MATHS

BOOKS - NIKITA MATHS (HINGLISH)

VECTOR

MULTIPLE CHOICE QUESTIONS

1. Direction of zero vector

A. does not exist

B. is towards origin

C. is indeterminate

D. is determinate

Answer: C

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2. The system of vector $\hat{i}, \hat{j}, \hat{k}$ is

A. orthogonal

B. coplanar

C. collinear

D. parallel

Answer: A

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3. If $\bar{a} \text{ and } \bar{b}$ are tow parallel vectors wth equal magnitude, then

A. $a = b$

B. $ab = 0$

C. $a \neq b$

D. a and b may or may not equal

Answer: D

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4. If $\bar{a}$ is a non-zero vector and k is a scalar such that $|k\bar{a}| = 1,$ then k=

A. $|\bar{a}|$

B. 1

C. $\dfrac{1}{|\bar{a}|}$

D. $\pm\dfrac{1}{|\bar{a}|}$

Answer: D

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5. If $\bar{a}$ is a non-zero vector of modulus a and m is non-zero scalar, then $m\bar{a}$ is a unit vector, if

A. $m = \pm 1$

B. $m = |\bar{a}|$

C. $m = \dfrac{1}{|\bar{a}|}$

D. $m = \pm 2$

Answer: C

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6. Two vectors $\bar{a}$ and $\bar{b}$ are collinear or parellel of coincident vectors, if

A. $\bar{a}$ and $\bar{b}$ are negatives of each other

B. $\bar{a}$ and $\bar{b}$ are squares of each other

C. $\bar{a}$ and $\bar{b}$ are scalar multiple of each other

D. $\bar{a}$ and $\bar{b}$ are projections of each other

Answer: C

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7. If $\vec{a}$ and $\vec{b}$ are non-collinear vectors and x, y are some scalars such that $x\vec{a}+y\vec{b}=\vec{0}$, then

A. $x=0, y\neq 0$

B. $x\neq 0, y\neq 0$

C. $x\neq 0, y=0$

D. $x=0, y=0$

Answer: D

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8. If $\bar{a}, \bar{b}, \bar{c}$ are non-collinear vectors such that for some scalars $x, y, z, x\bar{a}+y\bar{b}+z\bar{c}=\bar{0}$, then

A. $x = 0, y \neq 0, z \neq 0$

B. $x \neq 0, y = 0, z \neq 0$

C. $x \neq 0, y \neq 0, z = 0$

D. $x = 0, y = 0, z = 0$

Answer: D

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9. If $\bar{a}$ and $\bar{b}$ are two non-collinear vectors, then $x\bar{a} + y\bar{b}$, where x and y are scalars represents a vector which is

A. parallel to $\bar{b}$

B. parallel to $\bar{a}$

C. coplanar with $\bar{a}$ and $\bar{b}$

D. coplanar with $\bar{a}$ or $\bar{b}$

Answer: C

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10. $[\bar{a} \quad \bar{b} \quad \bar{c}]$ is the scalar triple product of three vectors $\bar{a}, \bar{b}, \bar{c}$ then $[\bar{a} \quad \bar{b} \quad \bar{c}] =$

A. $[\bar{b} \quad \bar{a} \quad \bar{c}]$

B. $[\bar{c} \quad \bar{b} \quad \bar{a}]$

C. $[\bar{b} \quad \bar{c} \quad \bar{a}]$

D. $[\bar{a} \quad \bar{c} \quad \bar{b}]$

Answer: C

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11. Let the vectors $\bar{u}, \bar{v}, \bar{w}$ be coplanar, , then $\bar{u} \cdot (\bar{v} \times \bar{w})$=

A. 0

B. $\bar{v}$

C. a unit vectors

D. $\bar{u}$

Answer: A

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12. The vectors $\bar{a}$ lies in the plane of vectors $\bar{b}$ and $\bar{c}$. Which of the following is correct?

A. $\bar{a} \cdot (\bar{b} \times \bar{c}) = 0$

B. $\bar{a} \cdot (\bar{b} \times \bar{c}) = 1$

C. $\bar{a} \cdot (\bar{b} \times \bar{c}) = -1$

D. $\bar{a} \cdot (\bar{b} \times \bar{c}) = 3$

Answer: A

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13. Which of the following represents the volume of paralleloP1ped. If $\overline{OA} = \bar{a}, \overline{OB} = \bar{b}, \overline{OC} = \bar{c}$ are its co-terminous edges?

A. $\frac{1}{2}[\bar{a} \ \ \bar{b} \ \ \bar{c}]$

B. $\frac{1}{6}[\bar{a} \ \ \bar{b} \ \ \bar{c}]$

C. $[\bar{a} \ \ \bar{c} \ \ \bar{b}]$

D. $[\bar{a} \ \ \bar{b} \ \ \bar{c}]$

Answer: D

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14. The volume of the tetrahedron with $\bar{a}, \bar{b}, \bar{c}$ as its co-terminous as is given by

A. $\frac{1}{2}[\bar{a} \ \ \bar{b} \ \ \bar{c}]$

B. $\frac{1}{3}[\bar{a} \ \ \bar{b} \ \ \bar{c}]$

C. $\frac{1}{6}[\bar{a} \ \ \bar{b} \ \ \bar{c}]$

D. $[\bar{a} \quad \bar{b} \quad \bar{c}]$

Answer: D

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15. The volume of the tetrahedron with $\bar{a}, \bar{b}, \bar{c}$ as its co-terminous as is given by

A. $\frac{1}{6}[\bar{a} \quad \bar{b} \quad \bar{c}]$

B. $[\bar{a} \quad \bar{b} \quad \bar{c}]$

C. $\frac{1}{3}[\bar{a} \quad \bar{b} \quad \bar{c}]$

D. $\frac{1}{2}[\bar{a} \quad \bar{b} \quad \bar{c}]$

Answer: A

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16. If $\bar{p}, \bar{q}, \bar{r}$ are any three vectors, which of the following statements is not true?

A. $(\bar{q} \times \bar{r}) \cdot \bar{p} = \bar{p} \cdot (\bar{q} \times \bar{r})$

B. $(\bar{p} \times \bar{q}) \cdot \bar{r} = \bar{r} \cdot (\bar{p} \times \bar{q})$

C. $(\bar{p} \times \bar{q}) \cdot \bar{r} = (\bar{q} \times \bar{p}) \cdot \bar{r}$

D. $(\bar{p} \times \bar{q}) \cdot \bar{r}$ represents the volume of the paralleloP1ped with co-terminous edges $\bar{p}, \bar{q}, \bar{r}$

Answer: C

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17. If $\bar{p}, \bar{q}, \bar{r}$ are any three vectors, which of the following statements is not true?

A. $\bar{p} \cdot (\bar{q} \times \bar{r}) = (\bar{q} \times \bar{r}) \cdot \bar{p}$

B. $\bar{p} \cdot (\bar{q} \times \bar{r}) = (\bar{p} \times \bar{q}) \cdot \bar{r}$

C. $\bar{p}\cdot(\bar{q}\times\bar{r})=(\bar{p}\times\bar{r})\cdot\bar{p}$

D. $\bar{p}\cdot(\bar{q}\times\bar{r})=(\bar{r}\times\bar{p})\cdot\bar{q}$

Answer: C

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18. If $\bar{a}$ and $\bar{b}$ are parallel vectors $[\bar{a}\quad\bar{b}\quad\bar{c}]$=

A. 0

B. 1

C. 2

D. 4

Answer: A

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19. The unit vectors parallel to the resultant vectors of $2\hat{i} + 4\hat{j} - 5\hat{k}$ and $\hat{i} + 2\hat{j} + 3\hat{k}$ is

A. $\dfrac{3\hat{i} + 6\hat{j} - 2\hat{k}}{7}$

B. $\dfrac{\hat{i} + \hat{j} + \hat{k}}{\sqrt{3}}$

C. $\dfrac{\hat{i} + \hat{j} + 2\hat{k}}{\sqrt{6}}$

D. $\dfrac{-\hat{i} - \hat{j} + 8\hat{k}}{\sqrt{69}}$

Answer: A

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20. If $\widehat{e_1}, \widehat{e_2}$ and $\widehat{e_1} + \widehat{e_2}$ are unit vectors, then angle between $\widehat{e_1}$ and $\widehat{e_2}$ is

A. 90°

B. 120°

C. 450°

D. 135°

Answer: B

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21. $\left(\bar{a}\cdot\hat{i}\right)\hat{i}+\left(\bar{a}\cdot\hat{j}\right)\hat{j}+\left(\bar{a}\cdot\hat{k}\right)\hat{k}\Big)=$

A. $\bar{a}$

B. $2\bar{a}$

C. $3\bar{a}$

D. 0

Answer: A

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22. If $\bar{a}\cdot\hat{i}=\bar{a}\cdot\left(2\hat{i}+\hat{j}\right)=\bar{a}\cdot\left(\hat{i}+\hat{j}+3\hat{k}\right)=1$, then $\bar{a}=$

A. $\hat{i} - \hat{j} + \hat{k}$

B. $3\hat{i} - 3\hat{j} + 3\hat{k}$

C. $\dfrac{\hat{i} + \hat{j} + 2\hat{k}}{3}$

D. $\dfrac{3\hat{i} - 3\hat{j} + \hat{k}}{3}$

Answer: D

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23. If $\bar{c} = 5\bar{a} - 4\bar{b}$ and $\bar{a}$ is perpendicular to $\bar{b}$, then $c^2 =$

A. $5a^2 + 4b^2$

B. $5a^2 + 16b^2$

C. $25a^2 + 16b^2$

D. 0

Answer: C

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24. If $\bar{c} = 2\bar{a} + 5\bar{b}$, $|\bar{a}| = a$, $|\bar{b}| = b$ and the angle between $\bar{a}$ and $\bar{b}$ is $\frac{\pi}{3}$, then c^2=

A. $4a^2 + 10ab + 25b^2$

B. $a^2 + 10ab + 5b^2$

C. $4a + 10ba + 25b^2$

D. $4a + 10ab + b^2$

Answer: A

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25. If the angle between $\bar{b}$ and $\bar{c}$ is $\frac{\pi}{3}$ and $\bar{a} = \bar{b} + 4\bar{c}$, then $a^2 =$

A. $b^2 + bc + c^2$

B. $b^2 + 4bc + 5b^2$

C. $b^2 + 4bc + 16c^2$

D. $b^2 + 8bc + 16c^2$

Answer: C

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26. If the angle between $\bar{a}$ and $\bar{b}$ is $\frac{P1}{4}$ and $\bar{c} = 3\bar{a} - 3\bar{b}$, then $c^2 =$

A. $9a^2 + \sqrt{2}ab + 4b^2$

B. $9a^2 - 6\sqrt{2}ab + 4b^2$

C. $9a^2 - 6ab + 4b^2$

D. $9a^2 + b^2 + 6ab$

Answer: B

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27. If the angle between $\vec{a}$ and $\vec{b}$ is $\frac{\pi}{6}$ and $\vec{c} = \vec{a} + 3\vec{b}$, then $c^2 =$

A. $a^2 + \sqrt{3}ab + ab^2$

B. $a^2 + 2\sqrt{3}ab + b^2$

C. $a^2 + 3ab + b^2$

D. $a^2 + 3\sqrt{3}ab + 9b^2$

Answer: D

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28. If $\bar{b} = \bar{a} - 4\bar{c}$ and angle between $\bar{a}$ and $\bar{c}$ is $\frac{\pi}{6}$ and $a = 2, c = 1$ then $b^2 =$

A. $20 - \sqrt{3}$

B. $20 - 8\sqrt{3}$

C. $16 - 4\sqrt{3}$

D. $15 - \sqrt{3}$

Answer: B

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29. If the position vectors of the vertices of a triangle be $2\hat{i}+4\hat{j}-\hat{k}, 4\hat{i}+5\hat{j}+\hat{k}$ and $3\hat{i}+6\hat{j}-3\hat{k}$, then the triangle is

A. right angled

B. isosceles

C. equilateral

D. right angled isosceles

Answer: D

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30. If $7\hat{j}+10\hat{k}, \ -\hat{i}+6\hat{j}+6\hat{k}$ and $-4\hat{i}+9\hat{j}+6\hat{k}$ are vertices of a triangle, then it is

A. only isosceles

B. only right angled

C. equilateral

D. isosceles right angled

Answer: D

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31. Let α, β, γ be distinct real numbers. The points with position vectors $\alpha\hat{i} + \beta\hat{j} + \gamma\hat{k}, \beta\hat{i} + \gamma\hat{j} + \alpha\hat{k}, \gamma\hat{i} + \alpha\hat{j} + \beta\hat{k}$

A. are collinear

B. form an equilateral triangle

C. form a right angled triangle

D. form a scalene triangle

Answer: B

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32. The perimeter of the triangle with sides $3\hat{i}+4\hat{j}+5\hat{k}, 4\hat{i}-3\hat{j}+5\hat{k}$ and $7\hat{i}+\hat{j}$ is

A. $\sqrt{450}$

B. $\sqrt{150}$

C. $\sqrt{50}$

D. $\sqrt{200}$

Answer: A

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33. The perimeter of the triangle whose vertices have the position vectors $\hat{i}+\hat{j}+\hat{k}, 5\hat{i}+3\hat{j}-3\hat{k}$ and $2\hat{i}+5\hat{j}+9\hat{k}$ is

A. $15+\sqrt{157}$

B. $16+\sqrt{157}$

C. $15 - \sqrt{157}$

D. $\sqrt{15} - \sqrt{157}$

Answer: A

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34. Let $\bar{\lambda} = \bar{a} \times (\bar{b} + \bar{c}), \overline{\mu} = \bar{b} \times (\bar{c} + \bar{a}), \bar{\gamma} = \bar{c} \times (\bar{a} + \bar{b})$, then

A. $\bar{\lambda} + \overline{\mu} = \bar{\gamma}$

B. $\bar{\lambda}, \overline{\mu}, \bar{\gamma}$ are coplanar

C. $\bar{\lambda} + \bar{\gamma} = 2\overline{\mu}$

D. $\bar{\lambda} + \bar{\gamma} = \overline{\mu}$

Answer: B

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35. $\begin{vmatrix} \bar{a} \cdot \bar{a} & \bar{a} \cdot \bar{b} \\ \bar{a} \cdot \bar{b} & \bar{b} \cdot \bar{b} \end{vmatrix} =$

