



MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

DIRECTION COSINES AND DIRECTION RATIOS

Solved Examples

1. If A, B, C are the points (0, 4, 1), (2, 3, -1), (4, 5, 0) respectively, then angle between \overleftrightarrow{AB} and \overleftrightarrow{BC} is

A. $\pi/6$

B. $\pi/3$

C. $\pi/2$

D. $\pi/4$

Answer: C



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2. The foot of the perpendicular from $(1, 2, 3)$ to the line joining the points $(6, 7, 7)$ and $(9, 9, 5)$ is

A. $(5, 3, 9)$

B. $(3, 5, 9)$

C. $(3, 9, 5)$

D. $(3, 9, 9)$

Answer: B



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3. If the line joining the points $(-1, 2, 3)$, $(2, -1, 4)$ is perpendicular to the line joining the points $(x, -2, 4)$, $(1, 2, 3)$ then $x =$

A. 3

B. 10

C. $-3/10$

D. $-10/3$

Answer: D



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4. If the d.c.'s (l, m, n) of two lines are connected by the relations $l + m + n = 0$ and $2mn + 3ln - 5lm = 0$ then the angle between the lines is

A. $\pi/4$

B. $\pi/3$

C. $\pi/6$

D. $\pi/2$

Answer: D



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5. If A (4, 3, 5), B (6, 4, 3), C (2, -1, 4), D (0, 1, 5) then the projection of \overline{AB} on \overline{CD} is

A. 0

B. $3/4$

C. $-4/3$

D. $-3/4$

Answer: C



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6. If α, β, γ are respectively the acute angles made by any line with the coordinate axes then

A. $\alpha + \beta + \gamma = 90^\circ$

B. $\alpha + \beta + \gamma = 360^\circ$

C. $0 < \alpha + \beta + \gamma < 270^\circ$

D. $\alpha + \beta + \gamma = 180^\circ$

Answer: C



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7. If the feet of the perpendiculars from $(3, 4, 5)$ to the coordinate axes are

A, B, C and the angle between AB and AC is $\cos^{-1}\left(\frac{9}{a}\right)$ then $a =$

A. $5\sqrt{34}$

B. $3\sqrt{34}$

C. $\sqrt{34}$

D. 25

Answer: A



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8. If $(2, 5, 1)$ and $(9, 10, 5)$ are the ends of a diagonal of a rectangular parallelepiped whose faces are parallel to the coordinate planes, then the lengths of edges are

A. 7, 5, 4

B. 17, 4, 5

C. 14, 5, 7

D. 4, 7, 15

Answer: A



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9. If a, b, c are direction ratios of line which lies 2 and 10 and such that (i) the sum of a, b, c is 19 (ii) $a, b, 11$ are in arithmetic progression (iii) $a, c, 27$ are in geometric progression then the values of a, b, c are

A. 3, 6, 10

B. 3, 7, 9

C. 5, 6, 7

D. 4, 6, 9

Answer: B



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Exercise 1

1. If $OP = 21$ and d.c. 's of \overrightarrow{OP} are $\left(\frac{2}{7}, \frac{6}{7}, -\frac{3}{7}\right)$ then $P =$

A. (6, -12, 4)

B. (6, 18, -9)

C. (3/2, -6, 2)

D. (5, -10, 6)

Answer:



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2. If $P = (-2, 3, 6)$ then the d.c.'s of \overrightarrow{OP} are

A. $\left(\frac{3}{13}, \frac{4}{13}, -\frac{12}{13} \right)$

B. $(6, 6, -3)$

C. $\left(-\frac{2}{7}, \frac{3}{7}, \frac{6}{7} \right)$

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

Answer:



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3. The direction cosines of the line passing through $P(2, 3, -1)$ and the origin are

