Name: _____ Date: _____

EXAM 4 REVIEW

m) find $4\vec{v} + 7\vec{w}$ for $\vec{v} = \langle 2, 3 \rangle$ and $\vec{w} = \langle 5, 1\sqrt{3} \rangle$
n) find $\vec{v} - 2\vec{w}$ for $\vec{v} = \langle -11, -6 \rangle$ and $\vec{w} = \langle -3, 2 \rangle$

Find a unit vector in the direction of the given vector.

a) $\langle 8, -6 \rangle$ b) $\langle -3, -\sqrt{7} \rangle$ c) $\langle 9, 2 \rangle$

Add, subtract, multiply, and divide as indicated.

a) $(5 - 2i) + (-2 + 6i)$ b) $(-9 - i) - (5 - 3i)$

Find the approximate magnitude and direction angle of sum $\vec{v} = \vec{v_1} + \vec{v_2}$ of the given vectors $\vec{v_1}$ and $\vec{v_2}$ (see Example 22.18).

a) $||\vec{v_1}|| = 6$, and $\theta_1 = 60°$, and
$||\vec{v_2}|| = 2$, and $\theta_2 = 180°$

Find the absolute value $|a+bi|$ of the given complex number, and simplify your answer as much as possible.

a) $|4+3i|$ b) $|6-6i|$ c) $|-3i|$ d) $|-2-6i|$

Convert the complex number into polar form $r(\cos(\theta)+i\sin(\theta))$.

a) $2+2i$ b) $4\sqrt{3}-4i$ c) $-7+7\sqrt{3}i$ d) $-5-5i$
e) $8-8i$ f) $-8+8i$ g) $-\sqrt{5}-\sqrt{15}i$ h) $\sqrt{7}-\sqrt{21}i$

Convert the complex number into the standard form $a+bi$.

a) $6(\cos(150°)+i\sin(150°))$ b) $10(\cos(315°)+i\sin(315°))$
c) $2(\cos(90°)+i\sin(90°))$ d) $\cos(\frac{\pi}{6})+i\sin(\frac{\pi}{6})$

Multiply the complex numbers and write the answer in standard form $a+bi$.

a) $4(\cos(27°)+i\sin(27°))\cdot 10(\cos(123°)+i\sin(123°))$

b) $7(\cos(182°)+i\sin(182°))\cdot 6(\cos(43°)+i\sin(43°))$

Divide the complex numbers and write the answer in standard form $a+bi$.

a) $\dfrac{18(\cos(320°)+i\sin(320°))}{3(\cos(110°)+i\sin(110°))}$ b) $\dfrac{10(\cos(207°)+i\sin(207°))}{15(\cos(72°)+i\sin(72°))}$

Determine the general nth term a_n of an arithmetic sequence $\{a_n\}$ with the data given below.

a) $d = 4$, and $a_8 = 57$ b) $d = -3$, and $a_{99} = -70$

Determine the value of the indicated term of the given arithmetic sequence.

a) if $a_1 = 8$, and $a_{15} = 92$, find a_{19}

Determine the sum of the arithmetic sequence.

a) Find the sum $a_1 + \cdots + a_{48}$ for the arithmetic sequence $a_n = 4n + 7$.

b) Find the sum $\sum_{n=1}^{21} a_n$ for the arithmetic sequence $a_n = 2 - 5n$.

Find the value of the finite geometric series using formula (25.2). Confirm the formula either by adding the the summands directly, or alternatively by using the calculator.

a) Find the sum $\sum_{j=1}^{4} a_j$ for the geometric sequence $a_j = 5 \cdot 4^{j-1}$.

b) Find the sum $\sum_{i=1}^{7} a_i$ for the geometric sequence $a_n = \left(\frac{1}{2}\right)^n$.

Find the value of the infinite geometric series.

a) $\sum_{j=1}^{\infty} a_j$, for $a_j = 3 \cdot \left(\frac{2}{3}\right)^{j-1}$

b) $\sum_{j=1}^{\infty} 7 \cdot \left(-\frac{1}{5}\right)^{j}$

c) $\sum_{j=1}^{\infty} 6 \cdot \frac{1}{3^j}$

d) $\sum_{n=1}^{\infty} -2 \cdot (0.8)^{n}$

A geometric sequence, $a_n = a_1 \cdot r^{n-1}$, has the given properties. Find the term a_n of the sequence.

a) $a_1 = 3$, and $r = 5$, find a_4

b) $a_1 = 200$, and $r = -\frac{1}{2}$, find a_6

c) $a_1 = -7$, and $r = 2$, find a_n (for all n)

d) $r = 2$, and $a_4 = 48$, find a_1

Exercise V.1

Find the magnitude and direction angle of the vector

$$\vec{v} = \langle 7, -7\sqrt{3} \rangle.$$

Exercise V.2

For the vectors $\vec{v} = \langle 3, -2 \rangle$ and $\vec{w} = \langle -5, 6 \rangle$, evaluate the following expression:

$$7 \cdot \vec{v} - 3 \cdot \vec{w}$$

Exercise V.3

Convert the complex number to polar form:

a) $-3 - 3i$

b) $-5\sqrt{3} + 5i$

Exercise V.4

Multiply and write the answer in standard form:

$$4(\cos(207°) + i\sin(207°)) \cdot 2(\cos(108°) + i\sin(108°))$$

Exercise V.5

Divide and write the answer in standard form:

$$\frac{9(\cos(190°) + i\sin(190°))}{15(\cos(70°) + i\sin(70°))}$$

Exercise V.6

Evaluate the sum:

$$\sum_{n=1}^{7}(3n^2 + 4n)$$

Exercise V.7

Determine whether the sequence is an arithmetic sequence, geometric sequence, or neither. If it is one of these, then find the general formula for the nth term a_n of the sequence.

a) $54, -18, 6, -2, \frac{2}{3}, \ldots$
b) $2, 4, 8, 10, \ldots$
c) $9, 5, 1, -3, -7, \ldots$

Exercise V.8

Find the sum of the first 75 terms of the arithmetic sequence:

$$-30, -22, -14, -6, 2, \ldots$$

Exercise V.9

Find the sum of the first 8 terms of the geometric series:

$$-7, -14, -28, -56, -112, \ldots$$

Exercise V.10

Find the value of the infinite geometric series:

$$80 - 20 + 5 - 1.25 + \ldots$$