Computational and Theoretical Sciences Department
Kulliyyah of Science

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1. Let UIA + IAU + AUI= 999 ,where each letter correspond to some digit differ than 0.If U>I>A then largest possible value of U equal to

(A) 3 (B) 4 (C) 5 (D) 6 (E) 7

2. Let arithmetic mean of two numbers *a* and *b* equal to 5 and arithmetic mean of three numbers *a, b* and *c* equal to 6. Then *c* equal to

(A) 5 (B) 6 (C) 7 (D) 8 (E) 11

3. Let geometric mean of two numbers *a* and *b* equal to 5 and geometric mean of three numbers *a, b* and *c* equal to 6. Then *c* equal to

(A) 1.2 (B) 1.44 (C) 4.68 (D) 6.48 (E) 8.64

4. Consider equation $ax+b=cx+d$. This equation has single solution if

(A) $a=c$ (B) $a=d$ (C) $b=c$ (D) $b \neq d$ (E) $a \neq c$

5. Consider equation $ax+b=cx+d$. This equation has infinitely many solutions if

(A) a=c and b=d (B) a=c and b≠d (C) a≠c and b=d (D) a≠c and b≠d (E) ab=cd

6. Consider equation $ax+b=cx+d$. This equation has no solution if

(A) a=c and b=d (B) a=c and b≠d (C) a≠c and b=d (D) a≠c and b≠d (E) ab=cd

7. If for positive *a*,*b* and *c* $\frac{1}{a+b} < \frac{1}{b+c}$ then we have following

(A) $a<c$ (B) $a>c$ (C) $a>b$ (D) $a<b$ (E) $b<a+c$

8. How many positive integer *x* satisfy following inequality: $\frac{1}{x+3} > 0.07$?

(A) 7 (B) 9 (C) 11 (D) 13 (E) 14

9. How many positive integers *x* satisfy following double inequalities: $0.13 > \frac{1}{x+3} > 0.07$?

(A) 7 (B) 9 (C) 11 (D) 13 (E) 14

10. Let two positive real numbers *a* and *b* satisfy equality $\frac{a+b}{2} = \sqrt{ab}$,i.e. their arithmetic mean equal to its geometric mean. Then

(A) $a>b$ (B) $a<b$ (C) $a=b$ (D) $a=2b$ (E) $b=2a$

11. Let three positive real numbers *a* ,*b* and *c* satisfy equality $\frac{a+b+c}{3} = \sqrt[3]{abc}$,i.e. their arithmetic mean equal to its geometric mean. Then

(A) $a>b=c$ (B) $a<b<c$ (C) $a=b=c$ (D) $a=b>c$ (E) $a=b<c$

12. Let x_1 and x_2 be the roots of the following quadratic equation $0.156x^2 - 0.013x - 0.013=0$.
Find $x_1 + x_2$.

(A) -0.013 (B) 0.013 (C) 0.156 (D) 1/12 (E) -1/12

13. Let x_1 and x_2 be the roots of the following quadratic equation $0.156x^2 - 0.013x - 0.013=0$. Find $x_1 \cdot x_2$.

(A) -0.013 (B) 0.013 (C) 0.156 (D) 1/12 (E) -1/12

14. Let x_1 and x_2 be the roots of the following quadratic equation $0.156x^2 - 0.013x - 0.013=0$. Find $\frac{1}{x_1} + \frac{1}{x_2}$.

(A) 12 (B) -12 (C) 2 (D) -1 (E) 1

15. Let x_1 and x_2 be the roots of the following quadratic equation $0.156x^2 - 0.013x - 0.013=0$. Find $x_1^2 + x_2^2$.

(A) 29/144 (B) -29/144 (C) 25/144 (D) -23/144 (E) 23/144

16. Let x_1 and x_2 be the roots of the following quadratic equation $0.156x^2 - 0.013x - 0.013=0$. Find $x_1^3 + x_2^3$.

(A) 31/1728 (B) -35/1728 (C) 35/1728 (D) 37/1728 (E) -37/1728

17. If for $a_1 = -1$, $a_2 = 2$ and for $n \geq 3$ $a_n = \frac{a_{n-1}}{a_{n-2}}$, then a_{2009} equal to

(A) 2 (B) 1/2 (C) -1/2 (D) -1 (E) -2

18. How many integer solutions does the following system of inequalities have? $\begin{cases} x^2 - y < -1 \\ x^2 + y < 5 \end{cases}$?

