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Continuing Education Course #535
Vector Fundamentals

1. _____ are properties of a vector.
- a. Magnitude and direction
- b. Weight and mass
- c. Speed and size
- d. Latitude and longitude

2. A scalar has which property?
- a. Direction
- b. Magnitude
- c. Heading
- d. Moment

3. All of the following are examples of vectors except _____.
- a. temperature
- b. velocity
- c. force
- d. moment (torque)

4. Given vector A = 3i + 4j - 5k, its length is _____.
- a. 7.07
- b. 12
- c. 3.46
- d. 5.02

5.

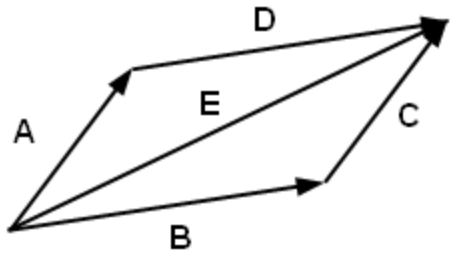

Figure A1

Using Figure A1, A + B equals _____.
- a. C
- b. E

○ c. D
○ d. none of the above

6.

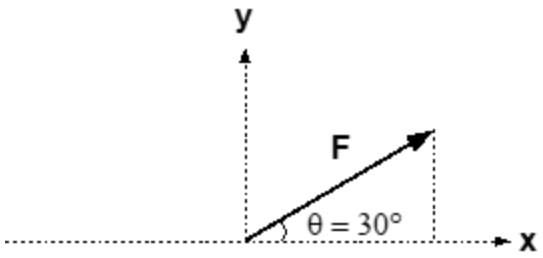

Figure A2

Using Figure A2, if F = 70 N, the vector component along the x-axis equals _____N and the vector component along the y-axis equals _____N.

○ a. 41.3, 56.5
○ b. 35, 60.6
○ c. 50.1, 48.9
○ d. 60.6, 35

7.

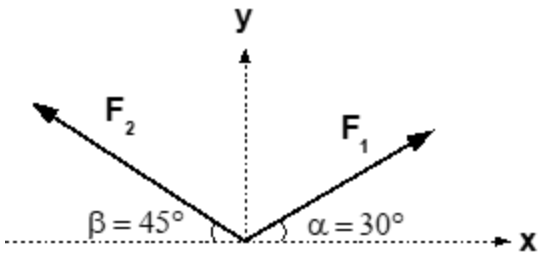

Figure A3

Using Figure A3, if F1 = 60 N, F2 = 50 N, the resulting force vector is F = _____ i + _____ j N.

○ a. 13.4, 63.2
○ b. 87.4, 65.4
○ c. 16.6, 65.3
○ d. 18.3, 62.1

8.

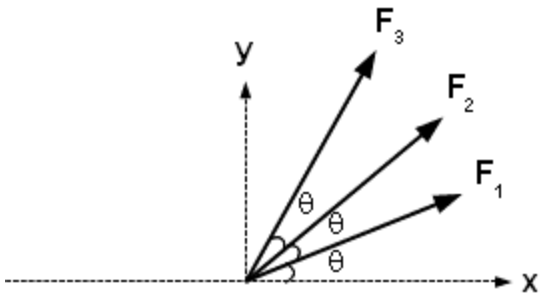

Figure A4

Using Figure A4, if the angles all equal 20 degrees, F1 = 10 N, F2 = 12 N, F3 = 15 N, the resultant vector is F = _____ i + _____ j N.

- a. 26.1, 24.1
- b. 7.50, 13.0
- c. 27.1, 22.6
- d. 9.40, 3.42

9. Given that A = 4i + 2j - 5k and B = i - 7j - 5k, the dot product A · B is _____.

- a. 14
- b. 15
- c. 16
- d. 17

10. Given that A = 4i + 2j - 5k and B = i - 7j - 5k, the cross product A × B is _____.

- a. -43i + 17j + 18k
- b. 4i - 14j + 25k
- c. 12i - 23j + 27k
- d. -45i + 15j - 30k

11. The angle between A and B in the above problem is _____.

- a. 74.1
- b. 78.6
- c. 75.0
- d. 68.3

12.

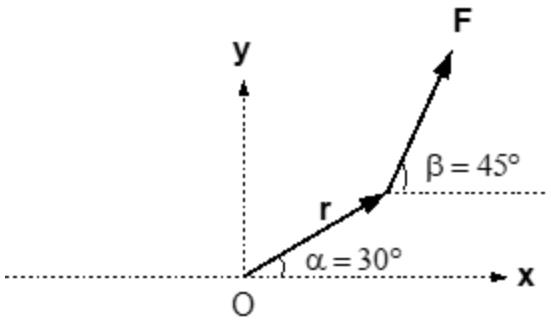

Figure A5

Using Figure A5, the moment M resulting from the force F = 10 N applied at a distance r = 5m from the point O is _____ k Nm.

- a. 11.2
- b. 12.9
- c. 13.5
- d. 14.8

13. Two vectors, A and B, form an angle of θ. The projection of A on B is given by _____.

- a. Bcosθ
- b. A · B
- c. A × B
- d. (A · B) / B

14. The angle between two known vectors may be found using _____.

- a. parallelogram method
- b. vector decomposition
- c. the triple product
- d. the dot product

15. The right-hand rule is used _____.

- a. to calculate the dot product of two vectors
- b. to find the projection of a vector onto another vector
- c. to determine the direction of the resulting vector from a cross product
- d. to find the magnitude of the resulting vector from a cross product