A. 0

B. $a^2 b^2$

C. $\left|\bar{a} \times \bar{b}\right|^2$

D. $\left(\bar{a} \cdot \bar{b}\right)$

Answer: C

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36. The value of $\begin{vmatrix} \bar{a} \cdot \bar{a} & \bar{a} \cdot \bar{b} & \bar{a} \cdot \bar{c} \\ \bar{b} \cdot \bar{a} & \bar{b} \cdot \bar{b} & \bar{b} \cdot \bar{c} \\ \bar{c} \cdot \bar{a} & \bar{c} \cdot \bar{b} & \bar{c} \cdot \bar{c} \end{vmatrix} =$

A. $-[\bar{a} \quad \bar{b} \quad \bar{c}]$

B. $2[\bar{a} \quad \bar{b} \quad \bar{c}]$

C. $[\bar{a} \quad \bar{b} \quad \bar{c}]^2$

D. $[\bar{a} \quad \bar{b} \quad \bar{c}]$

Answer: C

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37. If $\bar{a}, \bar{b}, \bar{c}$ be three vecotrs such that $\bar{a} \times \bar{b} = \bar{c}, \bar{b} \times \bar{c} = \bar{a}, \bar{c} \times \bar{a} = \bar{b}$, then

A. $|\bar{a}| = |\bar{b}|$

B. $|\bar{b}| = |\bar{c}|$

C. $|\bar{a}| = |\bar{c}|$

D. $|\bar{a}| = |\bar{b}| = |\bar{c}|$

Answer: D

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38. If $|\bar{a}| = 50$ and $\bar{b} = 6\hat{i} - 8\hat{j} - \frac{15}{2}\hat{k}$ are collinear vectors such that the angle made by $\bar{a}$ with positive Z-axis is acute , then $\bar{a} =$

A. $-12\hat{i} + 16\hat{j} + 15\hat{k}$

B. $12\hat{i} - 16\hat{j} - 15\hat{k}$

C. $-24\hat{i} + 32\hat{j} + 30\hat{k}$

D. $24\hat{i} - 32\hat{j} - 30\hat{k}$

Answer: C

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39. If $\bar{a}$ and $\bar{b}$ are the position vectors of the points $(1, -1), (-2, m)$ and $\bar{a}, \bar{b}$ are collinear, then m=

A. -2

B. 2

C. 3

D. -3

Answer: B

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40. If the vectors $3\hat{i} - 5\hat{j} + \hat{k}$ and $9\hat{i} - 15\hat{j} + p\hat{k}$ are collinear, then find the value p.

A. -3

B. 3

C. $\frac{-1}{3}$

D. $\frac{1}{3}$

Answer: B

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41. If the vectors $2\hat{i} - q\hat{j} + 3\hat{k}$ and $4\hat{i} - 5\hat{j} + 6\hat{k}$ are collinear, then of q is

A. 5

B. 10

C. $\frac{5}{2}$

D. $\frac{5}{4}$

Answer: C

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42. The value of k for which the vectors $\bar{a} = \hat{i} - \hat{j}$ and $\bar{b} = -2\hat{i} + k\hat{j}$ are colllinear is

A. 2

B. 3

C. $\frac{1}{3}$

D. $\frac{1}{2}$

Answer: A

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43. Let $\bar{a}$ and $\bar{b}$ be non-collinear. If $\bar{c} = (x-2)\bar{a} + \bar{b}$ and $\bar{d} = (2x+1)\bar{a} - \bar{b}$ are collinear, then x=

A. $\frac{-2}{3}$

B. $\frac{2}{3}$

C. $\frac{-1}{3}$

D. $\frac{1}{3}$

Answer: D

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44. If the points $A(3, 2, -4), B(9, 8, -10)$ and $C(-2, -3. p)$ are collinear, then p=

A. 9

B. -9

C. 1

D. -1

Answer: C

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45. If the points $A(4, 5, 2), B(3, 2, p)$ and $C(5, 8, 0)$ are collinear , then p=

A. -4

B. 4

C. 0

D. 2

Answer: B

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46. If the points $A(2, 1, 1,), B(0, -1, 4)$ and $C(k, 3, -2)$ are collinear, then k= ....

A. 0

B. 1

C. 4

D. -4

Answer: C

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47. If the points $A(5, -6, -2), B(p, 2, 4)$ and $C(3, -2, 1)$ are collinear, then p=

A. -4

B. 4

C. -1

D. 1

Answer: D

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48. If the points $A(1, -2, 3), B(2, 3, -4)$ and $C(0, -p, 10)$ are collinear, then p=

A. 7

B. -7

C. 5

D. -5

Answer: A

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49. If the points $A(1, -2, 2), B(3, 1, 1)$ and $C(-1, p, 3)$ are collinear, then p=

A. 5

B. -5

C. 1

D. -1

Answer: B

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50. If $P(5, 6, -1), Q(2, -7, \beta)$ and $R(-1, -20, 7)$ are collinear , then $\beta =$

A. 2

B. 3

C. 5

D. 0

Answer: B

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51. If the points A(3,0,p),B(-1,q,3) and C(-3,3,0) are collinear, then find

(1) the ratio in which the points C divides the line segment AB

(2) the value of p and q.

A. $p=9, q=2$

B. $p=9, q=-2$

C. $p=-9, q=-2$

D. $p=-9, q=2$

Answer: A

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52. If the points with position vectors $60\hat{i}+2\hat{j}, 40\hat{i}-8\hat{j} and a\hat{i}-52\hat{j}$ are collinear, find the value of a.

A. $a=-40$

B. $a=40$

C. $a=20$

D. $a=30$

Answer: A

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53. The points with position vectors $\bar{a}+\bar{b}, \bar{a}-\bar{b}$ and $\bar{a}+k\bar{b}$ are collinear for

A. all real values of k

B. all positive values of k

C. all negative values of k

D. $k = \pm 1$

Answer: A

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54. If the position vectors of the points A,B and C be a,b and 3a-2b respectively, then prove that the points A,B and C are collinear.

A. collinear

B. non-collinear

C. form a right angled triangle

D. non-coplanar

Answer: A

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55. If position vectors of four points A, B, C, D are $\hat{i}+\hat{j}+\hat{k}, 2\hat{i}+3\hat{j}, 3\hat{i}+5\hat{j}-2\hat{k}, -\hat{j}+\hat{k}$ respectively, then $\overline{AB}$ and $\overline{CD}$ are related as

A. perpendicualr

B. parallel

C. independent

D. $\overline{AB}\cdot\overline{CD}=6$

Answer: B

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56. If $\bar{a}=\hat{i}-2\hat{j}+3\hat{k}, \bar{b}=2\hat{i}+3\hat{j}-4\hat{k}, \bar{c}=4\hat{i}+13\hat{j}-18\hat{k}$ and $\bar{c}=\bar{a}x+y\bar{b}$, then

A. $x=2, y=3$

B. $x = -2, y = -3$

C. $x = 2, y = -3$

D. $x = -2, y = 3$

Answer: D

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57. If

$\bar{a} = -\hat{i} - \hat{j} + 2\hat{k}, \bar{b} = 3\hat{i} + \hat{j} - \hat{k}, \bar{c} = 9\hat{i} + \hat{j} + 2\hat{k}$ and $\bar{c} = x\bar{a} + y\bar{b}$

, then

A. $x = 3, y = 4$

B. $x = 3, y = -4$

C. $x = -3, y = 4$

D. $x = -3, y = -4$

Answer: A

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58. If $\bar{a} = \hat{i} - \hat{j} - 2\hat{k}, \bar{b} = 2\hat{i} - \hat{j} - \hat{k}, \bar{c} = 3\hat{i} - \hat{k}$ and $\bar{c} = m\bar{a} + n\bar{b}$, then m+n=

A. 0

B. 1

C. 2

D. -1

Answer: A

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59. If $\bar{a} = \hat{i} + 3\hat{j}, \bar{b} = 2\hat{i} + 5\hat{j}, \bar{c} = 4\hat{i} + 2\hat{j}$ and $\bar{c} = t_1\bar{a} + t_2\bar{b}$, then

A. $t_1 = -16, t_2 = -10$

B. $t_1 = -16, t_2 = 10$

C. $t_1 = 16, t_2 = -10$

D. $t_1 = 16, t_2 = 10$

Answer: B

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60. If $\bar{a} = \hat{i} + 2\hat{j}, \bar{b} = -2\hat{i} + \hat{j}, \bar{c} = 4\hat{i} + 3\hat{j}$ and $\bar{c} = x\bar{a} + y\bar{b}$, then

A. $x = 2, y = 1$

B. $x = -2, y = 1$

C. $x = 2, y = -1$

D. $x = -2, y = -1$

Answer: C

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61. If

$\bar{a} = 2\hat{i} - \hat{j} + 3\hat{k}, \bar{b} = \hat{i} - 2\hat{j} + 4\hat{k}, \bar{c} = -\hat{i} + 3\hat{j} - 5\hat{k}$ and $\bar{d} = \hat{i} + 4\hat{j} -$

, then

A. $x = 3, y = 2, z = 1$

B. $x = 2, y = 3, z = 1$

C. $x = 1, y = 2, z = 3$

D. $x = 1, y = 3, z = 2$

Answer: C

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62. If

$\bar{a} = 2\hat{i} + \hat{j} - 4\hat{k}, \bar{b} = 2\hat{i} - \hat{j} + 3\hat{k}, \bar{c} = 3\hat{i} + \hat{j} - 2\hat{k}$ and $\bar{d} = -\hat{i} - 3\hat{j} +$

, then

A. $x = 2, y = -2, z = 3$

B. $x = 2, y = 2, z = -3$

C. $x = -2, y = 2, z = 3$

D. $x = 2, y = 2, z = 3$

Answer: B

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63. If $\bar{a} = 2\hat{i} - \hat{j} + \hat{k}, \bar{b} = \hat{i} + 3\hat{j} - 2\hat{k}, \bar{c} = -2\hat{i} + \hat{j} - 3\hat{k}$ and $\bar{d} = 3\hat{i} + 2\hat{j} -$

, then

A. y, x, z are in AP

B. y, x/2, z are in AP

C. x, y, z are in AP

D. x, y, z are in GP

Answer: B

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64. If $\bar{a}, \bar{b}, \bar{c}$ are three coplanar vectors, the $\begin{vmatrix} \bar{a} & \bar{b} & \bar{c} \\ \bar{a}\cdot\bar{a} & \bar{a}\cdot\bar{b} & \bar{a}\cdot\bar{c} \\ \bar{b}\cdot\bar{a} & \bar{b}\cdot\bar{b} & \bar{b}\cdot\bar{c} \end{vmatrix}$=

A. -1

B. $\bar{0}$

C. 1

D. 0

Answer: B

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65. If $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar and the vectors $\bar{p} = \bar{a} - \bar{b} + \bar{c}, \bar{q} = \bar{a} + \bar{b} - 3\bar{c}, \bar{r} = \bar{a} + 4\bar{b} + m\bar{c}$ are collinear then m=

A. -9

B. 9

C. -11

D. 11

Answer: D

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66. If $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar and the vectors $\bar{p} = 2\bar{a} - 4\bar{b} + 4\bar{c}, \bar{q} = \bar{a} + m\bar{b} + 4\bar{c}, \bar{r} = -\bar{a} + 2\bar{b} + 4\bar{c}$ are collinear then m=

A. 6

B. -6

C. 2

D. -2

Answer: C

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67. If $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar and the vectors $\bar{p} = 3\bar{a} + \bar{b} + 4\bar{c}, \bar{q} = 2\bar{a} + 2\bar{b} + 3\bar{c}, \bar{r} = \bar{a} + 3\bar{b} + m\bar{c}$ are collinear then m=

A. 3

B. -3

C. 5

D. -5

Answer: A

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68. If $\bar{p} = \hat{i} - 2\hat{j} + \hat{k}$ and $\bar{q} = \hat{i} + 4\hat{j} - 2\hat{k}$ are position vectors points P and Q. find the position vector of the points R which divides segment PQ internally in the ratio 2:1.

A. $\hat{i} - 2\hat{j} - \hat{k}$

B. $\hat{i} - 2\hat{j} + \hat{k}$

C. $\hat{i} - 2\hat{j} - \hat{k}$

D. $\hat{i} + 2\hat{j} + \hat{k}$

Answer: D

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69. If $\bar{p} = \hat{i} - 2\hat{j} + \hat{k}$ and $\bar{q} = \hat{i} + 4\hat{j} - 2\hat{k}$ are position vectors points P and Q. find the position vector of the points R which divides segment PQ internally in the ratio 2:1.

A. $(1, 2, 1)$

B. $(1, -2, -1)$

C. $(1, -2, 1)$

D. $(1, 2, -1)$

Answer: B

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70. If $\bar{a} = 2\hat{i} - \hat{j} + 5\hat{k}, \bar{b} = -3\hat{i} + 2\hat{j}$ are the position vectors of points A, B respectively and points $C(\bar{c})$ divides the line segment AB internallly in the ratio 1:4 , then $\bar{c} =$

A. $\hat{i} - \frac{2}{5}\hat{j} - 4\hat{k}$

B. $\hat{i} - \frac{2}{5}\hat{j} + 4\hat{k}$

C. $\hat{i} + \frac{2}{5}\hat{j} - 4\hat{k}$

D. $\hat{i} + \frac{2}{5}\hat{j} + 4\hat{k}$

Answer: C

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71. Find the corrdinates of the point which divides the line segment joining the points A(2,-6,8) and B (-1,3,-4) externally in the ratio 1:3.

A. $\left(\frac{1}{4}, \frac{-3}{4}, 1\right)$

B. $\left(\frac{1}{4}, \frac{-3}{4}, -1\right)$

C. $\left(\frac{5}{4}, \frac{-15}{4}, 5\right)$

D. $\left(\frac{5}{4}, \frac{-15}{4}, -5\right)$

Answer: A

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72. If the point C divides the line segment joining the points $A(4, -2, 5)$ and $B(-2, 3, 7)$ externally in the ratio 8:5, then points C is

A. $\left(-12, \frac{34}{3}, \frac{31}{3}\right)$

B. $\left(-12, \frac{31}{3}, \frac{34}{3}\right)$

C. $\left(-12, \frac{14}{3}, \frac{31}{3}\right)$

D. $\left(-12, \frac{31}{3}, \frac{14}{3}\right)$

Answer: C

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73. If the point C divides the line segment joining the points $A(2, -1, -4)$ and $B(3, -2, 5)$ externally in the ratio 3:2, then points C is

A. $(5, -4, -23)$

B. $(5, 4, -23)$

C. $(5, -4, 23)$

D. $(5, 4, 23)$

Answer: D

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74. Find the corrdinates of the point which divides the line segment joining the points A(2,-6,8) and B (-1,3,-4) externally in the ratio 1:3.

