Review Exercises Test 3
MATH 171

TRIGONOMETRY

① Find θ WHEN $\sin\theta = -0.5736$ & $\cos\theta > 0$

② Find θ WHEN $\tan\theta = -0.809$ & $\sin\theta > 0$

③ Find θ WHEN $\sec\theta = 1.122$ & $\sin\theta < 0$

④ Express the given angle in radian measure in terms of π

   $12°, 225°, 15°, 24°, 300°, 540°$

⑤ Express the angle in terms of degrees

   $\dfrac{3\pi}{10}, \dfrac{\pi}{18}, \dfrac{7\pi}{4}, \dfrac{3\pi}{20}, \dfrac{3\pi}{2}, \dfrac{4\pi}{3}$

⑥ Solve for θ

   ⓐ $4\tan^2\theta - 1 = 0$

   ⓑ $\cos\theta - \dfrac{1}{9}\sec\theta = 0$

   ⓒ $3\sin^2\theta + 2\sin\theta = 0$

   ⓓ $\tan^4\theta - 6\tan^2\theta - 7 = 0$

   ⓔ $\cos^2\theta - 2\cos\theta + 1 = 0$

   ⓕ $20\sin\theta + 3 = 2\csc\theta$

⑦ Find the EXACT VALUES of the following (using special triangles)

   $\sin 60°, \tan 45°, \cot 60°, \sin 90°, \cos(180°), \sec 30°$

⑧ You are standing 5km from the base of a rocket launch pad, filming the take off of the rocket

   • what is the angle of elevation of the camera if it is pointed at the rocket that has risen to a height of 3.31km?

COMPLEX NUMBERS

Perform the indicated operations (your final answer should consist of a single complex number.

① $(3j-2)(j+4)$

② $(1+2j)(3-j)$

③ $j(3-2j)$

④ $\dfrac{2}{j} - \dfrac{5}{2+j}j$

⑤ $\dfrac{3+j}{-1-j}$

⑥ $\dfrac{(2+j)(-1-j)}{4j(3+2j)}$

⑦ $\dfrac{j^2-j}{2j-j^8}$

⑧ $j^2\sqrt{-7} - \sqrt{-28} + 8$

⑨ $(2-j)^3$

⑩ $j + j^2 + j^3 + \cdots + j^{99} + j^{100}$

⑪ Solve for z (z is a complex number)

ⓐ $(2+j)z + 3 - j = 0$

ⓑ $(4+3j)(2-j)z - (7+2j)z = 4-2j$

ⓒ $4z^2 - 2z + 15 = 0$ (use quadratic formula)

ⓓ $z^2 - z + 3 = 0$ (use quadratic formula)

⑫ Express the following in polar coordinates

ⓐ $-8 - 15j$

ⓑ $3 - 4j$

ⓒ $7 + 5j$

ⓓ $-0.55j + 0.24j$

ⓔ $-2j$

⑬   Give the rectangular form

     ⓐ $3(\cos 60° + j\sin 60°)$

     ⓑ $5(\cos 135° + j\sin 135°)$

     ⓒ $6(\cos 180° + j\sin 180°)$

     ⓓ $15(\cos 0° + j\sin 0°)$

⑭   Express the given numbers in exponential form

     ⓐ $5(\cos 54° + j\sin 54°)$

     ⓑ $5.9 + 2.4j$

     ⓒ $47.3 - 10.9j$

     ⓓ $-3 + j$

⑮   Express the complex numbers in rectangular form

     ⓐ $3e^{21j}$

     ⓑ $2e^{56j}$

     ⓒ $3.2\,e^{222j}$

     ⓓ $5e^{-59j}$

⑯   Solve for z (using quadratic formula for ⓒ)

     ⓐ $z = 3 + \sqrt{4 - j}$

     ⓑ $z = (2 + j)^{1/3}$

     ⓒ $z^2 + (2 - 2j)z + (7 + 22j) = 0$

ANSWERS

TRIGONOMETRY

① $\theta = 325°$ ② $\theta = 141°$ ③ $\theta = 333°$

④ $\frac{\pi}{15}$, $\frac{5\pi}{4}$, $\frac{\pi}{12}$, $\frac{2\pi}{15}$, $\frac{5\pi}{3}$, 3π

⑤ $54°, 10°, 315°, 27°, 270°, 240°$

⑥
   ⓐ $26.6°, 153.4°, 206.6°, 333.4°$

   ⓑ $70.5°, 109.5°, 250.5°, 284.5°$

   ⓒ $0°, 180°, 221.8°, 318.2°$

   ⓓ $69.3°, 110.7°, 249.3°, 290.7°, 45°, 135°, 225°, 315°$

   ⓔ $0°$

   ⓕ $14.5°, 165.5°, 203.6°, 336.4°$

⑦ $\sqrt{3}/2$, 1 , $1/\sqrt{3}$, 1 , -1 , $2/\sqrt{3}$

⑧ $33.5°$

COMPLEX NUMBERS

① $-11 + 10j$ ② $5 + 5j$ ③ $2 + 3j$ ④ $-2 - j$ ⑤ $1 + j$

⑥ $-\frac{7}{52} + \frac{9}{52}j$ ⑦ $-\frac{1}{5} + \frac{3}{5}j$ ⑧ $8 - 3\sqrt{7}j$ ⑨ $14 - 13j$

⑩ 0 ⑪ ⓐ $-1 + j$ ⓑ $1 + \frac{1}{2}j$ ⓒ $\frac{1}{4} \pm \frac{\sqrt{59}}{4}j$ ⓓ $\frac{1 \pm j\sqrt{11}}{2}$

⑫ ⓐ $17(\cos 241.9° + j\sin 241.9°)$ ⓑ $5(\cos 306.9° + j\sin 306.9°)$

   ⓒ $8.6(\cos 355° + j\sin 355)$ ⓓ $0.6(\cos 156.4° + j\sin 156.4°)$

   ⓔ $2(\cos 270° + j\sin 270°)$

⑬ ⓐ $1.5 + \frac{3\sqrt{3}}{2}j$ ⓑ $-\frac{5}{\sqrt{2}} + \frac{5}{\sqrt{2}}j$ ⓒ -6 ⓓ 15

⑭ ⓐ $5e^{54j}$ ⓑ $6.4e^{22.1j}$ ⓒ $48.5e^{347j}$ ⓓ $3.16e^{161.6j}$

⑮ ⓐ $2.8 + 1.1j$ ⓑ $1.1 + 1.7j$ ⓒ $-2.4 - 2.1j$ ⓓ $2.6 - 4.3j$

⑯ ⓐ $1.01 + 0.24j$ ⓑ $1.29 + 0.2j$ ⓒ $-4 + 5j$ & $2 - 3j$