

**BILAL PRIMARY AND SECONDARY PUBLIC SCHOOL**

**DIRE DAWA**

**2ND SEMESTER MATHEMATICS assignment on unit 5 and 6 FOR GRADE 11<sup>th</sup>**

**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  $\theta$  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  $60^0$ ?  
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  $180^\circ$  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  $90^\circ$  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 though  $\theta = \frac{\pi}{2}$  or  $90^\circ$  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  $A - B$ .