(A) more than 5 (B) 5 (C) 4 (D) 3 (E) 2

19. For given triangle Δ ABC let

3 $\angle A$ - $\angle B$ $= 98^\circ 35''$

4 $\angle B$ - $\angle C$ $= 168^\circ$

3 $\angle C$ - $\angle A$ $= 143^\circ$.

Find $\angle B$.

(A) $94^\circ 35''$ (B) $94^\circ 25''$ (C) $49^\circ 35''$ (D) $49^\circ 25''$ (E) $98^\circ 35''$

20. For given triangle Δ ABC let $\angle A = \angle C$ and AB=5 sm. Find 2BC+3AB.

(A) 10 (B) 15 (C) 20 (D) 25 (E) 30

21. For given triangle Δ ABC let AB=BC and $\angle C = 80^\circ$. Find 3 $\angle B$ + 2$\angle A$.

(A) 80° (B) 160° (C) 180° (D) 200° (E) 220°

22. For given triangle Δ ABC let AB=BC =5 ,BD $\perp$ AC and BD=3. Find area of the triangle.

(A) 10 (B) 12 (C) 14 (D) 16 (E) 18

23. For given triangle Δ ABC let AB=BC =5 ,BD $\perp$ AC and BD=3. Find perimeter of the triangle.

(A) 18 (B) 19 (C) 20 (D) 21 (E) 22

24. Let D be point on BC such that AB+BD=AC and $\angle BAD = \angle DAC = 30^\circ$.Then $\angle ACB$ equal to

(A) 50 (B) 48 (C) 45 (D) 40 (E) 30

25. In ΔABC, the height AD=h_1 and the height CE=h_2 and $\angle ABC = 30^\circ$. Find the area of ΔABC.

(A) $2h_1h_2$ (B) h_1h_2 (C) $\frac{1}{2}h_1h_2$ (D) $(h_1 + h_2)^2$ (E) $h_1^2 + h_2^2$

26. If for given positive integers a and b their sum $a+b$ and product ab are even then we have following

(A) a-odd, b-even (B) a-odd, b-odd (C) a-even b-odd (D) a-even, b-even (E) There are not such numbers

27. If for given positive integers a and b their sum a+b and product ab are odd then we have following

(A) a-odd, b-even (B) a-odd, b-odd (C) a-even b-odd (D) a-even, b-even (E) There are not such numbers

28 . If a is divisible by 3 and b is divisible by 9 then their sum (a+b) is divisible by

(A) 3 (B) 6 (C) 9 (D) 12 (E) 18

29 . If a is divisible by 3 and b is divisible by 9 then their product (ab) is divisible by

(A) 3 (B) 9 (C) 27 (D) 12 (E) 18

30. The floor of a rectangular room is covered with square tiles. The width of the room counts m tiles, the length counts n tiles ($n \geq m$). Half the number of tiles lie at the edges of the room. For how many values of the dimensions (width and length) of the room is this possible?

(A) none (B) 1 (C) 2 (D) 3 (E) more than 3

31 . If the remainder when a is divided by 5 is 2, and the remainder when b is divided by 5 is 4, find the remainder when (ab) is divided by 5.

(A) 0 (B) 1 (C) 2 (D) 3 (E) 4

32 . If the remainder when a is divided by 5 is 2 , find the remainder when (4a-3) is divided by 5.

(A) 0 (B) 1 (C) 2 (D) 3 (E) 4

33 . If the remainder when a is divided by 5 is 2 , find the remainder when (a^2+3a +4) is divided by 5.

(A) 0 (B) 1 (C) 2 (D) 3 (E) 4

34 . How many divisors have 36 including 1 and itself?

(A) 3 (B) 6 (C) 9 (D) 12 (E) 18

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35 . How many divisors have 2^{2009} including 1 and given number itself?

(A) 2008 (B) 2009 (C) 2010 (D) 2011 (E) 2012

36 . How many divisors have $2^{6} \cdot 3^{19}$ including 1 and given number itself?

(A) 25 (B) 114 (C) 120 (D) 133 (E) 140