- A. $\left(\frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}, \frac{1}{\sqrt{14}} \right)$
- B. $\left(\frac{2}{\sqrt{14}}, \frac{-3}{\sqrt{14}}, \frac{1}{\sqrt{14}} \right)$
- C. $\left(\frac{-2}{\sqrt{14}}, \frac{-3}{\sqrt{14}}, \frac{1}{\sqrt{14}} \right)$
- D. $\left(\frac{2}{\sqrt{14}}, \frac{-3}{\sqrt{14}}, \frac{-1}{\sqrt{14}} \right)$

Answer:



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4. If a line makes angles $\pi/3, \pi/4$ with the positive x-axis and y-axis then the angle made by the line with positive z-axis is

- A. $\pi/2$
- B. $\pi/3$
- C. $\pi/4$
- D. $5\pi/12$

Answer:



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5. If a line makes angles 60° , 60° with the positive x-axis and y-axis then the angle made by the line with positive z-axis is

A. 0

B. 45° or 135°

C. 60° or 120°

D. 90°

Answer:



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6. If a line makes an angle of $\pi/4$ with the positive directions of each of x-axis and y-axis, then the angle that the line makes with the positive direction of the z-axis is

A. $\pi/6$

B. $\pi/3$

C. $\pi/4$

D. $\pi/2$

Answer:



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7. if the angles made by a straight line with the coordinate axes are

$\alpha, \frac{\pi}{2} - \alpha, \beta$ then $\beta =$

A. 0

B. $\frac{\pi}{6}$

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

D. π

Answer:

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8. If α, β, γ are the angles made by a line with the positive directions of the coordinate axes, then $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma =$

A. 0

B. 1

C. 2

D. $\sqrt{2}$

Answer:

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9. If a line in the space makes angles $\alpha, \beta,$ and γ with the coordinatess axes, then

$$\cos 2\alpha + \cos 2\beta + \cos 2\gamma + \sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma =$$

A. -1

B. 0

C. 1

D. 2

Answer:

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10. A line makes the same angle θ , with each of the x and z axis. If the angle β , which it makes with y-axis, is such that $\sin^2 \beta = 3 \sin^2 \theta$, then $\cos^2 \theta =$

A. $2/3$

B. $2/5$

C. $3/5$

D. $1/5$

Answer:



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11. A line AB in three-dimensional space makes angles 45° and 120° with the positive x-axis and the positive y-axis respectively. If AB makes an acute angle θ with the positive z-axis, then θ equals

A. 30°

B. 45°

C. 60°

D. 75°

Answer:



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12. A straight line is equally inclined to all the three coordinate axes. Then an angle made by the line with the y-axis is

A. $\cos^{-1}\left(\frac{1}{3}\right)$

B. $\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$

C. $\cos^{-1}\left(\frac{2}{\sqrt{3}}\right)$

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

Answer:



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13. The number of lines which are equally inclined to the coordinate axes is

A. 2

B. 4

C. 6

D. 8

Answer:



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14. The d.c.'s of a line which is equally inclined to the coordinate axes are

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

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

C. $\left(\frac{2}{7}, \frac{3}{7}, \frac{6}{7} \right)$

D. $\left(\frac{3}{13}, \frac{4}{13}, \frac{12}{13} \right)$

Answer:



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15. If the d.r.'s of a line are (3, -4, 12) then d.c.'s of the line are

A. $\left(\frac{4}{3}, \frac{2}{3}, -\frac{4}{3}\right)$

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

C. $\left(\frac{2}{6}, \frac{1}{6}, -\frac{2}{6}\right)$

D. $\left(\frac{3}{13}, \frac{-4}{13}, \frac{12}{13}\right)$

Answer:



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16. The d.c.'s of the line joining the points A(4, 3, 1), B(-2, 1, -2) are

A. $\left(\frac{2}{7}, -\frac{3}{7}, -\frac{6}{7}\right)$

B. $\left(\frac{6}{7}, \frac{2}{7}, \frac{3}{7}\right)$

C. $\left(-\frac{2}{7}, -\frac{3}{7}, \frac{6}{7}\right)$

D. $\left(\frac{2}{7}, \frac{3}{7}, -\frac{6}{7}\right)$

Answer:



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17. If $(l_1, m_1, n_1), (l_2, m_2, n_2)$ are d.c.'s of two lines then find the value of $(l_1m_2 - l_2m_1)^2 + (m_1n_2 - n_1m_2)^2 + (n_1l_2 - n_2l_1)^2 + (l_1l_2 + m_1m_2 + n_1n_2)$

A. 0

B. 1

C. 2

D. 4

Answer:



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18. If $(2, 1, -1)$ and $(1, -1, -1)$ are direction ratios of two lines, then the direction cosines of a line perpendicular to both the lines are

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

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

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

D. $\left(\frac{2}{\sqrt{14}}, -\frac{1}{\sqrt{14}}, \frac{3}{\sqrt{14}}\right)$

Answer:

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19. IF the d.r.'s of \overleftrightarrow{OA} , \overleftrightarrow{OB} are $(1, -2, -1)$, $(3, -2, 3)$ then the d.c.'s of the normal to the plane \overleftrightarrow{AOB} are

A. $\left(\frac{4}{\sqrt{29}}, \frac{3}{\sqrt{29}}, -\frac{2}{\sqrt{29}}\right)$

B. $\left(\frac{11}{\sqrt{171}}, \frac{7}{\sqrt{171}}, \frac{1}{\sqrt{17}}\right)$

C. $\left(\frac{3}{29}, -\frac{2}{9}, \frac{4}{29}\right)$

D. $\left(\frac{3}{\sqrt{29}}, -\frac{2}{\sqrt{29}}, \frac{4}{\sqrt{29}}\right)$

Answer:

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20. The direction ratios of two lines AB, AC are 1, -1, -1 and 2, -1, 1. The direction ratios of the normal to the plane ABC are

- A. 2, 3, -1
- B. 2, 2, 1
- C. 3, 2, -1
- D. -1, 2, 3

Answer:



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21. If (a_1, b_1, c_1) , (a_2, b_2, c_2) are d.r.'s of two perpendicular lines then

- A. $a_1a_2 = b_1b_2 = c_1c_2$
- B. $a_1a_2 + b_1b_2 + c_1c_2 = 0$
- C. $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$
- D. $a_1a_2 + b_1b_2 = c_1c_2$

Answer:



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22. If $(a_1, b_1, c_1), (a_2, b_2, c_2)$ are d.r.'s of two perpendicular lines then

A. $a_1a_2 = b_1b_2 = c_1c_2$

B. $a_1a_2 + b_1b_2 + c_1c_2 = 0$

C. $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

D. $a_1a_2 + b_1b_2 = c_1c_2$

Answer:



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23. If the direction cosines of any two lines are $(-2/3, 1/3, 2/3), (3/5, 4/5, 0)$ respectively, then the angle between those two lines is

A. $\cos^{-1}\left(\frac{1}{7}\right)$

B. $\cos^{-1}\left(\frac{2}{15}\right)$

C. $\cos^{-1}\left(\frac{5}{7}\right)$

D. $\cos^{-1}\left(\frac{10}{7}\right)$

Answer:



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24. The angle between the lines whose direction cosines are

$(\sqrt{3}/4, 1/4, \sqrt{3}/2)$ and $(\sqrt{3}/4, 1/4, -\sqrt{3}/2)$, is

A. π

B. $\pi/2$

C. $\pi/3$

D. $\pi/4$

Answer:

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25. If $P(2, 3, -6)$, $Q(3, -4, 5)$ are two points, then $\angle POQ$ is

A. $\cos^{-1}\left(\frac{18\sqrt{2}}{35}\right)$

B. $\cos^{-1}\left(\frac{81}{\sqrt{98}\sqrt{73}}\right)$

C. $\cos^{-1}\left(\frac{5}{7}\right)$

D. $\cos^{-1}\left(\frac{10}{7}\right)$

Answer:

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26. If $P = (0, 1, 2)$, $Q = (4, -2, 1)$, $O = (0, 0, 0)$ then $\angle POQ =$

A. $\pi/6$

B. $\pi/4$

C. $\pi / 3$

D. $\pi / 2$

Answer:



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27. The cosine of the angle A of the triangle with vertices A(1, -1, 2), B(6, 11, 2), C(1, 2, 6) is

A. $\frac{63}{65}$

B. $\frac{36}{65}$

C. $\frac{16}{65}$

D. $\frac{13}{64}$

Answer:



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28. The angle between the lines passing through the points $(8, 2, 0)$, $(4, 6, -7)$; $(-3, 1, 2)$, $(-9, -2, 4)$ is

A. $\cos^{-1}(2/63)$

B. $\cos^{-1}(20/63)$

C. $\pi/2$

D. $\pi/5$

Answer:



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29. The angle between the line passing through the points $(3, 1, -2)$ and $(4, 0, -4)$ and the line passing through the points $(4, -3, 3)$ and $(6, -2, 2)$ is

A. $\cos^{-1}(2/63)$

B. $\cos^{-1}(20/63)$

C. $\pi/3$

D. $\pi/5$

Answer:



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30. If $A(3, 4, 5)$, $B(4, 6, 3)$, $C(-1, 2, 4)$ and $D(1, 0, 5)$ are such that the angle between the lines \overline{DC} and \overline{AB} is θ then $\cos \theta =$

A. $\frac{2}{9}$

B. $\frac{4}{9}$

C. $\frac{5}{9}$

D. $\frac{7}{9}$

Answer:



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31. If the d.r.'s of two lines are $(1, -1, 0)$ and $(1, -2, 1)$ then the angle between them is

A. 30°

B. 45°

C. 60°

D. 90°

Answer:



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32. If the line joining the points $(k, 1, 2)$, $(3, 4, 6)$ is parallel to the line joining the points $(-4, 3, -6)$, $(5, 12, l)$ then $(k, l) =$

A. $(-2, 7)$

B. $(0, 6)$

C. $(0, -6)$

D. (2, -7)

Answer:



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33. If the line joining the points $A(4, 1, 2)$, $B(5, x, 0)$ is parallel to the line joining the points $P(2, 1, 1)$, $Q(3, 3, -1)$ then $x =$

A. $1/2$

B. 3

C. 2

D. $-3/2$

Answer:



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34. If the d.r.'s of two lines are $(x, 3, 5)$ and $(2, -1, 2)$ and if the angle between those lines is 45° , then the value of x is

- A. 4
- B. 5
- C. 2
- D. 1

Answer:



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35. If the line joining the points $(2, 3, 4)$, $(0, 1, 2)$ is perpendicular to the line joining the points $(x, 0, 4)$, $(7, -4, 3)$ then $x =$

- A. 2
- B. 10
- C. $-3/10$

D. $-10/3$

Answer:



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36. If O is the origin and $P = (1, -2, 1)$ and $OP \perp OQ$, then $Q =$

A. $(4, 3, 2)$

B. $(3, 2, 4)$

C. $(2, 3, 4)$

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

Answer:



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37. If the d.c.'s (l, m, n) of two lines are connected by the relations $l + m + n = 0$, $2lm - mn + 2nl = 0$ then the d.c.'s of the two lines are

- A. $(1/\sqrt{6}, 1/\sqrt{6}, -2/\sqrt{6}), (1/\sqrt{6}, -2/\sqrt{6}, 1/\sqrt{6})$
- B. $(1/14, 2/14, 3/14), (1/26, 3/26, 4/36)$
- C. $(1/\sqrt{14}, 2/\sqrt{14}, 3/\sqrt{14}), (1/\sqrt{26}, 3/\sqrt{26}, 4/\sqrt{26})$
- D. none

Answer:



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38. If the d.c.'s (l, m, n) of two lines are connected by the relations $l + 5m + 3n = 0$, $7l^2 + 5m^2 - 3n^2 = 0$ then the d.c.'s of the two lines are

