

BILAL PRIMARY AND SECONDARY PUBLIC SCHOOL

DIRE DAWA

2ND SEMESTER MATHEMATICS assignment on unit 5 and 6 FOR GRADE 11th

I. Write true if the statement is correct and false if is wrong.(1.5pts each)

- _____ 1. If a vector V has initial point $A(1, 3)$ and terminal point $B(-1, 5)$ then $\overrightarrow{AB} = (-2, 2)$.
 _____ 2. If two vectors U and V are perpendicular, then $U \cdot V = 0$.
 _____ 3. If two vectors $U = (2, 6)$ and $V = (-4, -2)$ then $|U - V| = 8$.
 _____ 4. The two vectors $U = 2i + j$ and $V = 5i - 10j$ are said to be parallel vectors.
 _____ 5. If U and V are parallel vectors with opposite direction, then $U \cdot V = -|U||V|$.

II. Choose the correct answer from the given alternatives(1.5pts each)

- _____ 6. The cosine of the angle θ between the vectors $U = 4i - j$ and $V = 5i + 3j$ is _____
 A. $\frac{\sqrt{2}}{2}$ B. $\frac{\sqrt{3}}{2}$ C. 1 D. $\frac{1}{2}$
- _____ 7. What is the work done (in joules) when a force of 50N is used to pull a crane 20m, along a level path, if a force is at an angle of 60° ?
 A. 360 B. 500 C. 760 D. $1500\sqrt{2}$
- _____ 8. The area of the parallelogram defined by the vectors $U = 2i + 3j + k$ and $V = 4i + j + 2k$ is _____
 A. 6 B. $8\sqrt{2}$ C. $5\sqrt{5}$ D. 10
- _____ 9. If vectors $A = 2i - 4j + 5k$ and $B = 2i + 6j + 4k$ then $A \cdot B =$ _____
 A. 2 B. 4 C. 5 D. 0
- _____ 10. The magnitude of the vector $U = 4i - 8j + 8k$ is _____
 A. 10 B. 12 C. 8 D. 11
- _____ 11. Vectors U and V make an angle $\theta = \frac{2\pi}{3}$ between them. If $|U| = 5$ and $|V| = 12$ then $U \cdot V =$ _____
 A. 40 B. -30 C. -60 D. 45
- _____ 12. For what value of k , vectors $U = ki - 3j$ and $V = 3i + 5j$ are perpendicular (orthogonal)?
 A. 3 B. 4 C. 5 D. 6
- _____ 13. What is the vector equation of the line passing through the point $(5, -4)$ and having direction vector $(-3, 4)$?
 A. $(x, y) = (5, -4) + t(-3, 4)$ C. $(x, y) = (5, -4) + t(-8, 0)$
 B. $(x, y) = (-3, 4) + t(5, -4)$ D. $(x, y) = (5, -4) + t(8, -8)$
- _____ 14. What is the standard equation of the line through the points $(-1, -1)$ and $(3, 10)$?
 A. $\frac{x+1}{4} = \frac{y+1}{11}$ B. $\frac{x-1}{4} = \frac{y-1}{11}$ C. $\frac{x+1}{-4} = \frac{y+1}{-11}$ D. $\frac{x-1}{2} = \frac{y-1}{9}$
- _____ 15. What is the equation of the circle centered at $C(1, -3)$ and radius 6?
 A. $x^2 + y^2 + 2x - 6y + 26 = 0$ C. $x^2 + y^2 - 2x + 6y - 36 = 0$
 B. $x^2 + y^2 - 2x + 6y - 26 = 0$ D. $x^2 + y^2 - 3x + y - 20 = 0$
- _____ 16. What is the equation of the circle whose end point of a diameter are $A(5, 3)$ and $B(3, -1)$?
 A. $x^2 + y^2 - 4x + 5y - 10 = 0$ C. $x^2 + y^2 - 3x - 4y + 15 = 0$
 B. $x^2 + y^2 - 8x - 2y + 12 = 0$ D. $x^2 + y^2 + 2x + 6y - 9 = 0$
- _____ 17. What is the equation the tangent line to the circle $x^2 + y^2 + 4x - 8y + 3 = 0$ at the point $P_1(2, 3)$?
 A. $2x - 3y + 4 = 0$ B. $-4x + 2y - 6 = 0$ C. $4x - y - 5 = 0$ D. $5x - 3y + 4 = 0$