A. $\left(\frac{-7}{2}, \frac{-21}{2}, 14\right)$

B. $\left(\frac{7}{2}, \frac{-21}{2}, -14\right)$

C. $\left(\frac{-7}{2}, \frac{21}{2}, -14\right)$

D. $\left(\frac{7}{2}, \frac{-21}{2}, 14\right)$

Answer: C

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75. The co-ordinates of the points which trisects the line segment joining the points $A(2, 1, 4)$ and $B(-1, 3, 6)$ are

A. $\left(-1, \frac{5}{3}, \frac{14}{3}\right), \left(0, \frac{7}{3}, \frac{16}{3}\right)$

B. $\left(1, \frac{5}{3}, \frac{14}{3}\right), \left(0, \frac{-7}{3}, \frac{16}{3}\right)$

C. $\left(1, \frac{5}{3}, \frac{14}{3}\right), \left(0, \frac{7}{3}, \frac{16}{3}\right)$

D. $\left(-1, \frac{5}{3}, \frac{14}{3}\right), \left(0, \frac{-7}{3}, \frac{16}{3}\right)$

Answer: D

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76. If the position vectors of points P, Q, R and $\overline{P}, \bar{q}, \bar{r}$ are $\bar{r} = \frac{5\bar{p} - 3\bar{q}}{2}$, then

A. R divides QP in internally in the ratio 5:3

B. R divides QP in externally in the ratio 5:3

C. R divides QP in internally in the ratio 5:3

D. R divides QP in externally in the ratio 5:3

Answer: A

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77. If the position vectors of points P, Q, R and $\overline{P}, \bar{q}, \bar{r}$ are $\bar{r} = \frac{2\bar{p} + \bar{q}}{3}$,

then

A. R divides QP in internally in the ratio 2:2

B. R divides QP in externally in the ratio 2:2

C. R divides QP in internally in the ratio 3:2

D. R divides QP in externally in the ratio 3:2

Answer: B

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78. If the position vectors of points A, B, C and $\bar{a}, \bar{b}, \bar{c}$ are $\bar{c} = \frac{7\bar{a} - 3\bar{b}}{4}$

, then

A. C divides BA in internally in the ratio 7:3

B. C divides BA in externally in the ratio 7:3

C. C divides AB in internally in the ratio 7:3

D. C divides AB in internally in the ratio 7:3

Answer: B

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79. If the position vectors of points A, B, C and $\bar{a}, \bar{b}, \bar{c}$ are $\bar{c} = 5\bar{a} - 4\bar{b}$, then

A. C divides BA in internally in the ratio 5:4

B. C divides BA in externally in the ratio 4:5

C. C divides AB in internally in the ratio 5:4

D. C divides AB in externally in the ratio 5:4

Answer: D

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80. If the points $A(\bar{a}), B(\bar{b}), C(\bar{c})$ are collinear and $2\bar{a} + 3\bar{b} - 5\bar{c} = \bar{0}$, then

A. C divides BA in internally in the ratio 2:3

B. C divides BA in externally in the ratio 2:3

C. C divides AB in internally in the ratio 3:2

D. C divides AB in externally in the ratio 3:2

Answer: C

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81. If $\bar{a}, \bar{b}, \bar{c}$ are position vectors of points A, B, C respectively such that $3\bar{a} + 5\bar{b} = 8\bar{c}$, then C divides AB,

A. externally in the ratio 3:5

B. internally in the ratio 3:5

C. externally in the ratio 5:3

D. internally in the ratio 5:3

Answer: D

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82. If $\bar{a}, \bar{b}, \bar{c}$ are position vectors of points A, B, C respectively such that $3\bar{a} + 5\bar{b} = 8\bar{c}$then A divides BC

A. externally in the ratio 5:8

B. internally in the ratio 5:8

C. externally in the ratio 8:5

D. internally in the ratio 8:5

Answer: C

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83. If $\bar{a}, \bar{b}, \bar{c}$ are position vectors of points A, B, C respectively such that $5\bar{a} - 3\bar{b} - 2\bar{c} = 0$, then

A. C divides BA in internally in the ratio 5:3

B. C divides BA in externally in the ratio 5:3

C. C divides AB in internally in the ratio 5:3

D. C divides AB in internally in the ratio 5:3

Answer: B

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84. If the points $A(\bar{a}), B(\bar{b}), C(\bar{c})$ are collinear and $3\bar{a} + 2\bar{b} - 5\bar{c} = \bar{0}$, then

A. Three points forms triangles ABC

B. C is the mid-point of seq. AB

C. C divides AB internally in ratio 2:3

D. C divides AB externally in ratio 3:2

Answer: C

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85. Find the position vector of the point which divides the join of the points $\left(2\vec{a} - 3\vec{b}\right)$ and $\left(3\vec{a} - 2\vec{b}\right)$ (i) internally and (ii) externally in the ratio $2:3$.

A. $12\bar{a}$

B. $-12\bar{a}$

C. $5\bar{b}$

D. $-5\bar{b}$

Answer: D

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86. If the points $A(3, 0, p), B(-1, q, 3), C(-3, 3, 0)$ are collinear, then

A. C divides AB externally in ratio 1:3

B. C divides AB internally in ratio 1:3

C. C divides AB externally in ratio 3:1

D. C divides AB internally in ratio 3:1

Answer: C

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87. If the points $A(2, p, 1), B(1, 2, q), C(3, 2, 1)$ are collinear, then

A. C divides AB externally in ratio 1:2

B. C divides AB internally in ratio 1:2

C. C divides AB externally in ratio 2:1

D. C divides AB internally in ratio 2:1

Answer: A

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88. If the points $A(2, p, 1), B(1, 2, q), C(3, 2, 1)$ are collinear, then

A. $p = 1, q = 2$

B. $p = 2, q = 1$

C. $p = -1, q = -2$

D. $p = -2, q = -1$

Answer: B

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89. If the points $A(3, 2, p), B(q, 8, -10), C(-2, -3, 1)$ are collinear, then

A. C divides BA in internally in the ratio 11:5

B. C divides BA in externally in the ratio 11:5

C. C divides AB in internally in the ratio 5:11

D. C divides AB in externally in the ratio 5:11

Answer: D

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90. If the points $A(3, 2, p), B(q, 8, -10), C(-2, -3, 1)$ are collinear, then

A. $p = -4, q = -9$

B. $p = -4, q = 9$

C. $p = 4, q = 9$

D. $p = 4, q = 9$

Answer: B

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91. In $\triangle ABC,$ D divides BC in the ratio l:m, G divides AD in the ratio (l+m):n then the position vector of G is

A. $\dfrac{m\bar{c}+l\bar{b}}{m+l}$

B. $\dfrac{m\bar{c}-l\bar{b}}{m+l}$

C. $\dfrac{l\bar{c}+m\bar{b}}{m+l}$

D. $\dfrac{l\bar{c}-l\bar{b}}{m-l}$

Answer: C

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92. In $\triangle ABC,$ D divides BC in the ratio l:m, G divides AD in the ratio (l+m):n then the position vector of G is

A. $\dfrac{m\bar{c}+n\bar{b}+l\bar{a}}{m+n+l}$

B. $\dfrac{l\bar{a} + m\bar{b} + n\bar{c}}{m + n + l}$

C. $\dfrac{n\bar{c} + l\bar{b} + m\bar{a}}{m + n + l}$

D. $\dfrac{l\bar{c} + m\bar{b} + n\bar{a}}{m + n + l}$

Answer: D

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93. The positon vectors of points P, Q, R are given by $\bar{p} = \bar{a} - 2\bar{b} + 3\bar{c}, \bar{q} = -2\bar{a} + 3\bar{b} + 2\bar{c}, \bar{r} = -8\bar{a} + 13\bar{b}$. If the points P, Q, R are collinear, then the ratio in which point P divides the line segment RQ is

A. $-3:1$

B. $3:1$

C. $-1:3$

D. $1:3$

Answer: A

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94. In $\triangle ABC$, if the points P, Q, R divides the sides BC, CA, AB in the ratio 1:4, 3:2, 3:7 respectively and the point S divides side AB in the ratio 1:3, then $\left(\overline{AP} + \overline{BQ} + \overline{CR}\right) : \left(\overline{CS}\right)$=

A. $2:5$

B. $5:2$

C. $4:5$

D. $5:4$

Answer: A

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95. If the origin is the centroid of the triangle whose vertices are A (2,p,-3), B(q,-2,5) and C(-5,1,r), then find the values of p,q and r.

A. $p = 1, q = -3, r = -2$

B. $p = 1, q = 3, r = -2$

C. $p = 1, q = 3, r = 2$

D. $p = -1, q = -3, r = -2$

Answer: B

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96. If G(a,2,-1) is the centroid of the triangle with vertices P(1,3,2),Q(3,b,-4) and R(5,1,c), then find the values of a,b and c.

A. $a = 3, b = 2, c = -1$

B. $a = 3, b = -2, c = 1$

C. $a = 3, b = 2, c = 1$

D. $a = 3, b = -2, c = -1$

Answer: A

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97. If $G\left(r, \frac{-4}{3}, \frac{1}{3}\right)$ is centroid of the triangle having vertices $A(5, 1, p), B(1, q, p), C(1, -2, 3)$, then

A. $p = -1, q = -3, r = \frac{7}{3}$

B. $p = 1, q = -3, r = \frac{7}{3}$

C. $p = -1, q = 3, r = \frac{7}{3}$

D. $p = 1, q = 3, r = \frac{7}{3}$

Answer: A

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98. If $G(-1, 2, 1)$ is the centroid triangle ABC whose two vertices are $A(3, 1, 4), B(-4, 5, -3)$, then the third vertex is

A. $(2, 0, -2)$

B. $(-2, 0, 2)$

C. $(-2, 0, -2)$

D. $(2, 0, 2)$

Answer: B

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99. If $A(2, -2, 3), B(x, 4, -1), C(3, x, -5)$ are the vertices and $G(2, 1, -1)$ is the centroid of $\triangle ABC$, then x=

A. -3

B. -1

C. 1

D. 11

Answer: C

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100. If $A(1, 4, 2), B(-2, 3, -5)$ are two vertices A and B and $G\left(\frac{4}{3}, 0, \frac{-2}{3}\right)$ is the centroid of the $\triangle ABC$, then the mid-point of side BC is

A. $\left(\frac{3}{2}, -2, -2\right)$

B. $\left(2, 1, \frac{3}{2}\right)$

C. $(-3, 1, -1)$

D. $(3, 1, 1)$

Answer: A

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101. The incentre of triangle whose vertices are $A(0, 3, 0), B(0, 0, 4), C(0, 3, 4)$ is

A. $(0, 24, 36)$

B. $(0, 36, 24)$

C. $(0, 3, 2)$

D. $(0, 2, 3)$

Answer: D

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102. The incentre of triangle whose vertices are $A(0, 3, 0), B(0, 0, 4), C(0, 3, 4)$ is

A. $(0, 2, 3)$

B. $(0, 3, 2)$

C. $(0, 9, 6)$

D. $(0, 6, 9)$

Answer: B

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103. The incentre of triangle whose vertices are $P(0, 2, 1), Q(-2, 0, 0), R(-2, 0, 2)$

A. $\left(\frac{-3}{2}, \frac{1}{2}, 1\right)$

B. $\left(\frac{3}{2}, \frac{-1}{2}, 1\right)$

C. $\left(\frac{-3}{2}, \frac{-1}{2}, 1\right)$

D. $\left(\frac{3}{2}, \frac{1}{2}, 1\right)$

Answer: A

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104. $\overline{PQ}-\overline{TQ}+\overline{PS}+\overline{ST}=$

A. $2\overline{PT}$

B. $2\overline{ST}$

C. $2\overline{QS}$

D. $\overline{PT}$

Answer: A

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105. $\overline{AB}-\overline{CB}+\overline{DA}+2\overline{CD}=$

A. $\overline{CB}$

B. $6\overline{OC}$

C. $\overline{CD}$

D. $\overline{AC}$

Answer: C

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106. If A, B, C, D, E are five coplanar points, then $\overline{DA}+\overline{DB}+\overline{DC}+\overline{AE}+\overline{BE}+\overline{CE}=$

A. $\overline{DE}$

B. $3\overline{DE}$

C. $2\overline{DE}$

D. $4\overline{ED}$

Answer: B

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107. If $\bar{a}$ and $\bar{b}$ are position verctors of A and B respectively, then the position vector of point C in produced AB such that $\overline{AC}=3\overline{AB}$ is

A. $3\bar{a} - \bar{b}$

B. $3\bar{b} - \bar{a}$

C. $3\bar{a} - 2\bar{b}$

D. $3\bar{b} - 2\bar{a}$

Answer: D

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108. $\overline{OA} + 6\overline{BC} + \overline{AB} + 5\overline{OB} =$

A. $\overline{OC}$

B. $6\overline{OC}$

C. $\overline{BC}$

D. $\overline{CD}$

Answer: B

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109. If D, E, F are the mid points of the side BC, CA and AB respectively of a triangle ABC, write the value of $\vec{A}D + \vec{B}E + \vec{C}F$.