- A. $(1/\sqrt{6}, 1/\sqrt{6}, -2/\sqrt{6}), (1/\sqrt{6}, -2/\sqrt{6}, 1/\sqrt{6})$
- B. $(1/\sqrt{14}, -2/\sqrt{14}, 3/\sqrt{14}), (1/\sqrt{6}, 1/\sqrt{6}, -2/\sqrt{6})$

C. $(1/\sqrt{14}, 2/\sqrt{14}, 3/\sqrt{14}), (1/\sqrt{26}, 3/\sqrt{26}, 4/\sqrt{26})$

D. none

Answer:



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39. If the d.c.'s (l, m, n) of two lines are connected by the relations $7l^2 + 5m^2 - 3n^2 = 0, l - 5m + 3n = 0$ then the d.c.'s of the two lines are

A. $(1/\sqrt{6}, 1/\sqrt{6}, -2/\sqrt{6}), (1/\sqrt{6}, -2/\sqrt{6}, 1/\sqrt{6})$

B. $(1/\sqrt{14}, -2/\sqrt{14}, 3/\sqrt{14}), (1/\sqrt{6}, 1/\sqrt{6}, -2/\sqrt{6})$

C. $(1/\sqrt{14}, 2/\sqrt{14}, 3/\sqrt{14}), (-1/\sqrt{6}, 1/\sqrt{6}, 2/\sqrt{6})$

D. none

Answer:



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40. If the d.c.'s (l, m, n) of two lines are connected by the relations $l + m - n = 0$, $12lm - mn - 61n = 0$ then the angle between the lines is

A. $\cos^{-1} \frac{19}{\sqrt{364}}$

B. 45°

C. 60°

D. 90°

Answer:

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41. If the d.c.'s (l, m, n) of two lines are connected by the relations $3l + m + 5n = 0$, $6mn - 2nl + 5lm = 0$ then the angle between the lines is

A. $\cos^{-1} \left(\frac{1}{6} \right)$ or $\pi - \cos^{-1} \left(\frac{1}{6} \right)$

B. 45°

C. 60° or 120°

D. $\cos^{-1} \frac{19}{\sqrt{364}}$

Answer:



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42. The direction ratios of two lines are given by $a + b + c = 0$, $2ab + 2ac - bc = 0$. Then the angle between the lines is

A. π

B. $\pi/3$

C. $\pi/2$

D. $\pi/6$

Answer:



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43. If the d.c.'s (l, m, n) of two lines are connected by the relations $l + m + n = 0$ and $2mn + 3ln - 5lm = 0$ then the angle between the lines is

A. $\pi/4$

B. $\pi/3$

C. $\pi/6$

D. $\pi/2$

Answer:



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44. If the direction ratios of two lines are given by $l + m + n = 0, mn - 2n + lm = 0$, then the angle between the lines is

A. $\pi/4$

B. $\pi / 3$

C. $\pi / 2$

D. 0

Answer:



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45. If the direction ratios of two lines are given by $3l - 4m + n = 0$ and $l + 2m + 3n = 0$ then the angle between the lines is

A. $\pi / 2$

B. $\pi / 3$

C. $\pi / 4$

D. $\pi / 6$

Answer:



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46. The acute angle between the two lines whose direction ratios are given by $l + m - n = 0$ and $l^2 + m^2 - n^2 = 0$ is

- A. 0
- B. $\pi/6$
- C. $\pi/4$
- D. $\pi/3$

Answer:

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47. Find the angle between the lines whose d.c's are related by

$$l + m + n = 0 \text{ \& } l^2 + m^2 - n^2 = 0$$

- A. $\pi/2$
- B. $\pi/3$

C. $\pi/4$

D. $\pi/6$

Answer:



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48. The angle between the lines whose direction cosines satisfy the equations $l + m + n = 0$ and $l^2 = m^2 + n^2$ is

A. $\frac{\pi}{6}$

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

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

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

Answer:



