Name _____ Score _____ Teacher _____ Date _____

Complex Numbers in Polar Form

Use exact modulus and standard angles. For roots, list every distinct root around one complete turn.

1. Divide 12[cos(0) + i sin(0)] and 4[cos(0) + i sin(0)].

Assumptions: Arguments are coterminal modulo one full turn. Trigonometric-form arguments use the selected angle unit. Divisors are nonzero, powers are at most 6, and every requested root is listed.

2. Convert sqrt(2)e^(i pi/4) to a+bi form.

Assumptions: Arguments are coterminal modulo one full turn. The exponent uses the radian argument; when degrees are selected, the equivalent degree argument is shown in brackets. Divisors are nonzero, powers are at most 6, and every requested root is listed.

Name _____ Score _____ Teacher _____ Date _____

Complex Numbers in Polar Form

Use exact modulus and standard angles. For roots, list every distinct root around one complete turn.

3. Convert z = 0 + 6i to trigonometric polar form.

Assumptions: Arguments are coterminal modulo one full turn. Trigonometric-form arguments use the selected angle unit. Divisors are nonzero, powers are at most 6, and every requested root is listed.

4. Use De Moivre's theorem to find [9e^(i 5pi/3)]^4.

Assumptions: Arguments are coterminal modulo one full turn. The exponent uses the radian argument; when degrees are selected, the equivalent degree argument is shown in brackets. Divisors are nonzero, powers are at most 6, and every requested root is listed.

Name _____ Score _____ Teacher _____ Date _____

Complex Numbers in Polar Form

Use exact modulus and standard angles. For roots, list every distinct root around one complete turn.

5. Find all 4th roots of 4096[cos(5pi/6) + i sin(5pi/6)].

Assumptions: Arguments are coterminal modulo one full turn. Trigonometric-form arguments use the selected angle unit. Divisors are nonzero, powers are at most 6, and every requested root is listed.

6. Multiply 7e^(i pi) and 5e^(i pi).

Assumptions: Arguments are coterminal modulo one full turn. The exponent uses the radian argument; when degrees are selected, the equivalent degree argument is shown in brackets. Divisors are nonzero, powers are at most 6, and every requested root is listed.

Name _____ Score _____ Teacher _____ Date _____

Complex Numbers in Polar Form

Use exact modulus and standard angles. For roots, list every distinct root around one complete turn.

7. Use De Moivre's theorem to find [11[cos(3pi/2) + i sin(3pi/2)]]^6.

Assumptions: Arguments are coterminal modulo one full turn. Trigonometric-form arguments use the selected angle unit. Divisors are nonzero, powers are at most 6, and every requested root is listed.

8. Divide 10e^(i 3pi/2) and 4e^(i 3pi/2).

Assumptions: Arguments are coterminal modulo one full turn. The exponent uses the radian argument; when degrees are selected, the equivalent degree argument is shown in brackets. Divisors are nonzero, powers are at most 6, and every requested root is listed.

Name _____ Score _____ Teacher _____ Date _____

Complex Numbers in Polar Form

Worked Answer Key

Use exact modulus and standard angles. For roots, list every distinct root around one complete turn.

1. Divide 12[cos(0) + i sin(0)] and 4[cos(0) + i sin(0)].

Answer: 3[cos(0) + i sin(0)]

1. Divide moduli and subtract arguments.
2. Result: radius 3, angle 0.

2. Convert sqrt(2)e^(i pi/4) to a+bi form.

Answer: 1 + 1i

1. Use a=r cos(theta) and b=r sin(theta).
2. The standard angle gives a=1 and b=1.

Name _____ Score _____ Teacher _____ Date _____

Complex Numbers in Polar Form

Worked Answer Key

Use exact modulus and standard angles. For roots, list every distinct root around one complete turn.

3. Convert z = 0 + 6i to trigonometric polar form.

Answer: 6[cos(pi/2) + i sin(pi/2)]

1. r = sqrt(0^2 + 6^2) = 6.
2. The quadrant gives theta = pi/2.

4. Use De Moivre's theorem to find [9e^(i 5pi/3)]^4.

Answer: 6561e^(i 20pi/3)

1. Raise the modulus: 9^4=6561.
2. Multiply the argument by 4: 20pi/3.

Name _____ Score _____ Teacher _____ Date _____

Complex Numbers in Polar Form

Worked Answer Key

Use exact modulus and standard angles. For roots, list every distinct root around one complete turn.

5. Find all 4th roots of 4096[cos(5pi/6) + i sin(5pi/6)].

Answer: 8[cos(5pi/24) + i sin(5pi/24)]; 8[cos(17pi/24) + i sin(17pi/24)]; 8[cos(29pi/24) + i sin(29pi/24)]; 8[cos(41pi/24) + i sin(41pi/24)]

1. Root modulus = 4th-root(4096) = 8.
2. Arguments are (theta+k full turns)/4 for k=0,...,3.
3. List all 4 distinct roots before angles repeat.

6. Multiply 7e^(i pi) and 5e^(i pi).

Answer: 35e^(i 2pi)

1. Multiply moduli and add arguments.
2. Result: radius 35, angle 2pi.

Name _____ Score _____ Teacher _____ Date _____

Complex Numbers in Polar Form

Worked Answer Key

Use exact modulus and standard angles. For roots, list every distinct root around one complete turn.

7. Use De Moivre's theorem to find [11[cos(3pi/2) + i sin(3pi/2)]]^6.

Answer: 1771561[cos(9pi) + i sin(9pi)]

1. Raise the modulus: 11^6=1771561.
2. Multiply the argument by 6: 9pi.

8. Divide 10e^(i 3pi/2) and 4e^(i 3pi/2).

Answer: 5/2e^(i 0)

1. Divide moduli and subtract arguments.
2. Result: radius 5/2, angle 0.