A. $\overline{OA}$

B. $\overline{AC}$

C. $\overline{AF}$

D. $\overline{O}$

Answer: D

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110. In triangle ABC, if $2\overline{AC} = 3\overline{CB}$, then $2\overline{OA} + 3\overline{OB} =$

A. $5\overline{OC}$

B. $-\overline{OC}$

C. $\overline{OC}$

D. $3\overline{OC}$

Answer: A

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111. If C is the mid-point of AB and P is any point outside AB, then

A. $\overline{PA} + \overline{PB} = \overline{PC}$

B. $\overline{PA} + \overline{PB} + \overline{PC} = 0$

C. $\overline{PA} + \overline{PB} = 2\overline{PC}$

D. $\overline{PA} + \overline{PB} + 2\overline{PC} = 0$

Answer: C

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112. If A, B, C are the vertices of a triangle whose position vectros are $\vec{a}, \vec{b}, \vec{c}$ and G is the centroid of the ΔABC, then $\overline{GA}+\overline{GB}+\overline{GC}=$

A. $\overline{O}$

B. $3\overline{GA}$

C. $3\overline{GA}$

D. $3\overline{GC}$

Answer: A

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113. D, E, F are the midpoints of the sides BC, CA and AB respectively of $\triangle ABC$ and O is any point in the plane of $\triangle ABC$. Show that

(1)$\overline{AD}+\overline{BE}+\overline{CF}=\bar{0}$

(2) $\overline{AD}+\frac{1}{3}\overline{BE}+\frac{1}{3}\overline{CF}=\frac{1}{2}\overline{AC}.$

A. $\overline{AB} = 2\overline{ED}$

B. $\overline{AB} = 2\overline{DE}$

C. $\overline{AB} = \overline{ED}$

D. $\overline{AB} = \overline{DE}$

Answer: A

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114. if D,E and F are the mid-points of the sides BC,CA and AB respectively of the $\Delta ABCa \cap dO$ be any points, then prove that

$OA + OB + OC = OD + OE + OF$

A. $\overline{OA}$

B. $\overline{OB}$

C. $\overline{EF}$

D. $\overline{DE}$

Answer: A

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115. X and Y are points on the sides AB and BC respectively of $\triangle ABC$ such that XY||AC and XY divides $\triangle ABC$ into two parts in area , find $\frac{AX}{AB}$

A. $\overline{EF} = 2\overline{BC}$

B. $\overline{EF} = \overline{BC}$

C. $\overline{EF} = \frac{1}{2}\overline{BC}$

D. $\overline{EF} = \frac{1}{3}\overline{BC}$

Answer: C

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116. If D, E, F are the mid-points of the sides BC, CA and AB respectively of $\triangle ABC$, then $\overline{AD}+\frac{2}{3}\overline{BE}+\frac{1}{3}\overline{CF}=$

A. $\overline{AC}$

B. $\overline{CA}$

C. $2\overline{AC}$

D. $\frac{1}{2}\overline{AC}$

Answer: D

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117. If A, B, C, D are four non-collinear points in the plane such that $\overline{AD}+\overline{BD}+\overline{CD}=\overline{O}$, then the point D is the ... of triangle ABC.

A. incentre

B. centroid

C. orthocentre

D. circumcentre

Answer: B

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118. Which of the following is trues?

A. The perpendicular bisectors of the sides of triangle are perpendicular to each other

B. The perpendicular bisectors of the sides of a triangle are congruent

C. The perpendicular bisectors of the sides of the triangle are concurrent

D. The perpendicular bisectors of the sides of a triangle are not concurrent

Answer: C

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119. If G_1 and G_2 are the centroid of $\triangle ABC$ and $\triangle PQR$ respectively, then $\overline{AP}+\overline{BQ}+\overline{CR}=$

A. $\overline{G_1G_2}$

B. $2\overline{G_1G_2}$

C. $3\overline{G_1G_2}$

D. $6\overline{G_1G_2}$

Answer: C

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120. P, Q, R are the mid-points of the sides BC, AC, and AB respectively of $\triangle ABC$. If $G_1(\overline{g_1})$ and $G_2(\overline{g_2})$ are the centroids of the $\triangle ABC$ and $\triangle PQR$ respectively, then

A. $\overline{g_1}=3\overline{g_2}$

B. $\overline{g_2} = 3\overline{g_1}$

C. $\overline{g_1} = -\overline{g_2}$

D. $\overline{g_1} = \overline{g_2}$

Answer: D

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121. If G is the point of concurrence of the median of $\triangle ABC$, then $\overline{GA} + \overline{GB} + \overline{GC} =$

A. $3\bar{q}$

B. $6\bar{q}$

C. $\overline{O}$

D. $\bar{q}$

Answer: C

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122. Let G be the centroid of a triangle PQR and S be any other point, the $\overline{SP} + \overline{SQ} + \overline{SR} =$

A. $\overline{O}$

B. $\overline{SG}$

C. $3\overline{SG}$

D. $2\overline{GS}$

Answer: C

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123. If G is the centroid of triangle ABC and L is a point on BC, such that $BL = 2LC$, then $\overline{GB} + 2\overline{GC} =$

A. $\overline{GL}$

B. $2\overline{GL}$

C. $\overline{OG}$

D. $3\overline{GL}$

Answer: D

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124. If G is the point of concurrence of the median of $\triangle ABC$, then $\overline{GA}+\overline{GB}+\overline{GC}=$

A. $3\overline{OG}$

B. $\overline{AB}$

C. $\overline{OG}$

D. $\overline{O}$

Answer: D

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125. D, E and F are the mid-points of the sides BC, CA and AB respectively of ΔABC and G is the centroid of the triangle, then $\overrightarrow{GD} + \overrightarrow{GE} + \overrightarrow{GF} =$

A. $\overline{O}$

B. $2(\bar{a} + \bar{b} + \bar{c})$

C. $\bar{a} + \bar{b} + \bar{c}$

D. $3\bar{g}$

Answer: A

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126. If P is the orthocentre and Q is the circumcentre of $\triangle (ABC)$, then $\overline{QA} + \overline{QB} + \overline{QC} =$

A. $2\overline{PQ}$

B. $2\overline{QP}$

C. $\overline{PQ}$

D. $\overline{QP}$

Answer: D

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127. If P is the orthocentre and Q is the circumcentre of $\triangle ABC$, then $\overline{PA} + \overline{PB} + \overline{PC} =$

A. $\overline{PQ}$

B. $\overline{PQ}$

C. $2\overline{PQ}$

D. $\overline{PQ}$

Answer: C

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128. IF $G(\bar{g}), H(\bar{h})$ and $p(\bar{p})$ are centroid orthocenter and circumenter of a triangle and $x\bar{p} + y\bar{h} + z\bar{g} = \bar{0}$ then (x,y,z)=

A. $(1, 1, -2)$

B. $(2, 1, -3)$

C. $(1, 3, -4)$

D. $(2, 3, -5)$

Answer: B

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129. If O is the circumcentre, G is the centroid and O' is orthocentre or triangle ABC then prove that: $\overrightarrow{OA} + \overrightarrow{OB} + \overrightarrow{OC} = \overrightarrow{OO'}$

A. $3\overline{QG}$

B. $\overline{QG}$

C. $\overline{GQ}$

D. $3\overline{GQ}$

Answer: A

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130. The vector $\overline{AB} = 3\hat{i} + 4\hat{k}$ and $\overline{AC} = 5\hat{i} - 2\hat{j} + 4\hat{k}$ are the sides of a triangle ABC. The length of the median through A is

A. $\sqrt{18}$

B. $\sqrt{72}$

C. $\sqrt{33}$

D. $\sqrt{288}$

Answer: C

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131. In an isosceles $\triangle ABC$, If $AB = AC$ and AD is the median, then $\overline{AD} \cdot \overline{BC} =$

A. $\overline{AC}$

B. $\overline{BD}$

C. 1

D. 0

Answer: D

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132. In a triangle OAB, $\angle AOB = 90^0$. If $P\, and\, Q$ are points of trisection of AB prove that $OP^2 + OQ^2 = \frac{5}{9}AB^2$.

A. $\frac{1}{3}(AB)^2$

B. $\frac{5}{3}(AB)^2$

C. $\frac{1}{9}(AB)^2$

D. $\frac{5}{9}(AB)^2$

Answer: D

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133. In parallelogram ABCD, if P is the mid-point of side AB, then

A. DP bisects diagonal AC

B. DP bisects diagonal BD

C. DP trisects diagonal BD

D. DP trisects diagonal AC and trisected by AC

Answer: D

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134. In parallelogram ABCD, if $\overline{AB} = \bar{a}$ and $\overline{AD} = \bar{b}$, then the diagonals interm of $\bar{a}$ and $\bar{b}$ are

A. $\bar{a} + \bar{b}, \bar{a} - \bar{b}$

B. $\bar{a}, \bar{b}$

C. $\bar{a} + \bar{b}, \bar{b} - \bar{a}$

D. $2\bar{a}, 2\bar{b}$

Answer: C

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135. If the two adjacent sides of a parallelogram are given by $\hat{i} + 2\hat{j} + 3\hat{k}$ and $-3\hat{i} - 2\hat{j} + \hat{k}$, then the lengths of the diagonals are

A. $2, 6\sqrt{5}$

B. $2\sqrt{5}, 6$

C. $2, 6$

D. $2, \sqrt{5}$

Answer: B

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136. Let $\overrightarrow{OA} = \vec{a}, \overrightarrow{OB} = 10\vec{a} + 2\vec{b}$ and $\overrightarrow{OC} = \vec{b}$ where O,A and C are non-collinear points . Let P denotes the area of the quadrilateral OABC and let q denots the area of the parallelogram with OA and OC as adjacent sides. If p =kq , then h=........

A. 4

B. 6

C. $\dfrac{|\bar{a} - \bar{b}|}{|2\bar{a}|}$

D. $\dfrac{|\bar{a} + \bar{b}|}{|2\bar{a}|}$

Answer: B

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137. By method, show that the quadrilateral with vertices A(1,2,-1), B(8,-3,-4), C(5,-1,1),D(-2,1,4) is a parallelogram.

A. parallelogram

B. trapezium

C. kite

D. rhombus

Answer: A

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138. The lie segments joining the midpoints of the ajdacent sides of a quadirlateral form

A. trapezium

B. parallelogram

C. rectangle

D. square

Answer: B

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139. Which of the following is true?

A. A quadrilateral is a square if and only if diagonal are congruent and bisects each other at right angle

B. A quadrilateral is a square if and only if diagonal are not congruent and bisects each other at right angle

C. A quadrilateral is a square if and only if diagonal are congruent

D. A quadrilateral is a square if and only ifdiagonals bisects each other at right angle

Answer: A

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140. Which of the following is true?

A. A quadrilateral is a rectangle if and only if diagonal are not congruent and bisect each other at right angle

B. A quadrilateral is a rectangle if and only if diagonal are congruent and bisect each other at right angle

C. A quadrilateral is a rectangle if and only if diagonal are congruent

D. A quadrilateral is a rectangle if and only if diagonals bisect each other at right angle

Answer: B

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141. Which of the following is trues?

A. A quadrilateral is a rhombus if and only if diagonal are congruent and bisects each other at right angle

B. A quadrilateral is a rhombus if and only if diagonal are not congruent and bisects each other at right angle

C. A quadrilateral is a rhombus if and only if diagonal bisect each other

D. A quadrilateral is a rhombus if and only if diagonal are at right angle

Answer: A

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142. Which of the following is true regarding the diagonals of a parallelogram?

A. If diagonals of a parallelogram are of equal length, then the parallelogram is a square

B. If diagonals of a parallelogram are of equal length, then the parallelogram is a rectangle

C. If diagonals of a parallelogram are of equal length, then the parallelogram is a rhombus

D. If diagonals of a parallelogram are of equal length, then the parallelogram is not a rectangle

Answer: B

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143. ABCD is a rhombus and P, Q, R, S are the mid-points of AB, BC, CD, DA respectively. Prove that $PQRS$ is a rectangle.

A. trapezium

B. rhombus

C. kite

D. parallelogram

Answer: D

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144. In quadrilateral ABCD, if $\overline{AB} = \overline{CD}$, then it is

A. trapezium

B. parallelogram

C. kite

D. rhombus

Answer: B

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145. In the quadrilateral $ABCD$:

A. $\frac{1}{2}(\overline{AC} \times \overline{BD})$

B. $\frac{1}{2}(\overline{AC} \times \overline{BD})$

C. $\overline{AC} \times \overline{DB}$

D. $\overline{AC} \times \overline{BD}$

Answer: B

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146. Let $\square PQRS$ be a quadrilateral. If M and N are the mid-points of the sides PQ and RS respectively, then PS+QR=

A. $4\overline{MN}$

B. $3\overline{MN}$

C. $2\overline{MN}$

D. $\overline{MN}$

Answer: C

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147. ABCD is a quadrilateral and E is the point of intersection of the lines joining the mid-points of opposite sides. If O be any point in the plane, then show that $\overrightarrow{OA}+\overrightarrow{OB}+\overrightarrow{OC}+\overrightarrow{OD}=4\overrightarrow{OE}$.

A. 3

B. 4

C. 7

D. 9

Answer: B

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148. If $\hat{i}+\hat{j}-\hat{k}, 2\hat{i}+3\hat{j}, 3\hat{i}+5\hat{j}-2\hat{k}$ and $-\hat{j}+\hat{k}$ are the position vectors of vertices of a quadrilateral, then it is a

A. parallelogram

B. trapezium

C. rectangle

D. square

Answer: B

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149. E and F are mid-points of sides of AD and BC respectively of quadrilateral ABCD having vertices $A(1, 2, 1), B(-2, 4, -1), C(-1, 3, 2), D(5, -1, 6)$, then

A. EF is parallel to AB

B. EF is parallel to CD

C. EF is a parallel to AB and CD

D. EF is not a parallel to AB and CD

Answer: C

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150. Which of the following is trues?

A. The diagonal of a kite bisect each other

B. The diagonal of a kite are at right angle

C. The diagonal of a kite are congruent

D. The diagonal of a kite bisect each at right angle

Answer: B

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151. OABC is a tetrahedron D and E are the mid points of the edges $\overrightarrow{OA}$ and $\overrightarrow{BC}$. Then the vector $\overrightarrow{DE}$ in terms of $\overrightarrow{OA}$, $\overrightarrow{OB}$ and $\overrightarrow{OC}$

A. $\overline{OC} \perp \overline{AB}$

B. $\overline{OC} = \overline{AB}$

C. $\overline{OC} = 2\overline{AB}$

D. $\overline{OC} = \overline{AB}$

Answer: A

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152. If M and N are the mid-points of the diagonals AC and BD respectively of a quadrilateral ABCD, then the of $\overrightarrow{AB} + \overrightarrow{AD} + \overrightarrow{CB} + \overrightarrow{CD}$ equals

A. $2\overline{MN}$

B. $2\overline{NM}$

C. $4\overline{MN}$

D. $4\overline{NM}$

Answer: C

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153. ABCD is a rhombus and P, Q, R and S are wthe mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rectangle.

