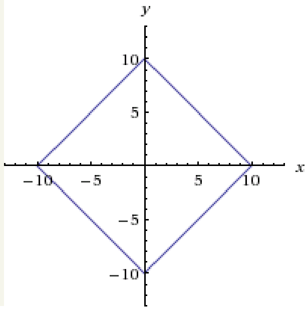
11

First of all to simplify the given expression a little bit let's multiply it be 2: $|\frac{x}{2}|+|\frac{y}{2}|=5$ --> $|x|+|y|=10$.

Now, find x and y intercepts of the region (x-intercept is a value(s) of x for y=0 and similarly y-intercept is a value(s) of y for x=0):
$y=0$ --> $|x|=10$ --> $x=10$ and $x=-10$;
$x=0$ --> $|y|=10$ --> $y=10$ and $y=-10$.

So we have 4 points: (10, 0), (-10, 0), (0, 10) and (-10, 0).

When you join them you'll get the region enclosed by $|x|+|y|=10$:



You can see that it's a square. Why a square? Because diagonals of the rectangle are **equal** (20 and 20), and also are **perpendicular bisectors** of each other (as they are on X and Y axis), so it must be a square. As this square has **a diagonal equal to 20**, so the $Area_{square}=\frac{d^2}{2}=\frac{20*20}{2}=200$.

Or the $Side=\sqrt{200}$ --> $area=side^2=200$.

Answer: D.

http://gmatclub.com/forum/if-equation-x-2-y-2-5-encloses-a-certain-region-126117.html

12

{Total}={Writers}+{Editors}-{Both}+{Neither}.

{Total}=100;
{Writers}=45;
{Editors}>38;
{Both}=x;
{Neither}=2x;

100=45+{Editors}-x+2x --> x=55-{Editors}. We want to maximize x, thus we should minimize {Editors}, minimum possible value of {Editors} is 39, thus x={Both}=55-39=16.

Answer: B.

http://gmatclub.com/forum/100-people-are-attending-a-newspaper-conference-45-of-them-127715.html

13

If x is an integer and |1-x|<2 then which of the following must be true?

|1-x| is just the distance between 1 and x on the number line. We are told that this distance is less than 2: --(-1)**----1----**3-- so, -1<x<3. Since given that x is an integer then **x can be 0, 1 or 2**.

A. x is not a prime number. Not true if x=2.
B. x^2+x is not a prime number. Not true if x=1.
C. x is positive. Not true if x=0.
D. Number of distinct positive factors of x+2 is a prime number. True for all three values of x.
E. x is not a multiple of an odd prime number. Not true if x=0, since zeo is a multiple of every integer except zero itself.

Answer: D.

http://gmatclub.com/forum/if-x-is-an-integer-and-1-x-2-then-which-of-the-following-138328.html

14

Basically we are asked to find the range of x for which $x^3-4x^5<0$ is true.

$x^3-4x^5<0$ --> $x^3(1-4x^2)<0$ --> $(1+2x)*x^3*(1-2x)<0$ --> roots are -1/2, 0, and 1/2 --> $-\frac{1}{2}<x<0$ or $x>\frac{1}{2}$.

Answer: C.

http://gmatclub.com/forum/which-of-the-following-represents-the-complete-range-of-x-108884.html

15

Coach Miller is filling out the starting lineup for his indoor soccer team. There are 10 boys on th team, and he must assign 6 starters to the following positions: 1 goalkeeper, 2 on defense, 2 in midfield, and 1 forward. Only 2 of the boys can play goalkeeper, and they cannot play any other positions. The other boys can each play any of the other positions. How many different groupings are possible?

A. 60
B. 210
C. 2580
D. 3360
E. 151200

2C1 select 1 goalkeeper from 2 boys;
8C2 select 2 defense from 8 boys (as 2 boys can only play goalkeeper 10-2=8);
6C2 select 2 midfield from 6 boys (as 2 boys can only play goalkeeper and 2 we've already selected for defense 10-2-2=6);
4C1 select 1 forward from 4 boys (again as 2 boys can play only goalkeeper, 4 we've already selected for defense and midfield 10-2-4=4)

Total # of selection=2C1*8C2*6C2*4C1=3360

Answer: D.

http://gmatclub.com/forum/coach-miller-is-filling-out-the-starting-lineup-for-his-57554.html

16

Using THREE non-zero digits a,b,c only, we can construct 3!=6 numbers: abc, acb, bac, bca, cab, cba. Their sum will be:

$$x=(100a+10b+c)+(100a+10c+b)+(100b+10a+c)+(100b+10c+a)+(100c+10a+b)+(100c+10b$$

$$=200*(a+b+c)+20*(a+b+c)+2*(a+b+c)=$$
$$=222*(a+b+c)$$

Largest integer by which x **MUST** be divisible is 222.

Answer: E (222).

http://gmatclub.com/forum/if-x-represents-the-sum-of-all-the-positive-three-digit-91007.html

17

$(\frac{1}{5})^{10}$

$\frac{1}{5^{10}}$

$$\frac{1}{(\frac{10}{2})^{10}}$$

$$\frac{2^{10}}{10^{10}}$$

$$\frac{1024}{10^{10}}$$

$$1024*10^{-10}$$

$$.0000001024$$

Tenth digit to the right of decimal is 4.

Ans: "C"

http://gmatclub.com/forum/what-is-the-tenth-digit-to-the-right-of-the-decimal-point-109600.html

18

We are given that $\frac{x}{|x|}<x$ (this is a true inequality), so first of all we should find the ranges of x for which this inequality holds true.