18. If U and V are vectors such that $|U| = 5, |V| = 2$ and $|2U - 5V| = 10\sqrt{3}$, then which of the following is the value of $U \cdot V$?
- A. -10 B. 15 C. 6 D. -5
19. If a translation T takes the point $(1, -4)$ to the point $(-3, 2)$ then what is the image of the line $\ell : 5x + 4y + 9 = 0$?
- A. $2x - 5y + 3 = 0$ B. $5x + 4y + 5 = 0$ C. $5x + 4y - 10 = 0$ D. $5x - 4y + 6 = 0$
20. The image of a figure with vertices $A(1, 2), B(3, 6), C(-1, 2)$ and $D(-2, -2)$ after reflection about the y -axis is _____
- A. $A^1(1, -2), B^1(-3, -6), C^1(1, -2)$ and $D^1(2, 2)$
 B. $A^1(-1, 2), B^1(-3, 6), C^1(1, 2)$ and $D^1(2, -2)$
 C. $A^1(1, -2), B^1(3, -6), C^1(-1, -2)$ and $D^1(-2, 2)$
 D. $A^1(1, 2), B^1(3, 6), C^1(-1, 2)$ and $D^1(-2, -2)$
21. What is the image of the point $P(4, 2)$ when reflected about the line $y = 2x - 1$?
- A. $(1, 2)$ B. $(1, 4)$ C. $(0, 4)$ D. $(-1, 3)$
22. If the translation T takes the point $(2, 3)$ to the point $(-5, 4)$, then what is the equation the image of the circle $(x + 4)^2 + (y + 2)^2 = 7$?
- A. $(x + 11)^2 + (y + 1)^2 = 7$ C. $(x + 8)^2 + (y + 5)^2 = 7$
 B. $(x + 4)^2 + (y - 3)^2 = 7$ D. $(x - 10)^2 + (y - 8)^2 = 7$
23. What is the image of the point $p(4, 1)$ when it is rotated through $\theta = \pi$ or 180° about the origin ?
- A. $(-4, 1)$ B. $(-1, 4)$ C. $1, -4)$ D. $(-4, -1)$
24. What is the image of the circle $(x + 1)^2 + (y - 2)^2 = 36$ when it is rotated through $\theta = \frac{\pi}{2}$ or 90° about the origin ?
- A. $(x + 2)^2 + (y - 1)^2 = 36$ C. $(x + 1)^2 + (y + 2)^2 = 36$
 B. $(x - 2)^2 + (y + 1)^2 = 36$ D. $(x + 2)^2 + (y + 1)^2 = 36$

III . Give short answer(1.5 pts each)

25. The Image of the point $p(-2, 3)$ after it is rotated through $\theta = \frac{\pi}{2}$ or 90° about $(1, 2)$ is _____
26. If $|A| = 4, |B| = \sqrt{3}$ and $A \cdot B = -3$ then the of $|A - B| =$ _____
27. If $A = (-2, 3), B = (3, 1)$ and C is any other point on the plane , then the coordinate form of $\overrightarrow{AC} - \overrightarrow{BC} =$ _____
28. The image of the circle $(x - 4)^2 + (y - 1)^2 = 9$ after it is reflected about the x -axis is _____
29. If $U = 2i - 7j$ and $V = 3i + 2j$, then $U \cdot V =$ _____
30. If $A = (3, -3)$ and $B = (1, -3)$, then the unit vector in the direction of $3A - B$ is _____

BONUS (show each of your steps) 5%

31. Let $A = -i + 0j + 3k$ and $B = -i + j + 0k$ be vectors in the space. Find the cosine of the angle between A and $A - B$.