A. $\overline{BD}$

B. $\overline{PQ}$

C. $\overline{RS}$

D. $\overline{AC}$

Answer: D

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154. If P, Q are the mid-points of the diagonals AC and BD of a quadrilateral aBCD and R is the mid-points of PQ, then $\overline{RA} + \overline{RB} + \overline{RC} + \overline{RD} =$

A. $4\overline{OR}$

B. $\overline{OR}$

C. $2\overline{RS}$

D. $\overline{O}$

Answer: D

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155. If ABCD is a quadrilateral, then $2\overline{AB} + 3\overline{BC} + 2\overline{CD} + \overline{DA} + \overline{CA} + \overline{DB} =$

A. $\overline{AC}$

B. $2\overline{AC}$

C. $\overline{AD}$

D. $\overline{O}$

Answer: D

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156. If ABCD is a square, then

$\overline{AB} + 2\overline{BC} + 3\overline{CD} + 4\overline{DA}$ =

A. $\overline{AC}$

B. $\overline{O}$

C. $\overline{CA}$

D. $2\overline{CA}$

Answer: D

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157. ABCD is a parallelogram with AC and BD as diagonals. Then, $\overrightarrow{AC} - \overrightarrow{BD} =$

A. $4\overline{AB}$

B. $3\overline{AB}$

C. $2\overline{AB}$

D. $\overline{AB}$

Answer: C

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158. Let ABCD is a parallelogram and $\vec{A}C, \vec{B}D$ be its diagonal, then $\vec{A}C + \vec{B}D$ is

A. $2\overline{AB}$

B. $2\overline{BC}$

C. $\overline{AB}$

D. $\overline{BC}$

Answer: B

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159. ABDC is a parallelogram and P is the point of intersection of its diagonals. If O is any point, then $\overline{OA} + \overline{OB} + \overline{OC} + \overline{OD} =$

A. $\overline{OP}$

B. $4\overline{OP}$

C. $\overline{O}$

D. $2\overline{OP}$

Answer: B

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160. ABCD is a parallelogram and O is the point of intersection of its diagonals. If points P, Q, R, S are the mid-points of OA, PB, QC, RD respectively, then the points Q, O, S

A. forms a triangle

B. are non-coplanar

C. are collinear

D. are non-collinear

Answer: C

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161. In parallelogram ABCD,if P, Q are mid-points of BC and CD respectively, then $\overline{AP} + \overline{AQ} =$

A. $\frac{3}{2}(\overline{AC})$

B. $\frac{5}{4}(\overline{AC})$

C. $(\overline{AC})$

D. $2(\overline{AC})$

Answer: A

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162. If $ABCD$ is a rhombus whose diagonals cut at the origin O, then proved that $\vec{O}A + \vec{O}B + \vec{O}C + \vec{O}D + \vec{O}$.

A. $\overline{AB} + \overline{AC}$

B. $2(\overline{AB} + \overline{AC})$

C. $\overline{AC} + \overline{BD}$

D. $\overline{O}$

Answer: D

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163. If PQRST is a pentagon, then $\overline{PQ}+\overline{PR}+\overline{PS}-\overline{TQ}-\overline{TR}-\overline{TS}=$

A. $\overline{PT}$

B. $2\overline{PT}$

C. $3\overline{PT}$

D. $4\overline{PT}$

Answer: C

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164. ABCDE is a pentagon. The resultant of the vectors $\overline{AB}, \overline{AE}, \overline{BC}, \overline{DC}, \overline{ED}$ and $\overline{AC}$ in terms of $\overline{AC}$ is

A. $4\overline{AC}$

B. $2\overline{AC}$

C. $3\overline{AC}$

D. $5\overline{AC}$

Answer: C

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165. If ABCDE is a pentago, then $\overline{AB} + \overline{BC} + \overline{CD} + \overline{DE} - \overline{AE} =$

A. $2\overline{AC}$

B. $2\overline{AE}$

C. $\overline{O}$

D. $\overline{AC}$

Answer: C

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166. $\bar{a}, \bar{b}$ are vectors, $\overline{AB}, \overline{BC}$ determined by two adjacent sides of a regular hexagon ABCDEF.The vector represented by $\overline{EF}$ is

A. $\bar{a} - \bar{b}$

B. $\bar{a} + \bar{b}$

C. $2\bar{a}$

D. $-\bar{b}$

Answer: D

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167. If ABCDEF is a regular hexagon inscribed in a circle with centre O, then $\overline{AB} + \overline{AC} + \overline{AD} + \overline{AE} + \overline{AF} =$

A. $\overline{AO}$

B. $5\overline{AO}$

C. $6\overline{AO}$

D. $8\overline{AO}$

Answer: C

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168. If ABCDEF is a regular hexagon, then $\overline{AB}+\overline{AC}+\overline{AE}+\overline{AF}=$

A. $\overline{AD}$

B. $3\overline{AD}$

C. $2\overline{AD}$

D. $\overline{O}$

Answer: C

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169. In a regular hexagon ABCDEF, $\overrightarrow{AE}$

A. $\overline{AC} + \overline{AB} + \overline{AF}$

B. $\overline{AC - \ + \overline{AB}} + \overline{AF}$

C. $\overline{AC} + \overline{AB} - \overline{AF}$

D. $-\overline{AC} + \overline{AB} + \overline{AF}$

Answer: B

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170. If $\bar{a}$ and $\bar{b}$ represent the sides $\overline{AB}$ and $\overline{BC}$ of a regular hexagon ABCDEF, then $\overline{FA} =$

A. $\bar{b} - \bar{a}$

B. $\bar{a} - \bar{b}$

C. $\bar{a} + \bar{b}$

D. $-(\bar{a} + \bar{b})$

Answer: B

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171. If $\overrightarrow{a}, \overrightarrow{b}$ are the vectors forming consecutive sides of a regular of a regular hexagon $ABCDEF$, then the vecrtor representing side CD is $\overrightarrow{a} + \overrightarrow{b}$ b. $\overrightarrow{a} - \overrightarrow{b}$ c. $\overrightarrow{b} - \overrightarrow{a}$ d. $-\left(\overrightarrow{a} + \overrightarrow{b}\right)$

A. $\bar{a} - \bar{b}$

B. $\bar{b}$

C. $\bar{a} + \bar{b}$

D. $\bar{b} - \bar{a}$

Answer: D

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172. If $A(3, -2, 2)$ and $B(2, 9, 5)$ are end points of a diameter of a circle, then points $C(5, 6, -1)$

A. is centre of the circle

B. lies on the circumference of the circle

C. lies outside the circle

D. lies inside the circle

Answer: B

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173. If AB and CD are two chord of a circle intersecting at right angles in P and O is centre, then $\overline{PA}+\overline{PB}+\overline{PC}+\overline{PD}=$

A. $2\overline{PO}$

B. $2\overline{OP}$

C. $\overline{OP}$

D. $\overline{PO}$

Answer: A

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174. $\hat{i}\cdot\left(\hat{j}\times\hat{k}\right)+\hat{j}\cdot\left(\hat{k}\times\hat{i}\right)+\hat{k}\cdot\left(\hat{i}\times\hat{j}\right)=$

A. 0

B. 1

C. 2

D. 3

Answer: D

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175. If $\hat{i},\hat{j},\hat{k}$ are the unit vectors and mutually perpendicular, then $\left[\hat{i}\quad\hat{j}\quad\hat{k}\right]$=

A. 0

B. -1

C. 1

D. 2

Answer: C

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176. If $\hat{i}, \hat{j}, \hat{k}$ are the unit vectors and mutually perpendicular, then $\left[\hat{i}+\hat{j} \quad \hat{j}+\hat{k} \quad \hat{k}+\hat{i}\right]$=

A. -1

B. 0

C. 1

D. 2

Answer: D

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177. If $\hat{i}, \hat{j}, \hat{k}$ are the unit vectors and mutually perpendicular, then $\left[\hat{i}-\hat{j} \quad \hat{j}-\hat{k} \quad \hat{k}-\hat{i}\right]$=

A. -1

B. 0

C. 1

D. 2

Answer: B

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178. If $\bar{a}, \bar{b}, \bar{c}$ are three non-zero, non-coplanar, mutually perpendicular vectors, then $\left[\bar{a} \quad \bar{b} \quad \bar{c}\right] =$

A. -1

B. 0

C. 1

D. 2

Answer: C

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179. If $\bar{a} \cdot \bar{b} = \bar{b} \cdot \bar{c} = \bar{c} \cdot \bar{a} = 0$, then $\bar{a} \cdot \left(\bar{b} \times \bar{c}\right) =$

A. a non-zero vector

B. 1

C. -1

D. $|\bar{a}|\left|\bar{b}\right||\bar{c}|$

Answer: D

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180. For non-zero vectors $\bar{a}, \bar{b}, \bar{c}, \left(\bar{a} \times \bar{b}\right) \cdot \bar{c} = |\bar{a}|\left|\bar{b}\right||\bar{c}|$ holds, iff

A. $\bar{a} \cdot \bar{b} = 0, \bar{b} \cdot \bar{c} = 0, \bar{c} \cdot \bar{a} \neq 0$

B. $\bar{a} \cdot \bar{b} \neq 0, \bar{b} \cdot \bar{c} = 0, \bar{c} \cdot \bar{a} = 0$

C. $\bar{a} \cdot \bar{b} = 0, \bar{b} \cdot \bar{c} \neq 0, \bar{c} \cdot \bar{a} = 0$

D. $\bar{a} \cdot \bar{b} = 0, \bar{b} \cdot \bar{c} = 0, \bar{c} \cdot \bar{a} = 0$

Answer: D

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181. For non-zero vectors $\bar{a}, \bar{b}, \bar{c}, \left(\bar{a} \times \bar{b}\right) \cdot \bar{c} = |\bar{a}|\left|\bar{b}\right||\bar{c}|$ holds, iff

A. $\bar{a} \cdot \bar{b} = 0, \bar{b} \cdot \bar{c} = 0, \bar{c} \cdot \bar{a} \neq 0$

B. $\bar{a} \cdot \bar{b} = 0, \bar{b} \cdot \bar{c} = 0, \bar{c} \cdot \bar{a} = 0$

C. $\bar{a} \cdot \bar{b} = 0, \bar{b} \cdot \bar{c} \neq 0, \bar{c} \cdot \bar{a} = 0$

D. $\bar{a} \cdot \bar{b} \neq 0, \bar{b} \cdot \bar{c} = 0, \bar{c} \cdot \bar{a} = 0$

Answer: B

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182. If $\bar{x} \cdot \bar{a} = 0, \bar{x} \cdot \bar{b} = 0, \bar{x} \cdot \bar{c} = 0$ for some non-zero vectors $\bar{x}$, then $[\bar{a} \quad \bar{b} \quad \bar{c}] = 0$ is

A. true

B. false

C. cannot say anything

D. either true or false

Answer: A

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183. If vectors $\bar{a} = 2\hat{i} + 3\hat{j} + 4\hat{k}, \bar{b} = \hat{i} + \hat{j} + 5\hat{k}$ and $\bar{c}$ form a left handed system, then $\bar{c}$ is

A. $11\hat{i} - 6\hat{j} - \hat{k}$

B. $-11\hat{i} + 6\hat{j} + \hat{k}$

C. $11\hat{i} - 6\hat{j} + \hat{k}$

D. $-11\hat{i} + 6\hat{j} - \hat{k}$

Answer: B

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184. If $\bar{a} = 3\hat{i} - 2\hat{j} + 7\hat{k}, \bar{b} = 5\hat{i} + \hat{j} - 2\hat{k}, \bar{c} = \hat{i} + \hat{j} - \hat{k},$ then $\bar{a} \cdot (\bar{b} \times \bar{c}) =$

A. -25

B. 37

C. 25

D. 31

Answer: C

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185. If $\bar{a} = 3\hat{i} - \hat{j} + 4\hat{k}, \bar{b} = 2\hat{i} + 3\hat{j} - 2\hat{k}, \bar{c} = -5\hat{i} + 2\hat{j} + 3\hat{k}$, then $\bar{a} \cdot (\bar{b} \times \bar{c}) =$

A. 100

B. 101

C. 111

D. 109

Answer: C

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186. If $\bar{a} = 7\hat{i} - \hat{j} + 2\hat{k}, \bar{b} = \hat{i} + 3\hat{j} - \hat{k}, \bar{c} = 4\hat{i} + 5\hat{k}$, then $\bar{a} \cdot (\bar{b} \times \bar{c}) =$

A. 120

B. 72

C. 138

D. 90

Answer: D

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187. If $\bar{a} = 2\hat{i} + 3\hat{j} - \hat{k}, \bar{b} = 4\hat{i} + 2\hat{j} + 3\hat{k}, \bar{c} = 2\hat{i} - 5\hat{j} + 9\hat{k},$ then $\bar{a} \cdot (\bar{b} \times \bar{c}) =$

A. 66

B. 0

C. 24

D. -90

Answer: B

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188. If $\bar{a} = \hat{i} + 2\hat{k}, \bar{b} = 2\hat{i} + \hat{j}, \bar{c} = \hat{j} + 2\hat{k}$, then $\bar{a} \cdot (\bar{b} \times \bar{c}) =$

A. 1

B. 2

C. 4

D. 6

Answer: D

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189. If $\bar{a} = 2\hat{i} + 3\hat{j} - \hat{k}, \bar{b} = 5\hat{i} - 6\hat{j} + 2\hat{k}$ and $\bar{c} = \hat{i} + \hat{j} + \hat{k}$, then $[\bar{a} \quad \bar{b} \quad \bar{c}] =$

A. 35

B. 9

C. 17

D. -36

Answer: D

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190. If $\bar{a}, \bar{b}, \bar{c}$ are unit vectors such that $\bar{a} \cdot \bar{b} = \frac{1}{2}, \bar{b} \cdot \bar{c} = \frac{1}{\sqrt{2}}$ and $\bar{c} \cdot \bar{a} = \frac{\sqrt{3}}{2}$, then $\bar{a} \cdot (\bar{b} \times \bar{c}) =$

A. $\frac{\sqrt{\sqrt{6} - 2}}{2}$

B. $\frac{\sqrt{\sqrt{6} + 2}}{2}$

C. $\frac{\sqrt{6} - 2}{2}$

D. $\frac{\sqrt{6} + 2}{2}$

Answer: A

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191. If

$\bar{a} = \hat{i} + \hat{j} + \hat{k}, \bar{b} = 2\hat{i} + q\hat{j} + \hat{k}, \bar{c} = \hat{i} - \hat{j} + 4\hat{k}$ and $\bar{a} \cdot (\bar{b} \times \bar{c}) = 1,$

then q=

A. 3

B. -3

C. 9

D. -9

Answer: A

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192. If $\bar{a}=\hat{i}+\hat{j}+\hat{k}, \bar{b}=2\hat{i}+\lambda\hat{j}+\hat{k}, \bar{c}=\hat{i}-\hat{j}+4\hat{k}$ and $\bar{a}\cdot(\bar{b}\times\bar{c})=10$, then λ is equal to

A. 6

B. 7

C. 9

D. 10

Answer: A

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193. If the vectors $\bar{a}=\hat{i}+\hat{j}+\hat{k}, \bar{b}=\hat{i}-\hat{j}+\hat{k}, \bar{c}=2\hat{i}+3\hat{j}+m\hat{k}$ are coplanar, then m=

