1

The tens and units digits of a three-digit integer must be 0: X00 (no digit gives the same digit when divided by 2 but 0: 0/2=0). Now, apart from this, X must be even because 300/2=150, not the same tens and units digits. Hence there are following three-digit integers possible: 200, 400, 600, and 800.

Answer: E.

2

The average age of a group of 5 members is 20 years. Two years later, a new member joins the group. The average age of the group becomes 22 years. What is the age of the new member ?
A. 20 years
B. 21 years
C. 22 years
D. 23 years
E. 24 years

The average age of a group of 5 members is 20 years --> the sum of the ages is 5*20=100;
Two years later the sum of the ages of these 5 members would be 100+5*2=110;

Now, say the age of the new member is x years, so the sum of the ages of a new 6 member group is 110+x. Since given that the average age of this group of 6 members is 22 years then: 22*6=110+x --> x=22.

Answer: C.

3

Jim is twice as old as Stephanie --> J=2S;

Stephanie four years ago, was three times as old as Kate --> S-4=3(K-4) --> K=(S+8)/3 (it would be better if it were "Stephanie four years ago, was three times as old as Kate was four years ago");

Five years from now, the sum of their ages will be 51 --> (J+5)+(S+5)+(K+5)=51 --> (2S+5)+(S+5)+((S+8)/3+5)=51 --> S=10.

Answer: B.

4

Total charges of company A: 575+0.04*575+82.5=680.5;
Total charges of company B: 530+0.03*530+93=638.9;

If we deal with company B, which offers the lower price, we can save 680.5-638.9=41.6 dollars.

Answer: A.

5

D (23) is not a trap answer, it's a correct answer.

Jane started baby-sitting when she was 18 years old. Whenever she baby-sat for a child, that child was no more than half her age at the time. Jane is currently 32 years old, and she stopped baby-sitting 10 years ago. What is the current age of the oldest person for whom Jane could have baby-sat?
A. 20
B. 21
C. 22
D. 23
E. 24

Check two extreme cases:
Jane = 18, child = 9, years ago = 32-18 = 14 --> child's age now = 9+14 = 23;
Jane = 22, child = 11, years ago = 32-22 = 10 --> child's age now = 11+10 = 21.

Answer: D.

6

$$\frac{0.99999999}{1.0001}-\frac{0.99999991}{1.0003}=\frac{1-10^{-8}}{1+10^{-4}}-\frac{1-9*10^{-8}}{1+3*10^{-4}}$$

Now apply $a^2-b^2=(a+b)(a-b)$:

.

Answer: D.

7

Original question reads:
The value of (2^(-14) + 2^(-15) + 2^(-16) + 2^(-17))/5 is how many times the value of 2^(-17)?

We need to find the value of: . $$\frac{\frac{1}{5}*(2^{-14}+2^{-15}+2^{-16}+2^{-17})}{2^{-17}}=\frac{\frac{1}{5}*(\frac{1}{2^{14}}+\frac{1}{2^{15}}+\frac{1}{2^{16}}+\frac{1}{2^{17}})}{\frac{1}{2^{17}}}$$.

Now, .

$$\frac{\frac{1}{5}*(\frac{1}{2^{14}}+\frac{1}{2^{15}}+\frac{1}{2^{16}}+\frac{1}{2^{17}})}{\frac{1}{2^{17}}}=\frac{2^{17}}{5}*(\frac{1}{2^{14}}+\frac{1}{2^{15}}+\frac{1}{2^{16}}+\frac{1}{2^{17}})=\frac{1}{5}*(2^3+2^2+2+1)=\frac{1}{5}*15=3$$.

Answer: C.

8

Given that $M=\frac{1}{201}+\frac{1}{202}+\frac{1}{203}+...+\frac{1}{300}$. Notice that 1/201 is the larges term and 1/300 is the smallest term.

If all 100 terms were equal to 1/300, then the sum would be 100/300=1/3, but since actual sum is more than that, then we have that M>1/3.

If all 100 terms were equal to 1/200, then the sum would be 100/200=1/2, but since actual sum is less than that, then we have that M<1/2.

Therefore, 1/3<M<1/2.

Answer: A.

9

Yes factoring out 10^2 and 10^3 and than reducing the fraction by 10^2 is one way to deal with this question:

$$\frac{10^8-10^2}{10^7-10^3}=\frac{10^2(10^6-1)}{10^3(10^4-1)}=\frac{10^6-1}{10*(10^4-1)}.$$

Now, 10^6-1 is very close to 10^6 and 10^4-1 is very close to 10^4, hence $\frac{10^6-1}{10*(10^4-1)}\approx\frac{10^6}{10*10^4}=\frac{10^6}{10^5}=10$.

Answer: B.

Or else you can notice that we need *approximate* value of a fraction. Now, 10^8 is much, much, much bigger than 10^2. So subtracting 10^2 from 10^8 will be very close to 10^8, basically 10^2 is negligible in this case. The same for for 10^7 and 10^3.
So $\frac{10^8-10^2}{10^7-10^3} \approx \frac{10^8}{10^7} = 10$.

10

We need to find the speed of the car in **miles per hour**. So, we should convert feet in miles and seconds in hours.

20 feet is $\frac{20}{5280}$ miles;
0.5 second is $\frac{0.5}{3600} = \frac{0.5}{60^2}$ hours;

The speed of the car therefore is $\frac{distance}{time} = \frac{(\frac{20}{5280})}{(\frac{0.5}{60^2})} = (\frac{20}{5280})*(\frac{60^2}{0.5})$.

Answer: A.