Test 4 Pretest, Chapter 8

Round each part in the *answer* to the nearest tenth, unless otherwise indicated.

Section 8.2 Formulas:

1. A vectors components, $\langle a, b \rangle$, are defined by $a = |\mathbf{V}| \cos\theta$ and $b = |\mathbf{V}| \sin\theta$.
2. A vector's **direction angle**, $0° \le \theta < 360°$, is defined by first finding $\hat{\theta}$, using either $\cos\hat{\theta} = \frac{|a|}{|\mathbf{V}|}$ or $\sin\hat{\theta} = \frac{|b|}{|\mathbf{V}|}$. To find θ, either add or subtract $\hat{\theta}$ with 180° or 360°, depending in which quadrant **V** lies.
3. The angle measure, α, between the two vectors, **V** and **W**: $\cos\alpha = \frac{\mathbf{V} \bullet \mathbf{W}}{|\mathbf{V}|\,|\mathbf{W}|}$; $0° \le \alpha \le 180°$.

Section 8.1:

Given two vectors $\mathbf{U} = \langle -12, -\frac{9}{4} \rangle$ and $\mathbf{V} = \langle \frac{3}{5}, -6 \rangle$, find the following

1. $\mathbf{B} = 4\mathbf{U} - 10\mathbf{V}$

$B = 4 \cdot \langle -12, -\frac{9}{4} \rangle + -10 \cdot \langle \frac{3}{5}, -6 \rangle$

$B = \langle -48, -9 \rangle + \langle -6, 60 \rangle$

$B = \langle -54, 51 \rangle$

2. $\mathbf{D} = \frac{8}{3}\mathbf{U} + \frac{10}{3}\mathbf{V}$

$D = \frac{8}{3} \cdot \langle -12, -\frac{9}{4} \rangle + \frac{10}{3} \langle \frac{3}{5}, -6 \rangle$

$D = \langle -32, -6 \rangle + \langle 2, -20 \rangle$

$D = \langle -30, -26 \rangle$

Given two vectors $\mathbf{G} = -2\mathbf{i} + 6\mathbf{j}$ and $\mathbf{H} = 3\mathbf{i} - 9\mathbf{j}$, find the following. Write each answer in **i, j** form.

3. $\mathbf{X} = \mathbf{G} - \mathbf{H}$

$X = (-2i + 6j) - (3i - 9j)$

$X = -2i + 6j - 3i + 9j$

$X = -5i + 15j$

4. $\mathbf{Z} = \frac{3}{2}\mathbf{G} + \frac{5}{3}\mathbf{H}$

$Z = \frac{3}{2}(-2i + 6j) + \frac{5}{3}(3i - 9j)$

$Z = -3i + 9j + 5i - 15j$

$Z = 2i - 6j$