1. **A** = the inner product of (-5,6) and (4,8).
   B = the magnitude of the cross product of (-5, 8,-6) and (1,2,3).

   Find **AB.**

2. Find the area enclosed by the ellipse $4x^2 + y^2 + 24x - 8y + 51 = 0$.

3. Let **A** = the remainder when $4x^5 + 9x^4 - x^3 + 2x^2 + 3x - 8$ is divided by x + 2.

   Let **B** = the number of negative real roots of $x^4 - 5x^3 + 4x^2 + 3x - 24 = 0$.

   Let **C** = the sum of the roots of the equation $x^3 + 4x^2 - 3 = 0$

   Find $\frac{\mathbf{A}}{\mathbf{B}} + \mathbf{C}$

4. A ship sets sail from port with a heading of 45° east of north. After sailing for 120 minutes at 10 mph, the ship's captain changes the heading to 163° 15' east of north and continues sailing for 1 hour at 10 mph.

   A = the distance from the port to the ship to the nearest tenths.
   B = using the distance from **A**, find the amount of time in minutes to the nearest tenth that it will take the ship to get back to port if it travels with constant heading and at 10 mph.

   Find **B – A**.

5. Find the area enclosed by the graph $g(x) = 6$ and $f(x) = \begin{cases} 2-2x, & x < -1 \\ 4, & -1 \le x \le 3 \\ 2x-2, & x > 3 \end{cases}$.

6. If the angle $(\alpha + \beta)$ is an acute angle and

$$\frac{\sin(\alpha)\sec(\alpha) + \sec(\beta)\cot(\beta)\sin(\beta)\tan(\beta)}{1 - (\sec(\alpha)\sec(\beta)\sin(\alpha)\sin(\beta))} = \frac{\sqrt{3}}{3}$$

   find $(\boldsymbol{\alpha} + \boldsymbol{\beta})$.

7. Let $x = \sqrt{1 + \sqrt{3 + \sqrt{1 + \sqrt{3 + \sqrt{\ldots}}}}}$

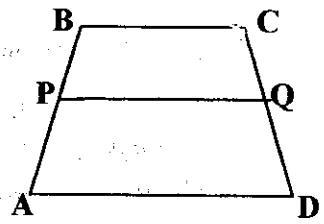
   Find $\mathbf{x^4 - 2x^2 - x + 3}$

8. Given matrix $\mathbf{P} = \begin{bmatrix} 2 & 5 & -1 \\ 5 & x & -4 \\ 1 & 9 & 7 \end{bmatrix}$ and det **P** = -123,

   Find the numerical value of **x.**

9. A golf ball is launched from the ground level at an initial speed of 10 m/s and at an angle of elevation of 30°. Find how high overhead the golf ball will be when it is 5 m downrange. ($g = 9.8\ m/s^2$)

10. **P** and **Q** are midpoints of sides **AB** and **CD** of the trapezoid shown in the figure (not drawn to scale). Express the vector **AQ** in terms of **u** = **AB**, **v** = **AD**, and **w** = **BC**.



11. Let **A** = the slope of the line whose parametric equations are
$$x = 3 + 2t \text{ and } y = -1 + 5t.$$

Let **B** = the sum of the coefficients of the equation whose roots are $8, 1+i$.

Let **C** = the number of horizontal asymptotes of $y = \dfrac{3x^2+5}{x^3+5x^2+2}$

Let **D** = the number of vertical asymptotes of $y = \dfrac{x+3}{x^4-13x^3+21x^2+13x-22}$

Find **ABCD.**

12. Solve the following:
$$\log_9(7x+17) = \log_9(37-6x)$$

$$\log_3(4y+4) - \log_3(6y+1) = 2$$

Find **xy.**

13. A regular hexagon is inscribed in a circle with diameter 4x. Find the apothem in terms of x.

14. If the ellipse $\dfrac{x^2}{6} + \dfrac{y^2}{9} = 1$ is shifted 2 units to the left and one unit down on the cartesian coordinate plane, find the coordinates of the foci of the new ellipse.

15. Find the area of Δ DOG if $d = 6.2$, $o = 7.5$, and G = 97°. (Round to the nearest tenth)