Activity 5
Signals and Systems

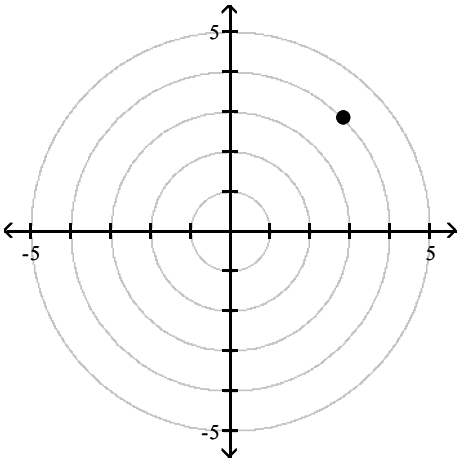
Name_____
Dr. Juan Manuel Campos

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

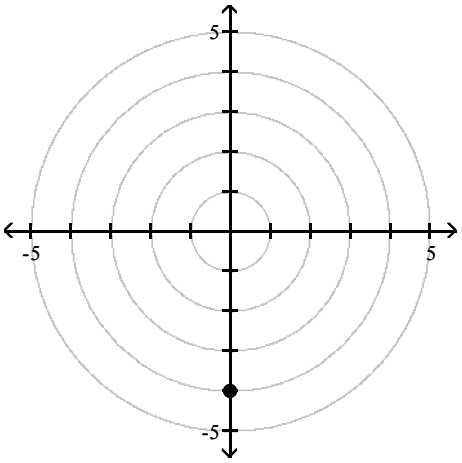
Plot the point given in polar coordinates.

1) $\left(4, \frac{5\pi}{4}\right)$ 1) _____

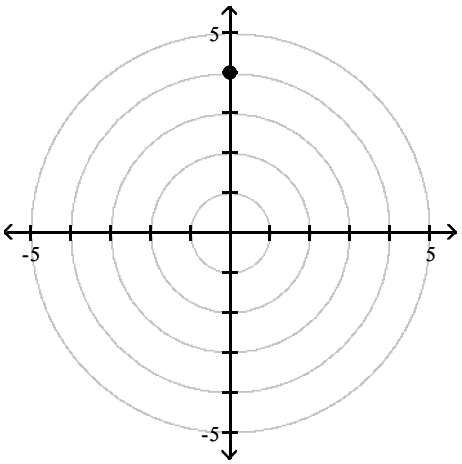
A)



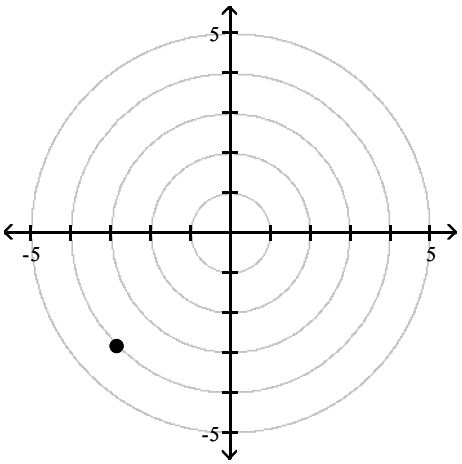
B)



C)



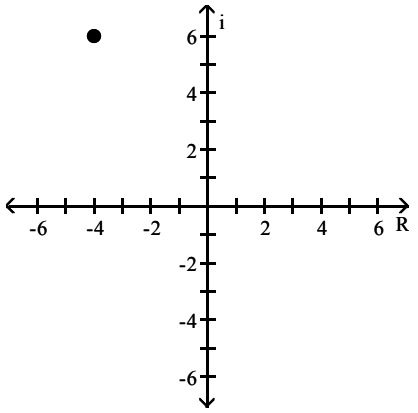
D)



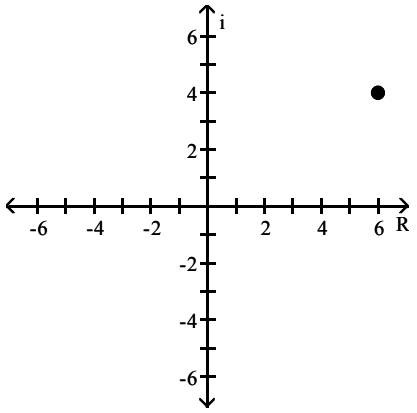
Plot the complex number in the complex plane.

