1. The average of 40 numbers is 45. If two numbers, namely, 65 and 25 are discarded, the average of the remaining numbers is
(a) 35 (b) 45 (c) 40 (d) 43

2. $\sin\theta\cos(90^\circ-\theta)+\cos\theta\sin(90^\circ-\theta)$ _____.
(a) –1 (b) 2 (c) 0 (d) 1

3. Simplify: $\dfrac{\cos 45^\circ}{\sec 30^\circ+\operatorname{cosec} 30^\circ}$
(a) $\dfrac{3\sqrt{2}+\sqrt{6}}{8}$ (b) $\dfrac{\sqrt{3}}{2\sqrt{2}-2\sqrt{6}}$ (c) $\dfrac{3\sqrt{2}-\sqrt{6}}{8}$ (d) $\dfrac{\sqrt{3}}{2\sqrt{6}-2\sqrt{2}}$

4. If α and β are roots of the equation $x^2-x-1=0$ then the equation whose roots are α/β and β/α is:
(a) $x^2+3x-1=0$ (b) $x^2+x-1=0$ (c) $x^2-x+1=0$ (d) $x^2+3x+1=0$

5. $\left|x+\dfrac{2}{x}\right|<3$, then x belongs to
(a) $(-2,-1)\cup(1,2)$ (b) $(-\infty,-2)\cup(-1,1)\cup(2,\infty)$
(c) $(-2,2)$ (d) $(-3,3)$

6. If $m=\cos\theta-\sin\theta$ and $n-\cos\theta+\sin\theta$, then the value of $\sec^2\theta$ is
(a) $\dfrac{(m+n)^2}{2}$ (b) $\dfrac{(m+n)^2}{4}$ (c) $\dfrac{4}{(m+n)^2}$ (d) None of these

7. The number of real solutions of equation $x^2-3|x|+2=0$
(a) 2 (b) 4 (c) 1 (d) 3

8. If $\cot\theta=\dfrac{4}{3}$, then value of $\left[\dfrac{1-\sin^2\theta}{1+\cos^2\theta}\right]$
(a) $\dfrac{16}{41}$ (b) $\dfrac{16}{35}$ (c) $\dfrac{25}{16}$ (d) None of these

ROUGH

9. The positive minimum value of $\cos ec\,\theta$ is

(a) 0 (b) 1 (c) 2 (d) $\frac{1}{2}$

10. For what value of m, the roots of the equation $x^2 - x + m = 0$ are non-real

(a) $\left(\frac{1}{4}, \infty\right)$ (b) $\left(-\infty, \frac{1}{4}\right)$ (c) $\left(-\frac{1}{4}, \frac{1}{4}\right)$ (d) None of these

11. The total number of subsets of {2, 4, 6}

(a) 3 (b) 9 (c) 8 (d) 4

12. If $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$ are the real roots of $px^2 + qx + r = 0$ then

(a) $p = r$ (b) $q^2 = pq$ (c) $q^2 = 2pr$ (d) none of these

13. If $\log_{10} 11 = p$, then $\log_{10}\left(\frac{1}{110}\right) =$

(a) $(1+p)^{-1}$ (b) $-(1+p)$ (c) $1-p$ (d) $\frac{1}{10p}$

14. If $3 \cot A = 4 \cos A$, then the relation between sec A and tan A is

(a) $4 \sec A = 3 \tan A$ (b) $3\sec^2 A - 4\tan^2 A = 0$

(c) $4\sec^2 A - 3\tan^2 A = 0$ (d) $3 \sec A - 4 \tan A = 0$

15. In a ΔABC, $\tan\left(\frac{A+C}{2}\right) =$

(a) $\tan\frac{B}{2}$ (b) $\cot\frac{B}{2}$ (c) $-\tan B$ (d) $\cot B$

16. If $p(x) = ax^2 + bx + c$ and $a + b + c = 0$, then one zero is

(a) $\frac{c}{a}$ (b) $-\frac{b}{a}$ (c) $\frac{b}{a}$ (d) cannot determined

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17. If $\cot(\alpha+\beta)=0$, the $\sin(\alpha+2\beta)$ is equal to

(a) $-\sin\alpha$ (b) $\sin\beta$ (c) $\cos\alpha$ (d) $\cos\beta$

18. $\sec^2\theta+\operatorname{cosec}^2\theta$ is equal to

(a) $\sec^2\theta.\cot^2\theta$ (b) $\sec^2\theta.\tan^2\theta$ (c) $\operatorname{cosec}^2\theta.\cot^2\theta$ (d) $\sec^2\theta.\operatorname{cosec}^2\theta$