A. -2

B. -4

C. 2

D. 4

Answer: C

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194. If the vectors $\bar{a}=\hat{i}-\hat{j}-6\hat{k}, \bar{b}=\hat{i}+p\hat{j}+4\hat{k}, \bar{c}=2\hat{i}-5\hat{j}+3\hat{k}$ are coplanar, then p=

A. -9

B. 9

C. -3

D. 3

Answer: C

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195. If the vectors $\bar{a}=-3\hat{i}+4\hat{j}-2\hat{k}, \bar{b}=\hat{i}+2\hat{j}, \bar{c}=\hat{i}-p\hat{j}$ are coplanar, then p=

A. -2

B. 1

C. -1

D. 2

Answer: D

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196. If the vectors $\bar{a}=4\hat{i}+13\hat{j}-18\hat{k}, \bar{b}=\hat{i}-2\hat{j}+3\hat{k}, \bar{c}=p\hat{i}+3\hat{j}-4\hat{k}$ are coplanar, then p=

A. -4

B. 4

C. -2

D. 2

Answer: D

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197. If the vectors $\bar{a}=\hat{i}-2\hat{j}+\hat{k}, \bar{b}=2\hat{i}-5\hat{j}+p\hat{k}, \bar{c}=5\hat{i}-9\hat{j}+4\hat{k}$ are coplanar, then p=

A. 3

B. -3

C. 11

D. -11

Answer: A

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198. If the vectors $\bar{a}=\hat{i}-2\hat{j}+\hat{k}, \bar{b}=p\hat{i}-5\hat{j}+3\hat{k}, \bar{c}=5\hat{i}-9\hat{j}+4\hat{k}$ are coplanar, then p=

A. -12

B. 12

C. -2

D. 2

Answer: D

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199. If the vectors $\bar{a} = \hat{i} + \hat{j} + \hat{k}, \bar{b} = \hat{i} - \hat{j} + \hat{k}, \bar{c} = 2\hat{i} + 3\hat{j} + \lambda\hat{k}$ are coplanar, then $\lambda =$

A. 2

B. -2

C. 4

D. -4

Answer: A

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200. If the vectors $\bar{a} = 4\hat{i} + 11\hat{j} + m\hat{k}, \bar{b} = 7\hat{i} + 2\hat{j} + 6\hat{k}, \bar{c} = \hat{i} + 5\hat{j} + 4\hat{k}$ are coplanar, then m=

A. 10

B. -10

C. 38

D. 0

Answer: A

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201. If $\bar{a} = \hat{i} - 2\hat{j} + \hat{k}, \bar{b} = x\hat{i} - 5\hat{j} + 3\hat{k}, \bar{c} = 5\hat{i} - 9\hat{j} + 4\hat{k}$ and $[\bar{a} \quad \bar{b} \quad \bar{c}] = 0$, then x=

A. 3

B. 4

C. 2

D. -1

Answer: C

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202. Let $\bar{a}=\hat{i}-\hat{k}, \bar{b}=x\hat{i}+\hat{j}+(1-x)\hat{k}, \bar{c}=y\hat{i}+x\hat{j}+(1+x-y)\hat{k}$. Then $[\bar{a} \quad \bar{b} \quad \bar{c}]$ depends on

A. only x

B. only y

C. neither x nor y

D. both x and y

Answer: C

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203. If the vectors $a\hat{i}+\hat{j}+\hat{k}, \hat{i}+b\hat{j}+\hat{k}, \hat{i}+\hat{j}+c\hat{k}$, where a, b, c are coplanar, then $a+b+c-abc=$

A. -2

B. -1

C. 2

D. 1

Answer: C

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204. If the vectors $a\hat{i}+\hat{j}+\hat{k}, \hat{i}+b\hat{j}+\hat{k}, \hat{i}+\hat{j}+c\hat{k}, (a \neq b \neq c)$ are coplanar, then $\frac{1}{1-a}+\frac{1}{1-b}+\frac{1}{1-c}=$

A. 1

B. -1

C. -2

D. 5

Answer: A

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205. If $\overrightarrow{a} = \hat{i} + \hat{j} + \hat{k}, \overrightarrow{b} = 4\hat{i} + 3\hat{j} + 4\hat{k}$ and $\overrightarrow{c} = \hat{i} + \alpha\hat{i} + \beta\hat{k}$ are linearly dependent vectors and $\left|\overrightarrow{c}\right| = \sqrt{3}.$ then

A. $\alpha = 1, \beta = 1$

B. $\alpha = 2, \beta = \pm 2$

C. $\alpha = -2, \beta = \pm 2$

D. $\alpha = \pm 1, \beta = 1$

Answer: D

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206. If $\bar{a}=\hat{i}+\hat{j}, \bar{b}=\hat{j}+\hat{k}, \bar{c}=\alpha\bar{a}+\beta\bar{b}$ and the vectors $\hat{i}-2\hat{j}+\hat{k}, 3\hat{i}+2\hat{j}-\hat{k}, \bar{c}$ are coplanar, then $\frac{\alpha}{\beta}=$

A. 0

B. -2

C. -3

D. -1

Answer: C

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207. Let a,b,c be distinct non- negative numbers . If the vectors $a\hat{i}+a\hat{j}+c\hat{k}, \hat{i}+\hat{k}$ and $c\hat{i}+c\hat{j}+b\hat{k}$ lie in a plane then c is

A. the arithemetic mean of a and b

B. the geometric mean of a and b

C. the harmonic mean of a and b

D. equal to zero

Answer: B

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208. Given vectors $\bar{a} = 3\hat{i} - 6\hat{j} - \hat{k}, \bar{b} = \hat{i} + 4\hat{j} - 3\hat{k}, \bar{c} = 3\hat{i} - 4\hat{j} - 12\hat{k},$ then the projection of $\bar{a} \times \bar{b}$ on vector $\bar{c}$ is

A. 14

B. -14

C. 12

D. 15

Answer: B

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209. If the points $A(2, 1, -1), B(0, -1, 0), C(\lambda, 0, 4), D(2, 0, 1)$ are coplanar, then $\lambda =$

A. 2

B. -2

C. 4

D. -4

Answer: C

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210. If the points $P(1, -1, -1), Q(3, 1, \lambda), R(0, 2, 1), S(-2, 0, 1)$ are coplanar, then $\lambda =$

A. 1

B. -1

C. 8

D. -8

Answer: B

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211. If the points $A(-6, 3, 2), B(3, -2, 4), C(5, 7, 3), D(-13, \lambda, -1)$ are coplanar, then $\lambda =$

A. 17

B. -17

C. 12

D. -12

Answer: A

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212. If the points $A(3, 9, 4), B(0, -1, -1), C(\lambda, 4, 4), D(4, 5, 1)$ are coplanar, then $\lambda =$

A. -2

B. 2

C. -4

D. 4

Answer: C

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213. If the points $A(4, 5, 1), B(5, 3, 4), C(4, 1, 6), D(3, \lambda, 3)$ are coplanar, then $\lambda =$

A. -3

B. 3

C. -5

D. 5

Answer: B

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214. If the points $A(2, -1, 0), B(-3, \lambda, 4), C(-1, -1, 4), D(0, -5, 2)$ are coplanar, then $\lambda =$

A. 16

B. -16

C. 17

D. -17

Answer: D

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215. If the points $A(2, -1, 1), B(4, 0, p), C(1, 1, 1), D(2, 4, 3)$ are coplanar, then p=

A. -3

B. 3

C. -1

D. 1

Answer: B

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216. If the origin and the points $P(2, 3, 4), Q(1, 2, 3)$ and $R(x, y, z)$ are coplanar, then

A. $x - 2y - z = 0$

B. $x + 2y + z = 0$

C. $x - 2y + z = 0$

D. $2x + 2y - z = 0$

Answer: C

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217. If the origin and the points $A(1, 2, -2), B(1, -2, 3), C(x, y, z)$ are coplanar, then

A. $2x + 5y + 4z = 0$

B. $2x - 5y - 4z = 0$

C. $2x + 5y - 4z = 0$

D. $2x - 5y + 4z = 0$

Answer: B

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218. If $O(0, 0, 0), A(x, 1, -1), B(0, y, 2)$ and $C(2, 3, z)$ are coplanar, then

A. $6x + 2y + 4 = 0$

B. $xyz - 6y + 4 = 0$

C. $xyz + 2y - 6z = 0$

D. $xyz - 6x + 2y + 4 = 0$

Answer: D

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219. The position vectors of the point A, B , C and D are $3\hat{i} - 2\hat{j} - \hat{k}, 2\hat{i} + 3\hat{j} - 4\hat{k}, -\hat{i} + \hat{j} + 2\hat{k}$ and $4\hat{i} + 5\hat{j} + \lambda\hat{k}$ respectively. If A, B, C, D are coplanar, then $\lambda =$

A. $\dfrac{-146}{17}$

B. $\dfrac{146}{17}$

C. $\frac{146}{15}$

D. $\frac{-146}{15}$

Answer: A

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220. If the points $A(2, -1, 0), B(-3, \lambda, 4), C(-1, -1, 4), D(0, -5, 2)$ are non-collinear, then $\lambda \neq$

A. -17

B. 17

C. -18

D. 18

Answer: A

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221. If the points $A(1, -1, 1), B(-1, 1, 1), C(\lambda, 1, 1), D(2, -3, 4)$ are non-coplanar, then $\lambda \neq =$

A. 3

B. -3

C. -1

D. 1

Answer: C

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222. If $\begin{vmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ a^3+1 & b^3+1 & c^2+1 \end{vmatrix} = 0$ and the vectors given by $A(1, a, a^2), B(1, b, b^2), C(1, c, c^2)$ are non-collinear, then $abc =$

A. 1

B. -1

C. 0

D. 3

Answer: B

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223. If $\vec{a}, \vec{b}, \vec{c}$ are non-coplanar vectors and λ is a real number then then vectors $\vec{a} + 2\vec{b} + 3\vec{c}, \lambda\vec{b} + 4\vec{c}$ and $(2\lambda - 1)\vec{c}$ are non-coplanar for

A. no value of λ

B. all except one value of λ

C. all except two values of λ

D. all values of λ

Answer: C

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224. If $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar vectors and λ is a real number, then $\left[\lambda(\bar{a}+\bar{b}) \quad \lambda^2\bar{b} \quad \lambda\bar{c}\right] = [\bar{a} \quad \bar{b}+\bar{c} \quad \bar{b}]$ for

A. exactly three values of λ

B. exactly two values of λ

C. exactly one values of λ

D. no real values of λ

Answer: D

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225. If $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar vectors and the points with position vectors $3\bar{a}+4\bar{b}-2\bar{c}, \bar{a}+\lambda\bar{b}+3\bar{c}, \bar{a}-6\bar{b}+6\bar{c}$ and $2\bar{a}+3\bar{b}-\bar{c}$ are coplanar, the $\lambda =$

A. -2

B. 2

C. -3

D. 3

Answer: A

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226. If $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar vectors and the points with position vectors $2\bar{a}+2\bar{b}$, $\bar{a}+\lambda\bar{b}+\bar{c}$ and $4\bar{a}+4\bar{b}-5\bar{c}$ are coplanar, then $\lambda =$

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227. If $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar vectors and the vectors $\bar{p}=2\bar{a}-5\bar{b}+2\bar{c}$, $\bar{q}=\bar{a}+5\bar{b}-6\bar{c}$ and $\bar{r}=3\bar{a}-4\bar{c}$ are coplanar such that $\bar{p}=m\bar{q}+n\bar{r}$, then

A. $m=1, n=1$

B. $m = 1, n = -1$

C. $m = -1, n = 1$

D. $m = -1, n = -1$

Answer: C

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228. If $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar vectors and the vectors $\bar{p} = -\bar{a} + 3\bar{b} - 5\bar{c}, \bar{q} = -\bar{a} + \bar{b} + \bar{c}$ and $\bar{r} = 2\bar{a} - 3\bar{b} + \bar{c}$ are coplanar such that $\bar{p} = m\bar{q} + n\bar{r}$, then

A. $m = 3, n = 2$

B. $m = -3, n = 2$

C. $m = 3, n = -2$

D. $m = -3, n = -2$

Answer: D

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229. If $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar vectors, then the vectors given by $\bar{p} = 2\bar{a} - 2\bar{c}, \bar{q} = 3\bar{a} + \bar{b} + 5\bar{c}$ and $\bar{r} = 2\bar{a} - 4\bar{b} + 3\bar{c}$ are

A. collinear

B. coplanar

C. non-coplanar

D. form a ight angled triangle

Answer: C

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230. If $l(\bar{b} \times \bar{c}) + m(\bar{c} \times \bar{a}) + n(\bar{a} \times \bar{b}) = 0$ and at least one of the l, m, n is not zero , then the vectors $\bar{a}, \bar{b}, \bar{c}$ are

A. parallel

B. coplanar

C. mutually perpendicular

D. non-coplanar

Answer: B

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231. The volume of the paralleloP1ped with co-terminous edges given by the vectors $3\hat{i}+5\hat{j}, 4\hat{i}+2\hat{j}-3\hat{k}, 3\hat{i}+\hat{j}+4\hat{k}$ is

A. 23cu. Units

B. 33cu. Units

C. 10cu. Units

D. 43cu. Units

Answer: A

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232. The volume of the paralleloP1ped with co-terminous edges given by the vectors $2\hat{i}+5\hat{j}-4\hat{k}, 5\hat{i}+7\hat{j}+5\hat{k}, 4\hat{i}+5\hat{j}-2\hat{k}$ is

A. 60cu. Units

B. 84cu. Units

C. 150cu. Units

D. 230cu. Units

Answer: B

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233. The volume of the paralleloP1ped with co-terminous edges given by the vectors $\hat{j}+\hat{k}, \hat{i}+3\hat{k}, \hat{i}+\hat{j}$ is

A. 3cu. Units

B. 4cu. Units

C. 1cu. units

D. 2cu. Units

Answer: D

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234. The volume of the paralleloP1ped with co-terminous edges given by the vectors $3\hat{i} - \hat{j} + 4\hat{k}, 6\hat{i} + 2\hat{j} - 5\hat{k}, 2\hat{i} + \hat{j} - 3\hat{k}$ is

A. 3cu. Units

B. -3cu. Units

C. 13cu. Units

D. 19cu. Units

Answer: A

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235. The volume of the paralleloP1ped with co-terminous edges given by the vectors $12\hat{i}+4\hat{j}+3\hat{k}, 8\hat{i}-12\hat{j}-9\hat{k}, 33\hat{i}-4\hat{j}-24\hat{k}$ is

A. 3696cu. Units

B. 4536cu. Units

C. 2352cu. Units

D. 1512cu. Units

Answer: A

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236. The volume of the paralleloP1ped with co-terminous edges $\bar{a}=2\hat{i}, \bar{b}=3\hat{j}, \bar{c}=4\hat{k}$ is

A. 2cu. Units

B. 1cu. Units

C. 24cu. Units

D. 8cu. Units

Answer: C

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237. The volume of the paralleloP1ped whose co-terminous edges are $\bar{a}, \bar{b}, \bar{c}$, where $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar units vectors each inclined with other at an angle of 60° is

A. 2cu. Units

B. $\sqrt{2}$cu. Units

C. $\frac{1}{2}$cu. Units

D. $\frac{1}{\sqrt{2}}$cu. Units

Answer: D

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238. If $\overline{AC} = 3\hat{i} + \hat{j} - 2\hat{k}, \overline{DB} = \hat{i} - 3\hat{j} - 4\hat{k}$ are the vectors along the diagonals of a parallelogram ABCD and $\overline{AE} = \hat{i} + 2\hat{j} + 3\hat{k}$ is another vector, then the volume of the paralleloP1ped whose co-terminous edges are represented by the vectors $\overline{AB}, \overline{AD}, \overline{AE}$ is

A. 2cu. Units

B. 10cu. Units

C. 6cu. Units

D. 12cu. Units

Answer: B

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239. If A,B,C,D are (1,1,1), (2,1,3), (3,2,2),(3,3,4) respectively, then find the volume of the parallelopiped with AB,AC and AD as the concurrent edges.

