Precalculus Name_____ ID: 1

Vector Unit Review

Date_____ Period____

Find the component form of the resultant vector.

1) $\mathbf{u} = \langle -1, 8 \rangle$
$\mathbf{v} = \langle -10, 8 \rangle$
Find: $-\mathbf{u} + \mathbf{v}$

2) $\mathbf{u} = \langle 2, -12 \rangle$
Find: $-8\mathbf{u}$

Express the resultant vector as a linear combination of unit vectors i and j.

3) $\mathbf{u} = -2\mathbf{i} - \mathbf{j}$
$\mathbf{v} = -11\mathbf{i} - \mathbf{j}$
Find: $2\mathbf{u} - 8\mathbf{v}$

4) $\mathbf{u} = -30\mathbf{i} - 40\mathbf{j}$
Find: $2\mathbf{u}$

Find the following information for each vector, if not provided in the question: Component form, magnitude and direction angle.

5) $\left|\mathbf{r}\right| = 9, 45°$

6) $\overrightarrow{CD}$ where $C = (-4, -2)$ $D = (-5, 1)$

7) $\overrightarrow{CD}$ where $C = (2, -6)$ $D = (4, -3)$

8) $\overrightarrow{AB}$ where $A = (4, 1)$ $B = (-3, -7)$

Find the component form of the resultant vector.

9) $\left|\mathbf{u}\right| = 13, 197°$
Unit vector in the direction of $\mathbf{u}$

10) $\mathbf{a} = \langle 9, -40 \rangle$
Unit vector in the opposite direction of $\mathbf{a}$

11) $\mathbf{u} = \langle -\sqrt{13}, 5 \rangle$
Unit vector in the opposite direction of $\mathbf{u}$

Find the dot product of the given vectors.

12) $\mathbf{u} = -7\mathbf{i} + 9\mathbf{j}$
$\mathbf{v} = 2\mathbf{i} + \mathbf{j}$

13) $\mathbf{u} = 4\mathbf{i} + 9\mathbf{j}$
$\mathbf{v} = 3\mathbf{i} - 6\mathbf{j}$

State if the two vectors are parallel, orthogonal, or neither.

14) $\mathbf{u} = 4\mathbf{i} + 8\mathbf{j}$
$\mathbf{v} = 8\mathbf{i} + 4\mathbf{j}$

15) $\mathbf{u} = -10\mathbf{i} - 4\mathbf{j}$
$\mathbf{v} = -2\mathbf{i} + 5\mathbf{j}$

16) $\mathbf{u} = 8\mathbf{i} - \mathbf{j}$
$\mathbf{v} = 16\mathbf{i} - 2\mathbf{j}$

Find the measure of the angle between the two vectors.

17) $\mathbf{u} = \langle 9, 0 \rangle$
$\mathbf{v} = \langle -7, 3 \rangle$

18) $\mathbf{u} = \langle -4, -1 \rangle$
$\mathbf{v} = \langle -7, 4 \rangle$

Convert numbers in rectangular form to polar form and numbers in polar form to rectangular form.

19) $-\frac{3\sqrt{2}}{2} + \frac{3\sqrt{2}}{2}i$

20) $-3\sqrt{2} + 3i\sqrt{2}$

21) 4

22) $-\frac{5}{2} + \frac{5\sqrt{3}}{2}i$

23) $4(\cos 315 + i\sin 315)$

24) $5(\cos 315 + i\sin 315)$

Convert each equation from rectangular to polar form.

25) $(x + 2)^2 + y^2 = 4$

26) $(x + 1)^2 + (y + 1)^2 = 2$

Convert each equation from polar to rectangular form.

27) $r = -2\sin\theta$

28) $r = 2\tan\theta\sec\theta$

Precalculus Name_____ ID: 1

Vector Unit Review

Date_____ Period____

Find the component form of the resultant vector.

1) $\mathbf{u} = \langle -1, 8 \rangle$
$\mathbf{v} = \langle -10, 8 \rangle$
Find: $-\mathbf{u} + \mathbf{v}$

$\langle -9, 0 \rangle$

2) $\mathbf{u} = \langle 2, -12 \rangle$
Find: $-8\mathbf{u}$

$\langle -16, 96 \rangle$

Express the resultant vector as a linear combination of unit vectors i and j.