2) $6 + 4i$ 2) _____

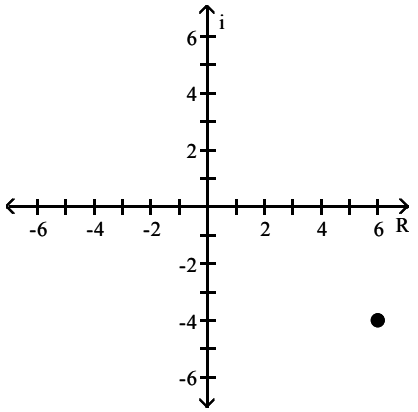
A)



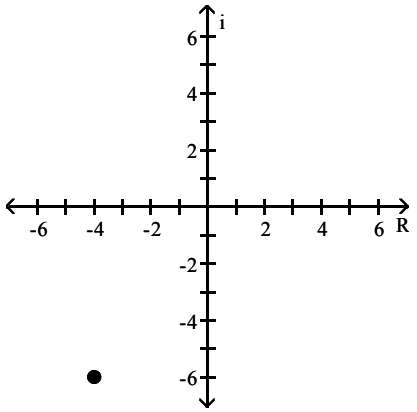
B)



C)



D)



The rectangular coordinates of a point are given. Find polar coordinates for the point.

3) $(0, 7)$ 3) _____

A) $\left(7, \frac{\pi}{2}\right)$ B) $(7, 0)$ C) $(7, \pi)$ D) $\left(7, -\frac{\pi}{2}\right)$

4) $(\sqrt{3}, 1)$ 4) _____

A) $\left(2, -\frac{\pi}{6}\right)$ B) $\left(2, -\frac{5\pi}{6}\right)$ C) $\left(2, \frac{\pi}{6}\right)$ D) $\left(2, \frac{5\pi}{6}\right)$

5) $(0.6, -1.1)$ Round the polar coordinates to two decimal places, with θ in degrees. 5) _____

A) $(1.25, -57.93°)$ B) $(1.25, -61.39°)$ C) $(1.25, 57.93°)$ D) $(1.25, 61.39°)$

The polar coordinates of a point are given. Find the rectangular coordinates of the point.

6) $\left(7, \frac{2\pi}{3}\right)$ 6) _____

A) $\left(\frac{7}{2}, \frac{-7\sqrt{3}}{2}\right)$ B) $\left(-\frac{7}{2}, \frac{7\sqrt{3}}{2}\right)$ C) $\left(\frac{7}{2}, \frac{7\sqrt{3}}{2}\right)$ D) $\left(-\frac{7}{2}, \frac{-7\sqrt{3}}{2}\right)$

7) $\left(5, \frac{3\pi}{4}\right)$ 7) _____

A) $\left(\frac{5\sqrt{2}}{2}, \frac{5\sqrt{2}}{2}\right)$ B) $\left(\frac{5\sqrt{2}}{2}, \frac{-5\sqrt{2}}{2}\right)$ C) $\left(\frac{-5\sqrt{2}}{2}, \frac{-5\sqrt{2}}{2}\right)$ D) $\left(\frac{-5\sqrt{2}}{2}, \frac{5\sqrt{2}}{2}\right)$

Write the complex number in rectangular form.

8) $8\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)$ 8) _____

A) $4\sqrt{3} + 4i$ B) $\frac{\sqrt{3}}{4} + \frac{1}{4}i$ C) $4 + 4\sqrt{3}i$ D) $\frac{1}{4} + \frac{\sqrt{3}}{4}i$

9) $9(\cos 180° + i \sin 180°)$ 9) _____

A) 9 B) $-9i$ C) $9i$ D) -9

Write the complex number in polar form. Express the argument in degrees, rounded to the nearest tenth, if necessary.

10) $\sqrt{3} - i$ 10) _____

A) $2(\cos 330° + i \sin 330°)$ B) $4(\cos 330° + i \sin 330°)$

C) $2(\cos 300° + i \sin 300°)$ D) $4(\cos 300° + i \sin 300°)$

11) $-12 + 16i$ 11) _____

A) $20(\cos 233.1° + i \sin 233.1°)$ B) $20(\cos 306.9° + i \sin 306.9°)$

C) $20(\cos 53.1° + i \sin 53.1°)$ D) $20(\cos 126.9° + i \sin 126.9°)$

12) $5i$ 12) _____

A) $5(\cos 270° + i \sin 270°)$ B) $5(\cos 0° + i \sin 0°)$

C) $5(\cos 90° + i \sin 90°)$ D) $5(\cos 180° + i \sin 180°)$

Solve the problem. Leave your answer in polar form.