A. 1cu. Units

B. 4cu. Units

C. 5cu. Units

D. 3cu. Units

Answer: C

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240. If A,B,C and D are {3,7,4),(5,-2,-3),(-4,5,6) and (1,2,3) respectively, then the value of the parallelopiped with AB, AC and AD as the co-terminus edges, is . . . Cubic units.

A. 154cu. Units

B. 106cu. Units

C. 44cu. Units

D. 92cu. Units

Answer: D

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241. If $A(4, 2, 1), B(2, 1, 0), C(3, 1, -1), D(1, -1, 2)$, then the volume of the paralleloP1ped with segments AB, AC, AD as a concurrent edges is

A. 7cu. Units

B. 6cu. Units

C. 3cu. Units

D. 5cu. Units

Answer: A

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242. If $[\bar{a} \quad \bar{b} \quad \bar{c}] = 2$ then the volume of the paralleloP1ped whose co-terminous edges are $2\bar{a} + \bar{b}, 2\bar{b} + \bar{c} \text{ and } 2\bar{c} + \bar{a}$

A. 9cu. Units

B. 8cu. Units

C. 18cu. Units

D. 16cu. Units

Answer: C

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243. If $\begin{bmatrix}\bar{a} & \bar{b} & \bar{c}\end{bmatrix}=4$ then the volume of the paralleloP1ped with $\bar{a}+\bar{b}, \bar{b}+\bar{c}$ and $\bar{c}+\bar{a}$ as co-terminous edges is

A. 6cu. Units

B. 7cu. Units

C. 8cu. Units

D. 4cu. Units

Answer: C

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244. If the three co-terminous edges of a paralleloP1ped are represented by $\bar{a}-\bar{b}, \bar{b}-\bar{c}, \bar{c}-\bar{a}$, then its volume is

A. $[\bar{a} \quad \bar{b} \quad \bar{c}]$

B. $2[\bar{a} \quad \bar{b} \quad \bar{c}]$

C. $[\bar{a} \quad \bar{b} \quad \bar{c}]^2$

D. 0

Answer: D

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245. The volume of paralleloP1ped with vector $\bar{a}+2\bar{b}+\bar{c}, \bar{a}-\bar{b}$ and $\bar{a}-\bar{b}-\bar{c}$ is equal to $k[\bar{a} \quad \bar{b} \quad \bar{c}]$. Then k=

A. -3

B. 3

C. 2

D. -2

Answer: B

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246. The volume of the tetrahedron whose co-terminous edges are $\hat{j}+\hat{k}, \hat{k}+\hat{i}, \hat{i}+\hat{j}$ is

A. $\frac{1}{6}$cu. Units

B. $\frac{1}{3}$cu. Units

C. $\frac{1}{2}$cu. Units

D. $\frac{2}{3}$cu. Units

Answer: B

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247. Find the volume tetrahedron whose coterminus edges are $7\hat{i}+\hat{k}, 2\hat{i}+5\hat{j}-3\hat{k}$ and $4\hat{i}+3\hat{j}+\hat{k}$.

A. 28cu. Units

B. 14cu. Units

C. 21cu. Units

D. 7cu. Units

Answer: B

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248. The volume of the tetrahedron whose co-terminous edges are $\bar{a}, \bar{b}, \bar{c}$, where $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar units vectors each inclined with other at an angle of 30° is

A. $\dfrac{3\sqrt{3}-5}{12}$cu. units

B. $\dfrac{3\sqrt{3}-5}{144}$cu. Units

C. $\dfrac{\sqrt{3\sqrt{3}-5}}{12}$ cu. Units

D. $\dfrac{\sqrt{3\sqrt{3}-5}}{144}$ cu. Units

Answer: C

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249. Volume of tetrahedron with vertices at $(0, 0, 0), (1, 0, 0), (0, 1, 0), (0, 0, 1)$ is

A. $\dfrac{1}{6}$ cu. Units

B. $\dfrac{1}{4}$ cu. Units

C. $\dfrac{1}{3}$ cu.units

D. $\dfrac{1}{5}$ cu. Units

Answer: A

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250. The volume of the tetrahedron whose vertices are $A(-1, 2, 3), B(3, -2, 1), C(2, 1, 3)$ and $C(-1, -2, 4)$

A. $\frac{2}{3}$ cu. Units

B. $\frac{32}{3}$ cu. Units

C. $\frac{8}{3}$ cu. Units

D. $\frac{16}{(3)}$ cu. Units

Answer: D

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251. The volume of the tetrahedron whose vertices are $(3, 7, 4), (5, -2, 3), (-4, 5, 6)$ and $(1, 2, 3)$ are

A. $\frac{42}{3}$ cu. Units

B. $\frac{41}{3}$ cu. Units

C. $\frac{46}{3}$ cu. Units

D. $\frac{45}{2}$ cu. Units

Answer: C

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252. If $\bar{a}\cdot\hat{i}=4,$ then $\left(\bar{a}\times\hat{j}\right)\cdot\left(2\hat{j}-3\hat{k}\right)=$

A. 12

B. 2

C. 0

D. -12

Answer: D

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253. If $\left[\hat{i}+4\hat{j}+6\hat{k}\quad 2\hat{i}+a\hat{j}+3\hat{k}\quad \hat{i}+2\hat{j}-3\hat{k}\right]=0$ then a=

A. 4

B. 3

C. 6

D. 2

Answer: C

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254. $[\hat{i} \quad \hat{j} \quad \hat{k}] + [\hat{k} \quad \hat{j} \quad \hat{i}] + [\hat{j} \quad \hat{k} \quad \hat{i}] =$

A. 1

B. 3

C. -3

D. -1

Answer: A

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255. If $\bar{u}=\hat{i}-2\hat{j}+\hat{k}, \bar{v}=3\hat{i}+\hat{k}, \overline{w}=\hat{j}-\hat{k}$, then $(\bar{u}+\overline{w})\cdot((\bar{u}\times\bar{v})\times(\bar{v}\times\overline{w}))$=

A. 0

B. 24

C. -12

D. 12

Answer: C

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256. If $\bar{u}=\hat{i}-2\hat{j}+\hat{k}, \bar{v}=3\hat{i}+\hat{k}, \overline{w}=\hat{j}-\hat{k}$, then $[\bar{u}\times\bar{v} \quad \bar{u}\times\overline{w} \quad \bar{v}\times\overline{w}]=$

A. 0

B. 24

C. -12

D. 12

Answer: A

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257. If $\bar{a} = \hat{i} + 5\hat{k}, \bar{b} = 2\hat{i} + 3\hat{k}, \bar{c} = 4\hat{i} - \hat{j} + 2\hat{k}, \bar{d} = \hat{i} - \hat{j},$ then $(\bar{c} - \bar{a})) \cdot (\bar{b} \times \bar{d}) =$

A. 15

B. 6

C. 0

D. 12

Answer: D

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258. If $\bar{u} = -\hat{i} - 2\hat{j} + \hat{k}, \bar{r} = 3\hat{i} + \hat{k}, \overline{w} = 4\hat{j} + 5\hat{k}$, then $(\bar{u} + \overline{w}) \cdot ((\bar{u} \times \bar{r}) \times (\bar{r} \times \overline{w}))$=

A. 66

B. 330

C. 198

D. 138

Answer: D

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259. If $\bar{c} = 3\bar{a} - 2\bar{b}$, then $[\bar{a} \quad \bar{b} \quad \bar{c}] =$

A. 0

B. 3

C. 2

D. 1

Answer: A

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260. $[\bar{a} \quad \bar{b} \quad \bar{a} \times \bar{b}] =$

A. $|\bar{a} \times \bar{b}|$

B. $|\bar{a} \times \bar{b}|^2$

C. 0

D. 1

Answer: B

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261. Which of the following is trues?

A. $[\bar{a} - \bar{b} \quad \bar{b} - \bar{c} \quad \bar{c} - \bar{a}] = 0$

B. $[\bar{a}+\bar{b} \quad \bar{b}+\bar{c} \quad \bar{c}+\bar{a}]=0$

C. $[\bar{a}+\bar{b} \quad \bar{c}+\bar{a} \quad \bar{b}+\bar{c}]=0$

D. $[\bar{a}\times\bar{b} \quad \bar{b}\times\bar{c} \quad \bar{c}\times\bar{a}]=0$

Answer: A

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262. $[\bar{a}-\bar{b} \quad \bar{b}-\bar{c} \quad \bar{c}-\bar{a}]=$

A. $[\bar{a} \quad \bar{b} \quad \bar{c}]$

B. $2[\bar{a} \quad \bar{b} \quad \bar{c}]$

C. 0

D. $3[\bar{a} \quad \bar{b} \quad \bar{c}]$

Answer: C

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263. If $\bar{a}, \bar{b}$ and $\bar{c}$ are unit coplanar vectors, then $[\,2\bar{a} - \bar{b} \quad 2\bar{b} - \bar{c} \quad 2\bar{c} - \bar{a}\,] =$

A. 0

B. 1

C. $-\sqrt{3}$

D. $\sqrt{3}$

Answer: A

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264. If $\bar{a}, \bar{b}$ and $\bar{c}$ are three non-coplanar vectors, then $(\bar{a} + \bar{b}) \cdot ((\bar{a} + \bar{c}) \times \bar{b}) =$

A. $[\,\bar{a} \quad \bar{b} \quad \bar{c}\,]$

B. $2[\,\bar{a} \quad \bar{b} \quad \bar{c}\,]$

C. 0

D. $-[\bar{a} \quad \bar{b} \quad \bar{c}]$

Answer: D

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265. $[\bar{a}+\bar{b} \quad \bar{b}+\bar{c} \quad \bar{c}+\bar{a}]=$

A. 0

B. $2[\bar{a} \quad \bar{b} \quad \bar{c}]$

C. $[\bar{a} \quad \bar{b} \quad \bar{c}]$

D. $-[\bar{a} \quad \bar{b} \quad \bar{c}]$

Answer: B

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266. $[\bar{a} \quad \bar{b}+\bar{c} \quad \bar{c}+\bar{b}+\bar{a}]=$

A. $[\bar{a} \quad \bar{b} \quad \bar{c}]$

B. $-[\bar{a} \quad \bar{b} \quad \bar{c}]$

C. 0

D. $2[\bar{a} \quad \bar{b} \quad \bar{c}]$

Answer: C

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267. $\bar{a} \cdot \left((\bar{a} + \bar{b} + \bar{c}) \times (\bar{b} + \bar{c})\right) =$

A. 0

B. 1

C. $[\bar{a} \quad \bar{b} \quad \bar{c}]$

D. $-[\bar{a} \quad \bar{b} \quad \bar{c}]$

Answer: A

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268. Value of $((\bar{a}+\bar{b}+\bar{c})\times(\bar{b}-\bar{a}))\cdot\bar{c}$ is

A. $[\bar{a}\quad\bar{b}\quad\bar{c}]$

B. 0

C. $3[\bar{a}\quad\bar{b}\quad\bar{c}]$

D. $2[\bar{a}\quad\bar{b}\quad\bar{c}]$

Answer: D

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269. If $\bar{a},\bar{b}$ and $\bar{c}$ are three non-coplanar vectors, then $[\bar{a}+\bar{b}+\bar{c}\quad\bar{a}-\bar{c}\quad\bar{a}-\bar{b}]=$

A. $-3[\bar{a}\quad\bar{b}\quad\bar{c}]$

B. $-2[\bar{a}\quad\bar{b}\quad\bar{c}]$

C. $4[\bar{a}\quad\bar{b}\quad\bar{c}]$

D. $2[\bar{a} \quad \bar{b} \quad \bar{c}]$

Answer: A

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270. If $\bar{a}, \bar{b}$ and $\bar{c}$ are three non-coplanar vectors, then $(\bar{a}+2\bar{b}-\bar{c})\cdot((\bar{a}-\bar{b})\times(\bar{a}-\bar{b}-\bar{c}))=$

A. $[\bar{a} \quad \bar{b} \quad \bar{c}]$

B. $2[\bar{a} \quad \bar{b} \quad \bar{c}]$

C. $3[\bar{a} \quad \bar{b} \quad \bar{c}]$

D. $4[\bar{a} \quad \bar{b} \quad \bar{c}]$

Answer: C

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271. If $\bar{a}, \bar{b}$ and $\bar{c}$ are three non-coplanar vectors, then $(\bar{a}+2\bar{b}-\bar{c}) \cdot ((\bar{a}-\bar{b}) \times (\bar{a}-\bar{b}-\bar{c})) =$

A. $[\bar{a} \quad \bar{b} \quad \bar{c}]$

B. $3[\bar{a} \quad \bar{b} \quad \bar{c}]$

C. $2[\bar{a} \quad \bar{b} \quad \bar{c}]$

D. 0

Answer: B

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272. If $\bar{a}, \bar{b}$ and $\bar{c}$ are three non-coplanar vectors, then $(\bar{a}-2\bar{b}-\bar{c}) \cdot ((\bar{a}+\bar{b}-\bar{c}) \times (\bar{a}-\bar{b}+\bar{c})) =$