19. Find the minimum value of the expression $\dfrac{1}{5+4\cos x}$

(a) $\dfrac{1}{6}$ (b) $\dfrac{1}{7}$ (c) $\dfrac{1}{8}$ (d) $\dfrac{1}{9}$

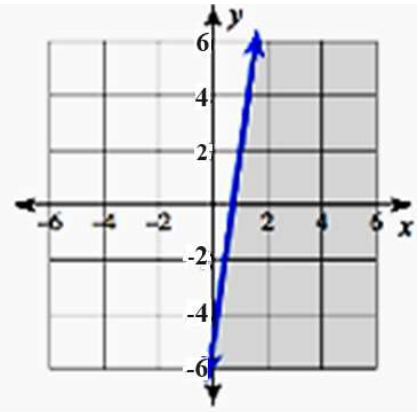
20. If the equation $(m-n)x^2+(n-l)x+l-m=0$ has equal roots, then l, m and n satisfy.

(a) $2l = m + 1$ (b) $2m = n + l$
(c) $m = n + l$ (d) more than one of the above

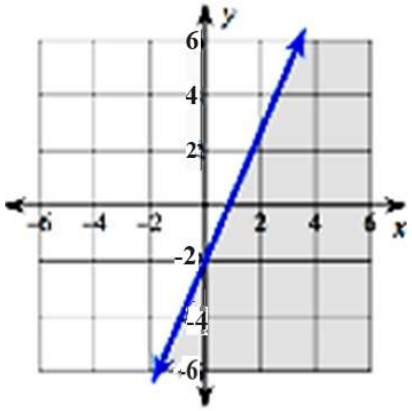
21. $y \le \dfrac{7}{3}x-2$

Select the correct graph for the above inequality

(a)



(b)



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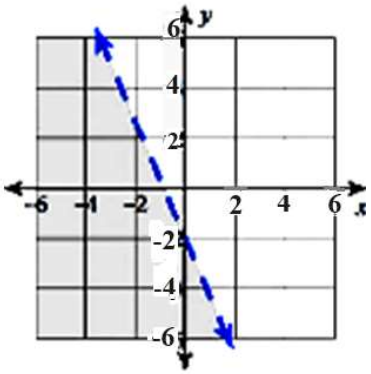
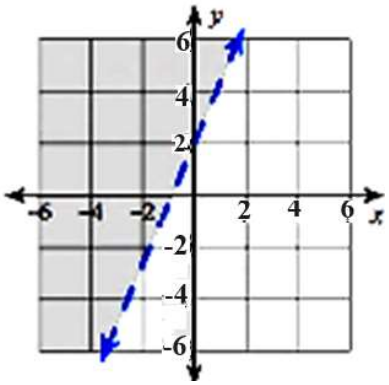
(c)



(d)



22. If α, β are the zeros of $kx^2 - 2x + 3k$ such that $\alpha + \beta = \alpha\beta$ then k = ?

(a) $\frac{1}{3}$ (b) $\frac{-1}{3}$ (c) $\frac{2}{3}$ (d) $\frac{-2}{3}$

23. If $\cos(\alpha + \beta) = 0$ then $\sin(\alpha - \beta) = ?$

(a) $\sin\alpha$ (b) $\cos\beta$ (c) $\sin 2\alpha$ (d) $\cos 2\beta$

24. If the height of a vertical pole is equal to the length of its shadow on the ground, the angle of elevation of the sun is

(a) 0^o (b) 30^o (c) 45^o (d) 60^o

25. If $\log_5 a.\log_a x = 2$, then x is equal to

(a) 125 (b) a^2 (c) 25 (d) None of these

26. Find the sum and the product of the roots of the equation $\sqrt{3}x^2 + 27x + 5\sqrt{3} = 0$

(a) $-9\sqrt{3}, 5$ (b) $9\sqrt{3}, 5$ (c) $6\sqrt{3}, -5$ (d) $6\sqrt{3}, 5$

27. If one root of the equation $2x^2 + ax + 6 = 0$ is 2 then a = ?

(a) 7 (b) – 7 (c) $\frac{7}{2}$ (d) $\frac{-7}{2}$

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28. 34. If the mots of the equation $3ax^2 + 2bx + c = 0$ are in the ratio 2 : 3, then
(a) $8ac = 25b$ (b) $8ac = 9b^2$ (c) $8b^2 = 9ac$ (d) $8b^2 = 25ac$

29. In a series, if $t_n = \frac{n^2 - 1}{n + 1}$, then $S_6 - S_3 =$ _____.
(a) 3 (b) 12 (c) 22 (d) 25

30. If $7^{\log x} + x^{\log 7} = 98$, then $\log_{10} \sqrt{x} =$
(a) 1 (b) $\frac{1}{2}$ (c) 2 (d) cannot be determined

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