3) $\mathbf{u} = -2\mathbf{i} - \mathbf{j}$
$\mathbf{v} = -11\mathbf{i} - \mathbf{j}$
Find: $2\mathbf{u} - 8\mathbf{v}$

$84\mathbf{i} + 6\mathbf{j}$

4) $\mathbf{u} = -30\mathbf{i} - 40\mathbf{j}$
Find: $2\mathbf{u}$

$-60\mathbf{i} - 80\mathbf{j}$

Find the following information for each vector, if not provided in the question: Component form, magnitude and direction angle.

5) $|\mathbf{r}| = 9, 45°$

$\left\langle \frac{9\sqrt{2}}{2}, \frac{9\sqrt{2}}{2} \right\rangle$

6) $\overrightarrow{CD}$ where $C = (-4, -2)$ $D = (-5, 1)$

$\langle -1, 3 \rangle$
$\sqrt{10} \approx 3.162$
$108.43°$

7) $\overrightarrow{CD}$ where $C = (2, -6)$ $D = (4, -3)$

$\langle 2, 3 \rangle$
$\sqrt{13} \approx 3.606$
$56.31°$

8) $\overrightarrow{AB}$ where $A = (4, 1)$ $B = (-3, -7)$

$\langle -7, -8 \rangle$
$\sqrt{113} \approx 10.63$
$228.81°$

Find the component form of the resultant vector.

9) $|\mathbf{u}| = 13, 197°$
Unit vector in the direction of $\mathbf{u}$

$\langle -0.96, -0.29 \rangle$

10) $\mathbf{a} = \langle 9, -40 \rangle$
Unit vector in the opposite direction of $\mathbf{a}$

$\left\langle -\frac{9}{41}, \frac{40}{41} \right\rangle$

11) $\mathbf{u} = \langle -\sqrt{13}, 5 \rangle$
Unit vector in the opposite direction of $\mathbf{u}$

$\left\langle \frac{\sqrt{494}}{38}, -\frac{5\sqrt{38}}{38} \right\rangle$

Find the dot product of the given vectors.

12) $\mathbf{u} = -7\mathbf{i} + 9\mathbf{j}$
$\mathbf{v} = 2\mathbf{i} + \mathbf{j}$

-5

13) $\mathbf{u} = 4\mathbf{i} + 9\mathbf{j}$
$\mathbf{v} = 3\mathbf{i} - 6\mathbf{j}$

-42

State if the two vectors are parallel, orthogonal, or neither.

14) $\mathbf{u} = 4\mathbf{i} + 8\mathbf{j}$
$\mathbf{v} = 8\mathbf{i} + 4\mathbf{j}$

Neither

15) $\mathbf{u} = -10\mathbf{i} - 4\mathbf{j}$
$\mathbf{v} = -2\mathbf{i} + 5\mathbf{j}$

Orthogonal

16) $\mathbf{u} = 8\mathbf{i} - \mathbf{j}$
$\mathbf{v} = 16\mathbf{i} - 2\mathbf{j}$

Parallel

Find the measure of the angle between the two vectors.

17) $\mathbf{u} = \langle 9, 0 \rangle$
$\mathbf{v} = \langle -7, 3 \rangle$

156.8°

18) $\mathbf{u} = \langle -4, -1 \rangle$
$\mathbf{v} = \langle -7, 4 \rangle$

43.78°

Convert numbers in rectangular form to polar form and numbers in polar form to rectangular form.

19) $-\frac{3\sqrt{2}}{2} + \frac{3\sqrt{2}}{2}i$

$3(\cos 135 + i\sin 135)$

20) $-3\sqrt{2} + 3i\sqrt{2}$

$6(\cos 135 + i\sin 135)$

21) 4

$4(\cos 0 + i\sin 0)$

22) $-\frac{5}{2} + \frac{5\sqrt{3}}{2}i$

$5(\cos 120 + i\sin 120)$

23) $4(\cos 315 + i\sin 315)$

$2\sqrt{2} - 2i\sqrt{2}$

24) $5(\cos 315 + i\sin 315)$

$\frac{5\sqrt{2}}{2} - \frac{5\sqrt{2}}{2}i$

Convert each equation from rectangular to polar form.

25) $(x + 2)^2 + y^2 = 4$

$r = -4\cos\theta$

26) $(x + 1)^2 + (y + 1)^2 = 2$

$r = -2\cos\theta - 2\sin\theta$

Convert each equation from polar to rectangular form.

27) $r = -2\sin\theta$

$x^2 + (y + 1)^2 = 1$

28) $r = 2\tan\theta\sec\theta$

$y = \frac{x^2}{2}$