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49. If the direction cosines of two lines are given by $l + m + n = 0$ and $l^2 - 5m^2 + n^2 = 0$ then the angle between them is

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

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

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

Answer:



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50. If the d.c.'s (l, m, n) of two lines are connected by the relations $2l + m + 2n = 0$ and $3l^2 + 5m^2 - 11n^2 = 0$ then the angle between the lines is

A. $\pi/4$

B. $\pi / 3$

C. $\pi / 6$

D. $\pi / 2$

Answer:

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51. P.T the smaller angle θ between any two diagonals of a cube is given by $\cos \theta = 1/3$

A. $\cos^{-1}(1/3)$

B. $\cos^{-1} \sqrt{2/3}$

C. $\cos^{-1}(1/\sqrt{3})$

D. $\cos^{-1}(2/3)$

Answer:

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52. The angle between a diagonal of a cube and the diagonal of a face of the cube is

A. $\cos^{-1}(1/3)$

B. $\cos^{-1} \sqrt{2/3}$

C. $\cos^{-1}(1/\sqrt{3})$

D. $\cos^{-1}(2/3)$

Answer:



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53. If a line makes angles $\alpha, \beta, \lambda, \delta$ with the four diagonals of a cube, then show that $\cos^2 \alpha + \cos^2 \beta + \cos^2 \lambda + \cos^2 \delta = \frac{4}{3}$.

A. $1/3$

B. $2/3$

C. $1/5$

D. $4/3$

Answer:



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54. If $(6,-2,-3), (1,2,2)$ are d.r.'s of two lines then the d.c.'s of line bisecting the angle between them are

A. $\left(\frac{25}{\sqrt{714}}, \frac{8}{\sqrt{714}}, \frac{5}{\sqrt{714}} \right), \left(\frac{11}{\sqrt{1050}}, -\frac{20}{\sqrt{1050}}, -\frac{23}{\sqrt{1050}} \right)$

B. $\left(\frac{13}{\sqrt{210}}, \frac{4}{\sqrt{210}}, \frac{5}{\sqrt{210}} \right), \left(\frac{1}{\sqrt{6}}, -\frac{2}{\sqrt{6}}, -\frac{1}{\sqrt{6}} \right)$

C.

$\left(-\frac{25}{\sqrt{714}}, \frac{8}{\sqrt{714}}, -\frac{5}{\sqrt{714}} \right), \left(\frac{11}{\sqrt{1050}}, -\frac{20}{\sqrt{1050}}, -\frac{23}{\sqrt{1050}} \right)$

D. $\left(\frac{23}{\sqrt{210}}, \frac{40}{\sqrt{210}}, \frac{5}{\sqrt{210}} \right), \left(\frac{1}{\sqrt{6}}, -\frac{2}{\sqrt{6}}, -\frac{1}{\sqrt{6}} \right)$

Answer:



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55. The projection of the join of the points $(3, 4, 2)$, $(5, 1, 8)$ on the line whose d.c.'s are $\left(\frac{2}{7}, -\frac{3}{7}, \frac{6}{7}\right)$ is

A. 7

B. $46/13$

C. $42/13$

D. $38/13$

Answer:



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56. The projection of the line segment joining the origin and the point P $(5, 2, 4)$ on the line whose d.c.'s are $\left(\frac{2}{7}, -\frac{3}{7}, \frac{6}{7}\right)$ is

A. 13

B. 10

C. 6

D. 4

Answer:



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57. The projection of the join of the two points $A(2, 3, 4)$, $B(3, 5, -2)$ on the line whose d.r.'s are $(2, 3, -6)$ is

A. $7/3$

B. $7/6$

C. 21

D. $44/7$

Answer:



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58. If the projections of the line segment \overline{PQ} on the axes are 3, 4, 12 then the length of \overline{PQ} is

A. 12

B. 13

C. $\sqrt{50}$

D. $2\sqrt{5}$

Answer:



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59. If the projections of a line segment on the axes are 3, -4, 12 then the length of the segment and d.c.'s of the line are

A. $13, \left(\frac{3}{13}, -\frac{4}{13}, \frac{12}{13} \right)$

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

C. $13, \left(\frac{12}{13}, \frac{4}{13}, \frac{3}{13} \right)$

D. none

Answer:



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60. If the projections of a line segment on the axes are 2, 1, 2 then the length of the segment and d.c.'s of the line are

A. $13, \left(\frac{3}{13}, -\frac{4}{13}, \frac{12}{13} \right)$

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

C. $13 \left(\frac{12}{13}, \frac{4}{13}, \frac{3}{13} \right)$

D. none

Answer:



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61. The projections of a vector on the three coordinate axes are 6, -3, 2 respectively. The direction cosines of the vector are

A. $\frac{6}{5}, -\frac{3}{5}, \frac{2}{5}$

B. $\frac{6}{7}, -\frac{3}{7}, \frac{2}{7}$

C. $-\frac{6}{7}, -\frac{3}{7}, \frac{2}{7}$

D. 6, -3, 2

Answer:



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62. If $A = (-2, 3, 4)$, $B = (-4, 4, 6)$, $C = (4, 3, 5)$, $D = (0, 1, 2)$ then the projection of AB on CD is

A. 0

B. 5

C. 7

D. 27

Answer:



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63. If $A(2, -1, 4)$, $B(0, 1, 5)$, $C(4, 3, 5)$, $D(6, 4, 3)$ then the projection of \overline{AB} on \overline{CD} is

A. $4/3$

B. $3/4$

C. $-4/3$

D. $-3/4$

Answer:



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64. If the projection of a line of length d on the coordinate axes are d_1, d_2, d_3 respectively then, prove that $d^2 = \frac{d_1^2 + d_2^2 + d_3^2}{2}$

A. $2d^2$

B. $3d^2$

C. d^2

D. $5d^2$

Answer:



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65. If $A(3, -1, 11)$, $B(0, 2, 3)$, $C(4, 8, 11)$ are three points, then the foot of the perpendicular drawn from the point A to the line joining the points B and C is

A. $(3, 5, 7)$

B. $(2, 5, 7)$

C. (5, 9, 6)

D. (1, 2, 3)

Answer:



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Exercise 2 Set 1

I : If $OP = 21$ and d.c.'s of \overrightarrow{OP} are $(2/7, 6/7, -3/7)$ then $P = (6, 18, -9)$.

II : If $P = (3, 4, -12)$ then d.c.'s of \overrightarrow{OP} are $(3/13, 4/13, -12/13)$

A. Only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer:



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2. If α, β, γ are the angles made by a line with the positive directions of the coordinate axes, then $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma =$

- A. Only I is true
- B. only II is true
- C. both I and II are true
- D. neither I nor II are true

Answer:



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3. If $P = (0, 1, 2), Q = (4, -2, 1), O = (0, 0, 0)$ then $\angle POQ =$

- A. Only I is true
- B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer:



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4. The direction ratios of two lines are given by

$a + b + c = 0, 2ab + 2ac - bc = 0$. Then the angle between the lines is

A. Only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer:



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Exercise 2 Set 2

1. If the d.c.'s are (l, m, n) whose d.r.'s of a ray are $(3, -4, 12)$ then ascending order of l, m, n is

A. l, m, n

B. m, n, l

C. m, l, n

D. n, l, m

Answer:



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2. The values of cosine of the angles made by the line with d.c.'s $(2/7, 3/7, 6/7)$ with the lines with d.r.'s in descending order of magnitude is

A) $(1, 0, 0)$

B) $(0, 1, 0)$

C) $(0, 0, 1)$

D) $(1, 1, 1)$

A. D, C, B, A

B. C, D, A, B

C. B, A, D, C

D. A, B, C, D

Answer:



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3. If the projections of \overline{PQ} on the axes are 2, -2, 1 then the length PQ =



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