

(20) ① Sketch the following

a) $r = -3 \cos \theta$

b) $r = 3 \sin 2\theta$

c) $\theta = -\pi/6$

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

(20) ② a) If $A = (-2, 5)$ and $B = (1, 4)$, represent \vec{AB} in the form $x\mathbf{i} + y\mathbf{j}$ b) Let $\vec{u} = 3\mathbf{i} - 4\mathbf{j}$ and

$\vec{v} = 2\mathbf{i} - \mathbf{j}$, find

$2\vec{u} - 3\vec{v}$. Simplify.

c) Find the magnitude of

$\vec{v} = 5\mathbf{i} - 3\mathbf{j}$.

d) If $\|\vec{v}\| = 2$, write thevector \vec{v} in the form

$a\mathbf{i} + b\mathbf{j}$ if the angle

it makes with the positive

x axis is 240° (15) ③ Write answers in $a + bi$ form:

a) $(3 - i)^2 + 4(1 + 2i)$

b) $\frac{1 - 5i}{2 + i}$

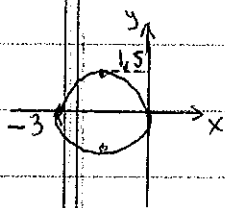
c) $1i + 2i^2 + 3i^3 + 4i^4$

(5) ④ Solve $x^2 + 2x + 2 = 0$. (Answers in $a + bi$ form)(10) ⑤ a) Divide: $\frac{14 \text{ cis } 400^\circ}{7 \text{ cis } 100^\circ}$ b) Write the complex number $-2.13 - 4.57i$ in polar form with $r \geq 0$.

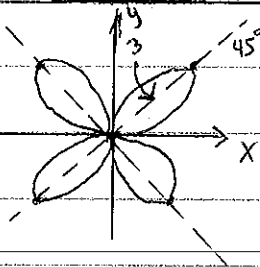
(MWF)

MAC 1114 EXAM II KEY (F'11)

① a)



b)



④

$$x = \frac{-2 \pm \sqrt{2^2 - 4(1)(2)}}{2(1)}$$

$$= -1 \pm i$$

⑤ a) $2 \text{ cis } 300^\circ$

$$b) r^2 = (2.13)^2 + (4.57)^2$$

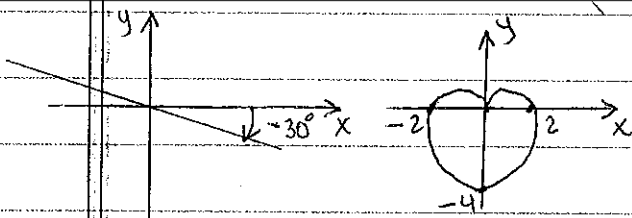
$$r = 5.04$$

$$\tan \theta = \frac{-4.57}{-2.13}$$

$$\theta \approx 65^\circ + 180^\circ = 245^\circ \text{ in QIII}$$

We get $5.04 \text{ cis } 245^\circ$

c)



$$\textcircled{2} a) (1 - (-2))i + (4 - 5)j$$

$$= 3i - j$$

$$b) 2(3i - 4j) - 3(2i - j)$$

$$= 6i - 8j - 6i + 3j = -5j$$

$$c) \sqrt{5^2 + 3^2} = \sqrt{34}$$

$$d) \vec{v} = 2(\cos 240^\circ i + \sin 240^\circ j)$$

$$= 2\left(-\frac{1}{2}i - \frac{\sqrt{3}}{2}j\right)$$

$$= -i - \sqrt{3}j$$

$$\textcircled{3} a) 9 - 6i + i^2 + 4 + 8i =$$

$$9 - 6i - 1 + 4 + 8i =$$

$$12 + 2i$$

$$b) \frac{1-5i}{2+i} \cdot \frac{2-i}{2-i} = \frac{2-10i-i+5i^2}{4+1}$$

$$= \frac{-3-11i}{5}$$

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$$c) i + 2(-1) + 3(-i) + 4 = 2 - 2i$$