A. $[\bar{a} \quad \bar{b} \quad \bar{c}]$

B. $3[\bar{a} \quad \bar{b} \quad \bar{c}]$

C. $6[\bar{a} \quad \bar{b} \quad \bar{c}]$

D. $-6[\bar{a} \quad \bar{b} \quad \bar{c}]$

Answer: C

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273. If $\bar{a}, \bar{b}$ and $\bar{c}$ are three coplanar vectors, then $(\bar{a}+\bar{b}) \cdot (((\bar{b}+\bar{c}) \times \bar{a} + (\bar{b}+(\bar{a}) \times \bar{b})) =$

A. 0

B. $[\bar{a} \quad \bar{b} \quad \bar{c}]$

C. $2[\bar{a} \quad \bar{b} \quad \bar{c}]$

D. $-[\bar{a} \quad \bar{b} \quad \bar{c}]$

Answer: A

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274. If $\bar{u}, \bar{v}, \overline{w}$ are three non-coplanar vectors, then $(\bar{u}+\bar{v}-\overline{w}) \cdot ((\bar{u}-\bar{v}) \times (\bar{v}-\overline{w})) =$

A. 0

B. $\bar{u} \cdot (\bar{v} \times \overline{w})$

C. $\bar{u} \cdot (\overline{w} \times \bar{v})$

D. $3\bar{u} \cdot (\overline{w} \times \bar{v})$

Answer: B

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275. If four points $A(\bar{a}), B(\bar{b}), C(\bar{c})$ and $D(\bar{d})$ are coplanar, then $[\bar{a} \quad \bar{b} \quad \bar{d}] + [\bar{b} \quad \bar{c} \quad \bar{d}] + [\bar{c} \quad \bar{a} \quad \bar{d}] =$

A. $[\bar{a} \quad \bar{c} \quad \bar{d}]$

B. $[\bar{a} \quad \bar{b} \quad \bar{c}]$

C. $[\bar{c} \quad \bar{b} \quad \bar{d}]$

D. $[\bar{d} \quad \bar{b} \quad \bar{c}]$

Answer: B

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276. For vectors $\bar{a}$ and $\bar{b}$ and $\bar{a}+\bar{b} \neq \ = 0$ and $\bar{c}$ is a non-zero vector, then $(\bar{a}+\bar{b}) \times (\bar{c}-(\bar{a}+\bar{b})) =$

A. $\bar{a}+\bar{b}$

B. $(\bar{a}+\bar{b}) \times \bar{c}$

C. $\lambda\bar{c}$ where is non-zero scalar

D. $\lambda(\bar{a}+\bar{b}), \lambda \neq 0$ is a scalar

Answer: B

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277. If $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar and m, n are real numbers, the $[m\bar{a} \quad m\bar{b} \quad 3\bar{c}] - [m\bar{b} \quad \bar{c} \quad n\bar{a}] - [n\bar{c} \quad n\bar{a} \quad 2\bar{b}] = 0$ is true for

A. exactly one value of m, n

B. exactly two value of m, n

C. exactly three values of m, n

D. all values of m, n

Answer: A

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278. The number of distinct real values of λ, for which the vectors $-\lambda^2\hat{i} + \hat{j} + \hat{k}, \hat{i} - \lambda^2\hat{j} + \hat{k}$ and $\hat{i} + \hat{j} - \lambda^2\hat{k}$ are coplanar, is

A. exactly three values of λ

B. exactly two value of λ

C. exactly one values of λ

D. all values of λ

Answer: B

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279. If $\begin{bmatrix} \bar{a} & \bar{b} & \bar{c} \end{bmatrix} = 12$, then $\begin{bmatrix} \bar{a}+\bar{b} & \bar{b}+\bar{c} & \bar{c}+\bar{a} \end{bmatrix} =$

A. 24

B. 36

C. 48

D. 26

Answer: A

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280. If $[2\bar{a}+\bar{b} \quad \bar{c} \quad \bar{d}]=\lambda[\bar{a} \quad \bar{c} \quad \bar{d}]+\mu[\bar{b} \quad \bar{c} \quad \bar{d}]$, then $\lambda+\mu=$

____

A. 6

B. -6

C. 10

D. 8

Answer: A

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281. If $[3\bar{a}+5\bar{b} \quad \bar{c} \quad \bar{d}]=p[\bar{a} \quad \bar{c} \quad \bar{d}]+q[\bar{b} \quad \bar{c} \quad \bar{d}]$, then $p+q=$

A. 8

B. -8

C. 2

D. 0

Answer: A

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282. If $\bar{a}, \bar{b}$ and $\bar{c}$ are non-coplanar and $(\bar{a}+2\bar{b}-\bar{c})\cdot((\bar{a}-\bar{b})\times(\bar{a}+\bar{b}-\bar{c}))=\lambda[\bar{a}\ \ \bar{b}\ \ \bar{c}]$ then $\lambda=$

A. 2

B. 1

C. 4

D. 5

Answer: B

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283. If $\bar{a}, \bar{b}$ and $\bar{c}$ are unit vectors perpendicular to each other, the $[\bar{a}\ \ \bar{b}\ \ \bar{c}]^2=$

A. 1

B. 3

C. 4

D. 2

Answer: A

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284. The value of $[\bar{a}-\bar{b} \quad \bar{b}-\bar{c} \quad \bar{c}-\bar{a}]$ where $|\bar{a}|=1, |\bar{b}|=2 \text{ and } |\bar{c}|=3$ is

A. 1

B. 6

C. 0

D. 3

Answer: C

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285. If $|\bar{a}| = 5, |\bar{b}| = 3, |\bar{c}| = 4$ and $|\bar{a}|$ is perpendicular to $|\bar{b}|$ and $|\bar{c}|$ such that the angle between $|\bar{b}|$ and $|\bar{c}|$ is $\frac{5\pi}{6}$, then $[\bar{a} \quad \bar{b} \quad \bar{c}] =$

A. 25

B. 20

C. 30

D. 10

Answer: C

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286. If $\bar{a}$ is perpendicular to $\bar{b}$ and $\bar{c}$, $|\bar{a}| = 2, |\bar{b} = 3, |\bar{c}\ | = 4$ and the angle between $\bar{b}$ and $\bar{c}$ is $\frac{2\pi}{3}$, then $|[\bar{a} \quad \bar{b} \quad \bar{c}]| =$

A. 12

B. $12\sqrt{3}$

C. $\frac{12}{\sqrt{3}}$

D. $12\sqrt{2}$

Answer: B

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287. If $|\bar{c}| = 1$ and $\bar{c}$ is perpedicular to $\bar{a}$ and $\bar{b}$ such that the angle between $\bar{a}$ and $\bar{b}$ is $\frac{\pi}{4}$, then $[\bar{a} \quad \bar{b} \quad \bar{c}] =$

A. $\frac{1}{\sqrt{2}}|\bar{a}||\bar{b}|$

B. $\frac{1}{2}|\bar{a}|^2|\bar{b}|^2$

C. $|\bar{a}||\bar{b}|$

D. $|\bar{a}|^2|\bar{b}|^2$

Answer: A

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288. If $\bar{a} = \hat{i} - \hat{j}, \bar{b} = \hat{j} - \hat{k}, \bar{c} = \hat{k} - \hat{i}$ and $\hat{d}$ is a units vectors such that $\bar{a} \cdot \hat{d} = [\bar{b} \quad \bar{c} \quad \bar{d}] = 0$, then $\hat{d} =$

A. $\frac{1}{\sqrt{2}}|\bar{a}||\bar{b}|$

B. $\frac{1}{2}|\bar{a}|^2|\bar{b}|^2$

C. $|\bar{a}||\bar{b}|$

D. $\pm\frac{\hat{i} + \hat{j} - 2\hat{k}}{\sqrt{6}}$

Answer: D

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289. If $\bar{b} = 2\hat{i} + \hat{j} - \hat{k}, \bar{c} = \hat{i} + 3\hat{k}$ and $\bar{a}$ is a unit vectors, then the maximum value of $[\bar{a} \quad \bar{b} \quad \bar{c}]$ is

A. $\sqrt{59}$

B. 1

C. 3

D. 7

Answer: A

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290. If $\bar{a}, \bar{b}, \bar{c}$ are linearly independent, the $\frac{\left[2\bar{a}+\bar{b} \quad 2\bar{b}+\bar{c} \quad 2\bar{c}+\bar{a}\right]}{\left[\bar{a} \quad \bar{b} \quad \bar{c}\right]} =$

A. 9

B. 8

C. 7

D. 3

Answer: A

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291. If $\overline{A}, \overline{B}, \overline{C}$ are three non-coplanar vector, the $\dfrac{\overline{A} \cdot \overline{B} \times \overline{C}}{\overline{C} \cdot \overline{A} \times \overline{B}} + \dfrac{\overline{B} \cdot \overline{A} \times \overline{C}}{\overline{C} \cdot \overline{A} \times \overline{B}} =$

A. -1

B. 0

C. 1

D. 2

Answer: B

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292. If $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar vectors and $\bar{d} = \lambda\bar{a} + \mu\bar{b} + \gamma\bar{c}$, then $\lambda =$

A. $\dfrac{[\bar{d} \quad \bar{b} \quad \bar{c}]}{[\bar{b} \quad \bar{a} \quad \bar{c}]}$

B. $\dfrac{[\bar{b} \quad \bar{c} \quad \bar{d}]}{[\bar{b} \quad \bar{c} \quad \bar{a}]}$

C. $\dfrac{[\bar{b} \quad \bar{d} \quad \bar{c}]}{[\bar{a} \quad \bar{b} \quad \bar{c}]}$

D. $\dfrac{[\bar{c} \quad \bar{b} \quad \bar{d}]}{[\bar{a} \quad \bar{b} \quad \bar{c}]}$

Answer: B

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293. If $\bar{a}, \bar{b}, \bar{c}$ are non-coplanar vectors and $\bar{a} = \lambda(\bar{b} \times \bar{c}) + \mu(\bar{c} \times \bar{a}) + \gamma(\bar{a} \times \bar{b})$ then $\lambda =$

A. $\dfrac{\bar{a} \cdot \bar{b}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}$

B. $\dfrac{\bar{b} \cdot \bar{c}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}$

C. $\dfrac{\bar{c} \cdot \bar{a}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}$

D. $\dfrac{\bar{a} \cdot \bar{a}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}$

Answer: D

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294. If $\bar{b}$ and $\bar{c}$ are any two perpendicular unit vectors and $\bar{a}$ is any vector, then $(\bar{a} \cdot \bar{b})\bar{b} + (\bar{a} \cdot \bar{c})\bar{c} + \left(\bar{a} \cdot \dfrac{\bar{b} \times \bar{c}}{|\bar{b} \times \bar{c}|}\right)(\bar{b} \times \bar{c}) =$

A. $\bar{b}$

B. $\bar{a}$

C. $\bar{c}$

D. $\bar{b} + \bar{c}$

Answer: B

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295. If $\bar{a}, \bar{b}, \bar{c}$ are three non-coplanar vectors and $\bar{p}, \bar{q}, \bar{r}$ are vectors defined by the relations $\bar{p} = \frac{\bar{b} \times \bar{c}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}, \bar{q} = \frac{\bar{c} \times \bar{a}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}, \bar{r} = \frac{\bar{a} \times \bar{b}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}$, then $(\bar{a} + \bar{b}) \cdot \bar{p} + (\bar{b} + \bar{c}) \cdot \bar{q} + (\bar{c} + \bar{a}) \cdot \bar{r} =$

A. 0

B. 1

C. 2

D. 3

Answer: D

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296. If $\bar{a}, \bar{b}, \bar{c}$ are three non-coplanar vectors and $\bar{p}, \bar{q}, \bar{r}$ are vectors defined by the relations $\bar{p} = \frac{\bar{b} \times \bar{c}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}, \bar{q} = \frac{\bar{c} \times \bar{a}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}, \bar{r} = \frac{\bar{a} \times \bar{b}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}$, then $(\bar{a} + \bar{b}) \cdot \bar{p} + (\bar{b} + \bar{c}) \cdot \bar{q} + (\bar{c} + \bar{a}) \cdot \bar{r} =$

A. 0

B. 1

C. 2

D. 3

Answer: D

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297. If $\bar{p} = \frac{\bar{b} \times \bar{c}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}, \bar{q} = \frac{\bar{c} \times \bar{a}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}, \bar{r} = \frac{\bar{a} \times \bar{b}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}$, where $\bar{a}, \bar{b}, \bar{c}$ are three non-coplanar vectors, then $(\bar{a} + \bar{b} + \bar{c}) \cdot (\bar{p} + \bar{q} + \bar{r}) =$

A. 3

B. 2

C. 1

D. 0

Answer: A

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298. If $\bar{p} = \frac{\bar{b} \times \bar{c}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}, \bar{q} = \frac{\bar{c} \times \bar{a}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}, \bar{r} = \frac{\bar{a} \times \bar{b}}{[\bar{a} \quad \bar{b} \quad \bar{c}]}$, where $\bar{a}, \bar{b}, \bar{c}$ are three non-coplanar vectors, then $(\bar{a} - \bar{b} - \bar{c}) \cdot \bar{p} - (\bar{b} - \bar{c} - \bar{a}) \cdot \bar{q} - (\bar{c} - \bar{a} - \bar{b}) \cdot \bar{r} =$

A. 3

B. 2

C. -1

D. 0

Answer: C

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299. If $\bar{a}, \bar{b}, \bar{c}$ are three non-coplanar vectors, then $\bar{a}\cdot\left(\frac{\bar{b}\times\bar{c}}{3[\bar{b}\ \ \bar{c}\ \ \bar{a}]}\right)-\bar{b}\cdot\left(\frac{\bar{c}\times\bar{a}}{2[\bar{c}\ \ \bar{a}\ \ \bar{b}]}\right)=$

A. $\frac{-1}{6}$

B. $\frac{-5}{6}$

C. $\frac{1}{6}$

D. $\frac{5}{6}$

Answer: A

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300. If z_1 and z_2 are z co-ordinates of the point of trisection of the segment joining the points $A(2, 1, 4), B(-1, 3, 6)$ then $z_1 + z_2 =$

A. 1

B. 4

C. 5

D. 10

Answer: D

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301. Let $\square PQRS$ be a quadrilateral. If M and N are the mid-points of the sides PQ and RS respectively, then PS+QR=

A. $3\overline{MN}$

B. $4\overline{MN}$

C. $2\overline{MN}$

D. $2\overline{NM}$

Answer: C

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