The following were changed at the resolution center at the convention: 8 E

1. **A** $\frac{22}{2}\left(-1+\left(-43\right)\right)=-484$

2. **D** $\frac{l}{w}=\frac{w}{l-w}\Rightarrow w^2+lw-l^2=0\Rightarrow w=\frac{-l\pm\sqrt{5l^2}}{2}=\frac{-l+l\sqrt{5}}{2}\Rightarrow\frac{l}{w}=\frac{l}{\frac{-l+l\sqrt{5}}{2}}=\frac{1+\sqrt{5}}{2}$

3. **D** $17r^4=272\Rightarrow r^4=16\Rightarrow r=\pm2\Rightarrow S=\frac{17\left(1-2^5\right)}{1-2}\,or\,\frac{17\left(1+2^5\right)}{1+2}=527$ or 187

4. **C** Fraction of pond covered is $\frac{2^{20}}{2^{30}}=\frac{1}{2^{10}}=\frac{1}{1024}$. Therefore the fraction not covered is $\frac{1023}{1024}$.

5. **C** $x^2=6+x\rightarrow x^2-x-6=0\rightarrow x=3$

6. **D** The value that minimizes the sum is the arithmetic mean, which is $\frac{21}{2}$.

7. **E** The first such value is 610.

8. **A** Each value will return a sine value of 1. Add this 20 times.

9. **C** $3^{\frac{3}{6}},3^{\frac{2}{6}},3^{\frac{1}{6}}\ldots$this is a geometric sequence.

10. **B**

$$
\begin{array}{l}
10000X=4636.636....\\
10X=4.636\\
\hline
9990X=4632\rightarrow X=\frac{4632}{9990}=\frac{772}{1665}
\end{array}
$$

11. **B** Every third term is even.

12. **B** $\frac{2}{3}\bullet\frac{3}{4}\bullet\frac{4}{5}\bullet....\frac{n-2}{n-1}\bullet\frac{n-1}{n}=\frac{2}{n}$.

13. **D** $\left(1+\left|-3\right|\right)^7=4^7=2^{14}=16384$.

14. **B** $\left[\frac{1993}{2}\right]=996;\left[\frac{1993}{3}\right]=664;\left[\frac{1993}{6}\right]=332$. Therefore $996+664-2\left(332\right)=996$.

15. **C** The general sum is found by $n^3-n\Rightarrow40^3-40=63960$.

16. **B** $a_1=\pi,\ a_2=e,\ d=e-\pi$. $a_{10}=\pi+9\left(e-\pi\right)=9e-8\pi$.

17. **A** $\sum_{n=2}^{\infty}\frac{1}{n\left(n+2\right)}=\frac{1}{2}\sum_{n=2}^{\infty}\left(\frac{1}{n}-\frac{1}{n+2}\right)$. This ends up being a telescoping series with the only terms remaining being $\frac{1}{2}\left(\frac{1}{2}+\frac{1}{3}\right)=\frac{5}{12}$.

18. **C** I and II only.

19. **A** $x = 1 + \frac{2}{x} \Rightarrow x^2 - x - 2 = 0 \Rightarrow x = 2$.

20. **C** We can rewrite the series as $3^{\left(1+2/3+3/9+4/27+\ldots\right)}$. Solving the series:

$$S = 1 + 2/3 + 3/9 + 4/27 + \ldots$$
$$1/3\, S = 1/3 + 2/9 + 3/27 + \ldots$$
$$2/3\, S = 1 + 1/3 + 1/9 + 1/27 + \ldots = 3/2$$

Therefore $S = 9/4$. So, $3^{9/4} = 9\sqrt[4]{3}$.

$3^{9/4} = 9\sqrt[4]{3}$

21. E $\frac{x+y}{2} = \frac{2xy}{x+y} \Rightarrow x^2 - 2xy + y^2 = 0 \Rightarrow (x-y)^2 = 0 \Rightarrow x = y$.

22. **B** $a_{18} = 64 + (17)(-3) = 13$.

23. **C** $71 \equiv 5 \pmod{6} \Rightarrow 2^{71} \equiv \left(2^{11}\right)^6 2^5 \pmod{9} \equiv 5 \pmod{9}$ **C**

24. **B** $\frac{100(8228) - 81(80)}{19} = \frac{1748}{19} = 92$

25. **A** $\frac{\frac{5}{36}}{1 - \left(\frac{5}{6}\right)^3} = \frac{30}{91}$.

26. A The series can be written as $-1(1+2+3+\ldots+15) = -120$.

27. **B** $ar\left(ar^5\right) = 64 \Rightarrow ar^3 = \pm 8$. Since all terms are positive, 8 is the fourth term.

28. **C** $d - a = 3(b-a) \Rightarrow b - a = \frac{r}{3} \Rightarrow c - a = 2(b-a) = \frac{2r}{3}$.

29. **B** $\frac{1}{2} \bullet \frac{2}{3} \bullet \frac{3}{4} \bullet \ldots \frac{19}{20} \bullet \frac{20}{21} = \frac{1}{21}$.

30. **E** Consider the infinite geometric series $1 + y + y^2 + \ldots = \frac{1}{1-y} \therefore y = -2x^2 \therefore 1 - 2x^2 + 4x^4 - 8x^6 + \ldots$.