Discussion Topics

1. Dot Product
2. Convert Standard Complex to & From Trigonometric (Cis Form)
3. Convert Vectors between Rectangular and Polar Form
4. Absolute Value of a Vector
5. Absolute Value of a Complex Number
6. Adding Vectors Regardless of form (Polar or Rectangular or a Combination)
7. Given Vectors in Polar Form. Add them
8. Unit Vector
9. Find Unit Vector in a given direction
10. Angle between Vectors
11. Orthogonal Projection of one vector onto another vector
12. Absolute value of a projection of one vector onto another vector
13. Solve a triangle using Law of Sines and Law of Cosines
14. Methods of finding area of a triangle.
15. DeMoivre's Theorem to find Powers and Roots of Complex Numbers
16. Work

Problems and Answers on the next 2 pages

Class Exercises

1. $\mathbf{P} = \langle 2, 4 \rangle$, $\mathbf{Q} = \langle 10, 21° \rangle$. Find $\mathbf{P} \bullet \mathbf{Q}$.
2. $\mathbf{P} = \langle 15, 61° \rangle$, $\mathbf{Q} = \langle 7, 100° \rangle$. Find $\mathbf{P} \bullet \mathbf{Q}$.
3. $2 - 13i$ Convert to the Other Form.
4. $\mathbf{v} = \langle 17, 35° \rangle$ Find $\| \mathbf{v} \|$
5. $\mathbf{w} = \langle -3, 6 \rangle$ Find $\| \mathbf{w} \|$
6. $\langle 3, -2 \rangle + \langle 10, 16° \rangle$ Give Both Answer Forms
7. A Plane is flying at a ground speed of 866 mph and a direction of 54° in still air. A wind kicks up at 33 mph at a direction of 123°. The pilot makes no compensating adjustments. Find the new speed and direction of the plane.
8. $\mathbf{v} = \langle 21, 85 \rangle$, $\mathbf{q} = \langle 10, 92 \rangle$ Find $\text{proj}_{\mathbf{v}}\mathbf{q}$
9. Find a unit vector in the same direction of $\mathbf{v} = \langle -32, 15 \rangle$.
10. Find Dot Product of $\mathbf{v} = \langle a, b° \rangle$ and $\mathbf{u} = \langle c, d° \rangle$.
11. $\mathbf{v} = -3i + 7j$, $\mathbf{w} = -9i - 11j$ Find the angle between $\mathbf{v}$ and $\mathbf{w}$.
12. A 275-pound cart is on an incline of 33°. Find the Force necessary to prevent the cart from rolling down the incline.
13. Find $\left(2 + 2\sqrt{3}i\right)^{10}$
14. Solve: $x^3 - 27 = 0$
15. Find the area of ΔABC, with $a = 10$, $b = 22$, $c = 15$.
16. Given ΔABC, with $a = 122$, $b = 165$, $C = 77°$. Find c.
17. A force $\mathbf{F}$ of 25 pounds with a direction of 57° moves an object from P(-3, 6) to Q(5, 12). Find the Work done.
18. Force $\mathbf{F} = \langle -3, 7 \rangle$ moves an object a distance of 10 units at an angle of 102°. Find the Work Done.
19. A force $\mathbf{F}$ of 93 pounds with a direction of 35° moves ab object a distance of 24 units at an angle of 13°. Find the Work done.
20. Find the **exact** value for sin 75°.
21. Solve: $x^3 + 2 - 2i = 0$

Exercise Solutions

If you notice any errors or typos, let me know so that I can correct them.

1. 33.006
2. 81.600
3. 13.153 cis 278.746°
4. 17
5. 6.708
6. <12.613, 0.756> and <12.635, 3.432°>
7. 878.367 mph at 56.010°
8. <21.997, 89.036>
9. <-0.905, 0.424>
10. ac cos(d° - b°)
11. 117.512°
12. 149.776
13. -524288 – 908093.454*i*
14. 3, -1.5 + 2.598*i*, -1.5 - 2.598*i*
15. 63.600
16. 181.803
17. 234.728
18. 62.233
19. 2069.474
20. $\frac{\sqrt{2}+\sqrt{6}}{4}$
21. 1 + *i*, -1.366 + 0.366*i*, 0.366 – 1.366*i*