Trigonometry & Complex Numbers

Questions

Working with Radians

Trigonometric Exact Values

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Quadratic Equations

Working with Radians

Q1) What is the radian equivalent of the following angles given in degrees?

Write your answer as a multiple of π.

a) 180°
b) 360°
c) 90°
d) 30°
e) 45°
f) 60°

Q2) What is the radian equivalent of the following angles given in degrees?

a) 10°
b) 40°
c) 305°
d) 24°

Q3) What is the degree equivalent of the following angles given in radians?

a) $\frac{3\pi}{2}$
b) $\frac{3\pi}{4}$
c) 2π
d) 2.5 rad
e) 1.5 rad
f) 3.5 rad

Trigonometric Exact Values

Q1) Work out the exact values of the following.

a) $Sin\ 30°$
b) $Sin\ 45°$
c) $Sin\ 60°$
d) $Cos\ 30°$
e) $Cos\ 45°$
f) $Cos\ 60°$
g) $Tan\ 30°$
h) $Tan\ 45°$
i) $Tan\ 60°$

Q2) Work out the exact values of the following.

a) $Sin\ 225°$

b) $Cos\ 225°$

c) $Cos\ 135°$

d) $Sin\ 135°$

Q3) Work out the exact values of the following.

a) $Sin\ \frac{\pi}{2}$

b) $Cos\ \frac{\pi}{4}$

c) $Sin\ 2\pi$

d) $Tan\ \frac{\pi}{3}$

e) $Sin\ \frac{\pi}{3}$

f) $Cos\ \frac{\pi}{3}$

Q4) Work out the exact values of the following.

a) $Sin\ \frac{5\pi}{3}$

b) $Sin\ \frac{3\pi}{2}$

c) $Cos\ \frac{2\pi}{3}$

d) $Sin\ \frac{11\pi}{6}$

e) $Cos\ \frac{3\pi}{4}$

f) $Tan\ \frac{5\pi}{6}$

Operations with Complex Numbers

Q1) Evaluate the following.

a) $(5 + 2i) + (8 + 9i)$

b) $(-2 - 7i) + (1 + 3i)$

c) $5(4 + 3i) - 4(-1 + 2i)$

d) $(6 + 3i)(7 + 2i)$

e) $(2 + 3i)^3$

f) $(4 + 5i)(4 - 5i)$

Q2) Given that $z = 7 - 6i$ and $w = 7 + 6i$, evaluate the following.

a) $z - w$

b) $w + z$

Q3) Given that $z = 6 - 5i$ and z^* is the complex conjugate of z, find

a) $z + z^*$

b) zz^*

Q4) Represent the following complex numbers on an Argand diagram.

a) $z = 3 + 4i$

b) $z = 4 - 5i$

c) $z = -2 + 5i$

d) $z = -3 - 7i$

Q5) Represent the following complex number operations on an Argand diagram.

a) $z_1 = 2 + 5i$ and $z_2 = 1 - 3i$. $z_1 + z_2$

b) $z_1 = -3 + 4i$ and $z_2 = 1 + 2i$. $z_1 - z_2$

Quadratic Equations

Q1) Solve each of the following quadratic equations.

a) $z^2 + 121 = 0$

b) $2z^2 + 120 = 0$

c) $(z - 3)^2 - 9 = -16$

d) $z^2 - 8z + 21 = 0$

Q2) $2 + 3i$ is one of the roots of quadratic equation $z^2 + pz + q = 0$ with real coefficients.

a) Write down the other root of the equation.

b) Find the quadratic equation, giving your answer in the form where p and q are real constants.