13) $z = 6\left(\cos\frac{3\pi}{2} + i\sin\frac{3\pi}{2}\right)$ 13) _____

$w = 12\left(\cos\frac{5\pi}{6} + i\sin\frac{5\pi}{6}\right)$

Find zw.

A) $72\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right)$ B) $72\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)$

C) $36\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right)$ D) $36\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)$

14) $z = 2 + 2i$ 14) _____

$w = \sqrt{3} - i$

Find zw.

A) $4\sqrt{2}\left(\cos\frac{23\pi}{12} + i\sin\frac{23\pi}{12}\right)$ B) $4\sqrt{2}\left(\cos\frac{\pi}{12} + i\sin\frac{\pi}{12}\right)$

C) $4\left(\cos\frac{\pi}{12} + i\sin\frac{\pi}{12}\right)$ D) $4\left(\cos\frac{23\pi}{12} + i\sin\frac{23\pi}{12}\right)$

Find zw or $\frac{z}{w}$ as specified. Leave your answer in polar form.

15) $z = 10(\cos 45° + i \sin 45°)$ 15) _____
$w = 5(\cos 15° + i \sin 15°)$

Find $\frac{z}{w}$.

A) $\frac{1}{2}(\cos 45° + i \sin 45°)$ B) $2(\cos 30° + i \sin 30°)$

C) $2(\cos 45° + i \sin 45°)$ D) $\frac{1}{2}(\cos 30° + i \sin 30°)$

16) $z = \sqrt{3}\left(\cos \frac{7\pi}{4} + i \sin \frac{7\pi}{4}\right)$ 16) _____
$w = \sqrt{6}\left(\cos \frac{9\pi}{4} + i \sin \frac{9\pi}{4}\right)$

Find $\frac{z}{w}$.

A) $3\sqrt{2}\left(\cos \frac{3\pi}{2} + i \sin \frac{3\pi}{2}\right)$ B) $\frac{\sqrt{2}}{2}\left(\cos \frac{\pi}{2} + i \sin \frac{\pi}{2}\right)$

C) $3\sqrt{2}\left(\cos \frac{\pi}{2} + i \sin \frac{\pi}{2}\right)$ D) $\frac{\sqrt{2}}{2}\left(\cos \frac{3\pi}{2} + i \sin \frac{3\pi}{2}\right)$

Write the expression in the standard form a + bi.

17) $\left[\sqrt{2}\left(\cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4}\right)\right]^4$ 17) _____

A) 4 B) 4i C) −4 D) −4i

18) $(1 + i)^{20}$ 18) _____

A) −1024i B) −1024 C) 1024 D) 1024i

19) $[2(\cos 15° + i \sin 15°)]^3$ 19) _____

A) $4\sqrt{2} + 4\sqrt{2}i$ B) 4 + 4i C) 3 + 3i D) $3\sqrt{2} + 3\sqrt{2}i$

Find all the complex roots. Leave your answers in polar form with the argument in degrees.

20) The complex fourth roots of −16 20) _____

A) $\sqrt[4]{2}(\cos 45° + i \sin 45°)$, $\sqrt[4]{2}(\cos 135° + i \sin 135°)$, $\sqrt[4]{2}(\cos 225° + i \sin 225°)$, $\sqrt[4]{2}(\cos 315° + i \sin 315°)$

B) $2(\cos 45° + i \sin 45°)$, $2(\cos 135° + i \sin 135°)$, $2(\cos 225° + i \sin 225°)$, $16(\cos 315° + i \sin 315°)$

C) $16(\cos 45° + i \sin 45°)$, $16(\cos 135° + i \sin 135°)$, $16(\cos 225° + i \sin 225°)$, $16(\cos 315° + i \sin 315°)$

D) $2(\cos 90° + i \sin 90°)$, $2(\cos 180° + i \sin 180°)$, $2(\cos 270° + i \sin 270°)$, $2(\cos 360° + i \sin 360°)$

Answer Key
Testname: COMPLEJOS

1) D
2) B
3) A
4) C
5) B
6) B
7) D
8) A
9) D
10) A
11) D
12) C
13) A
14) B
15) B
16) D
17) C
18) B
19) A
20) B