$\frac{x}{|x|}<x$ multiply both sides of inequality by $|x|$ (side note: we can safely do this as absolute value is non-negative and in this case we know it's not zero too) --> $x<x|x|$ --> $x(|x|-1)>0$:
Either $x>0$ and $|x|-1>0$, so $x>1$ or $x<-1$ --> $x>1$;
Or $x<0$ and $|x|-1<0$, so $-1<x<1$ --> $-1<x<0$.

So we have that: $-1<x<0$ or $x>1$. Note x is ONLY from these ranges.

Option B says: $x>-1$ --> ANY x from above two ranges would be more than -1, so B is always true.

Answer: B.

http://gmatclub.com/forum/x-x-x-which-of-the-following-must-be-true-about-x-13943.html

19

Dolphin once in 2 min;
Beluga once in 5 min;
So, dolphin comes up 2.5 times frequently than beluga, which is 150% (5-2)/2*100.

"X's height is 110% greater than that of Y."
Means: x=(1+110%)*y=(1+1.1)*y=2.1*y

http://gmatclub.com/forum/on-average-the-bottle-nosed-dolphin-comes-up-for-air-once-85737.html

20

$2x-3y\leq-6$ --> $y\geq\frac{2}{3}x+2$. Thi inequality represents ALL points, the area, above the line $y=\frac{2}{3}x+2$. If you draw this line you'll see that the mentioned area is "above" IV quadrant, does not contains any point of this quadrant.

Else you can notice that if x is positive, y can not be negative to satisfy the inequality $y\geq\frac{2}{3}x+2$, so you can not have positive x, negative y. But IV quadrant consists of such (x,y) points for which x is positive and y negative. Thus answer must be E.

Answer: E.

http://gmatclub.com/forum/in-the-rectangular-coordinate-system-shown-above-which-90285.html

21

First of all let's solve this inequality step by step and see what is the solution for it, or in other words let's see in which ranges this inequality holds true.

Two cases for $\frac{x}{|x|}<x$:

A. $x<0$ --> $|x|=-x$ --> $\frac{x}{-x}<x$ --> $-1<x$ --> $-1<x<0$;

B. $x>0$ --> $|x|=x$ --> $\frac{x}{x}<x$ --> $1<x$.

So given inequality holds true in the ranges: $-1<x<0$ and $x>1$. Which means that x can take values only from these ranges.

------{-1}xxxx{0}----{1}xxxxxx

Now, we are asked which of the following must be true about x. Option A can not be ALWAYS true because x can be from the range $-1<x<0$, eg $-\frac{1}{2}$ and $x=-\frac{1}{2}<1$.

Only option which is ALWAYS true is B. ANY x from the ranges $-1<x<0$ and $x>1$ will definitely be more the -1, all "red", possible x-es are to the right of -1, which means that all possible x-es are more than -1.

Answer: B.

http://gmatclub.com/forum/if-x-x-x-which-of-the-following-must-be-true-about-x-68886.html

22

Pick some smart number for x, let $x=2$ (I chose $x=2$ as in this case monthly shipments would be $\frac{x}{2}=1$).

From November to February $4x=8$ rakes were produced and in March business paid for storage of 8-1=7 rakes, in next month for storage of 6 and so on.

So total storage cost would be: $0.1(7+6+5+4+3+2+1)=2.8$ --> as $x=2$, then $2.8=1.4x$.

Answer: C.

http://gmatclub.com/forum/a-certain-business-produced-x-rakes-each-month-form-november-101738.html

23

Step by step analyzes:

B speed: 2 mph;
A speed: 3 mph (travelling in the opposite direction);
Track distance: $2*\pi*r=20*\pi$;

What distance will cover B in 10h: $10*2=20$ miles
Distance between B and A by the time, A starts to travel: $20*\pi-20$

Time needed for A and B to meet distance between them divided by the relative speed: $\frac{20*\pi-20}{2+3}=\frac{20*\pi-20}{5}=4*\pi-4$, as they are travelling in opposite directions relative speed would be the sum of their rates;

Time needed for A to be 12 miles ahead of B: $\frac{12}{2+3}=2.4$;

So we have three period of times:
Time before A started travelling: 10 hours;
Time for A and B to meet: $4*\pi-4$ hours;
Time needed for A to be 12 miles ahead of B: 2.4 hours;

Total time: $10+4*\pi-4+2.4=4*\pi+8.4$ hours.

Answer: B.

http://gmatclub.com/forum/car-b-starts-at-point-x-and-moves-clockwise-around-128215.html

24

You should notice that inequality $|a|+|b|>|a+b|$ holds true if and only a and b have opposite sign, as only in this case absolute value of **positive+negative** will be less than **|positive|+|negative|**. For example |-2|+|3|>|-2+3|. In all other cases $|a|+|b|=|a+b|$.

So, basically the question is whether a and b have opposite sign.

(1) a^2 > b^2 --> can not determine whether a and b have opposite sign. Not sufficient.
(2) |a|*b<0 --> just tells us that $b<0$, but we don't know the sign of a. Not sufficient.

(1)+(2) $b<0$ and $a^2>b^2$ --> still can not get the sign of a. Not sufficient.

Answer: E.

http://gmatclub.com/forum/is-a-b-a-b-105457.html

25

# of terms = $42+1+n=(n+43)$

$$Sum=372=(n+43)*\frac{(n-42)}{2}$$

$$744=(n+43)*(n-42)$$

$$n=50$$

OR

42 terms after zero and 42 terms below zero will total 0. So, our new question will be consecutive integers with first term 43 have sum 372, what is the last term:

$$\frac{43+n}{2}*(n-43+1)=372$$

$$(n+43)*(n-42)=744$$

$$n=50$$

Answer: D (50)