6-1: Vectors in the Plane
Pearson Pre-Calculus
Day 1

Two-dimensional vector:

Component form:

Head Minus Tail (HMT) Rule:

Direction:

Magnitude:

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1. Prove that $\overrightarrow{RS}$ and $\overrightarrow{PQ}$ are equivalent by showing that they represent the same vector.

$R = (-4, 7), S = (-1, 5), P = (0, 0),$ and $Q = (3, -2)$

Let $P = (-2,2), Q = (3, 4), R = (-2, 5), and\ S = (2, -8)$. Find the component form and magnitude of the vector.

2. $\overrightarrow{RS}$

3. $2\overrightarrow{QS}$

Let $\boldsymbol{u} = \langle -1, 3 \rangle, \mathbf{v} = \langle 2, 4 \rangle$, and $\boldsymbol{w} = \langle 2, -5 \rangle$. Find the component form of the vector.

4. **u** + **v**

5. 2**u** – 4**v**

6. Find a unit vector in the direction of the given vector $\boldsymbol{v} = \langle 1, -1 \rangle$

6-1: Vectors in the Plane
Pearson Pre-Calculus
Day 2

Resolving a vector:

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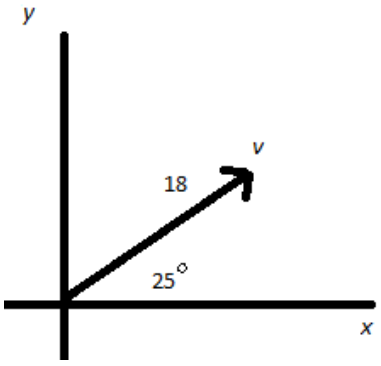
1. Find the unit vector in the direction of the given vector. Write your answer in **(a)** component form and **(b)** as a linear combination of the standard unit vectors **i** and **j**. $\mathbf{u} = \langle 2, 1 \rangle$

2. Find the component form of the vector ***v***.



3. Find the magnitude and direction angle of the vector: $\langle -1, 2 \rangle$.

4. Find the vector $\boldsymbol{v}$ with the given magnitude and the same direction as $\boldsymbol{u}$: $|\boldsymbol{v}| = 2, \boldsymbol{u} = \langle 3, -3 \rangle$

6-3: Parametric Equations and Motion
Pearson Pre-Calculus
Day 1

Parametric equations:

Parametric curve:

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1. Complete the table for the parametric equations and plot the corresponding points. $x = \cos t$, $y = \sin t$

t	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
x					
y					

2. Eliminate the parameter and identify the graph of the parametric curve: $x = 5 - 3t, y = 2 + t, -1 \leq t \leq 3$

3. Find a parametrization for the curve: The line through the points (-2, 5) and (4, 2)

6-3: Parametric Equations and Motion
Pearson Pre-Calculus
Day 2

Eliminate the parameter and identify the graph of the parametric curve.

1. $x = 1 - 2t, y = 2 - t,\ -\infty < t < \infty$

2. $x = t^2 - 2, y = 3t$

6-4: Polar Coordinate System
Pearson Pre-Calculus
Day 1

Polar coordinate system:

Find all Polar Coordinates of a Point:

Coordinate Conversion:

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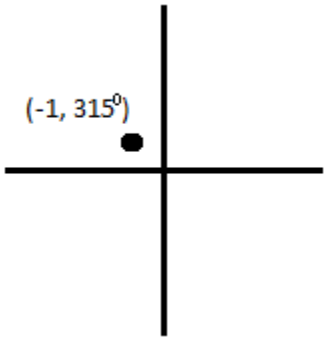
1. The polar coordinates of a point are given. Find its rectangular coordinates.



Plot the point with the given polar coordinates.

2. $(3, \frac{4\pi}{3})$

3. $(-2, 120^o)$

Find the rectangular coordinates of the point with given polar coordinates.

4. $\left(1.5, \frac{7\pi}{3}\right)$

5. $(2, 270^o)$

6-4: Polar Coordinate System
Pearson Pre-Calculus
Day 2

Polar coordinates of point *P* are given. Find all of its polar coordinates.

1. $P = (2, \frac{\pi}{6})$

2. $P = (1.5, -20^o)$

Convert the polar equation to rectangular form and identify the graph. Support your answer by graphing the polar equation.

1. $r = 3 \sec \theta$

2. $r \csc \theta = 1$

Convert the rectangular equation to polar form.

3. $2x - 3y = 5$

4. $(x - 3)^2 + y^2 = 9$

7-2: Matrix Algebra
Pearson Pre-Calculus
Day 1

m x *n* matrix:

Sum $A + B$:

Difference $A - B$:

Square Matrix:

Matrix Multiplication:

Determine the order of the matrix. Indicate whether the matrix is square.

1. $\begin{bmatrix} 5 & 6 \\ -1 & 2 \\ 0 & 0 \end{bmatrix}$

Find **(a)** A + B **(b)** A – B **(c)** 3A and **(d)** 2A – 3B

2. $A = \begin{bmatrix} 5 & -2 & 3 & 1 \\ -1 & 0 & 2 & 2 \end{bmatrix}$, $B = \begin{bmatrix} -2 & 3 & 1 & 0 \\ 4 & 0 & -1 & -2 \end{bmatrix}$

Use definition of matrix multiplication to find **(a)** AB and **(b)** BA

3. $A = \begin{bmatrix} 2 & 0 & 1 \\ 1 & 4 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ -3 & 1 \\ 0 & -2 \end{bmatrix}$

7-2: Matrix Algebra
Pearson Pre-Calculus
Day 2

Find **(a)** AB **(b)** BA

1. $A = \begin{bmatrix} -1 & 2 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} -3 & 5 \end{bmatrix}$

2. $A = \begin{bmatrix} -1 & 3 \\ 0 & 1 \\ 1 & 0 \\ -3 & -1 \end{bmatrix}, B = \begin{bmatrix} 5 & -6 \\ 2 & 3 \end{bmatrix}$

Solve for a and b.

3. $\begin{bmatrix} 2 & a-1 \\ 2 & 3 \\ -1 & 2 \end{bmatrix} = \begin{bmatrix} 2 & -3 \\ b+2 & 3 \\ -1 & 2 \end{bmatrix}$

4. $\begin{bmatrix} a+3 & 2 \\ 0 & 5 \end{bmatrix} = \begin{bmatrix} 4 & 2 \\ 0 & b-1 \end{bmatrix}$

7-2: Matrix Algebra
Pearson Pre-Calculus
Day 3

Inverse of a matrix:

Discriminant:

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1. Verify that the matrices are inverses of each other: $A = \begin{bmatrix} 3 & -2 \\ -1 & 1 \end{bmatrix}, B = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$

2. Show that the matrix does not have an inverse: $A = \begin{bmatrix} 6 & 3 \\ 2 & 1 \end{bmatrix}$

Determine whether the matrix has an inverse. If so, find the inverse matrix.

3. $A = \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$

4. $B = \begin{bmatrix} 1 & 2 & -1 \\ 2 & -1 & 3 \\ -1 & 0 & 1 \end{bmatrix}$