**MAT 320** **Quiz 1** **Fall 2025**

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Answers:

1. b
2. d
3. d
4. b
5. d
6. b
7. e
8. a
9. a
10. b

Submit electronic answers at

http://azrael.digipen.edu/cgi-bin/MAT320quiz.pl

1. $P(x) = x^3+1$

$$\frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$(x+1)(x^2-x+1)$$

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

$$\frac{1 \pm \sqrt{1-4}}{2} \qquad \frac{1+\sqrt{-3}}{2} \qquad \frac{1-\sqrt{3}\,i}{2}$$

$$\frac{1}{2}+\frac{\sqrt{3}\,i}{2}, \quad \frac{1}{2}-\frac{\sqrt{3}\,i}{2}$$

3. $q(x) = (x-(a+bi))(x-(a-bi))$

$$x^2 \underbrace{-2a}_{c_1} x + \underbrace{a^2+b^2}_{c_0}$$

4. 

5. $f(t) = e^{i4\pi t}$ || $f(t) = e^{i\omega t}$

$\omega = 4\pi$ freq $= \frac{\omega}{2\pi}$ $\therefore$ $\frac{4\pi}{2\pi} = 2\pi(2)$

6. Period (floor) $\frac{2\pi}{\omega}$

$$\frac{2\pi}{4\pi} = \frac{1}{2}$$

7. $f(z)$ $f: \mathbb{C} \to \mathbb{C}$ $f$ rotates $z$ by $\frac{2}{3}\pi$

$c = a+bi$ e

$r = \sqrt{a^2+b^2}$ $\theta = \tan^{-1} b/a$ $a = r\cos(\frac{2}{3}\pi)$ $a = r\cdot(-\frac{1}{2})$

$b = r\sin(\frac{2}{3}\pi)$ $b = r\cdot(\frac{\sqrt{3}}{2})$

$c = r(-\frac{1}{2}) + i(r\cdot\frac{\sqrt{3}}{2})$

8 $f(e^{i\pi/3})$

$\cos(\pi/3) + i\sin(\pi/3)$

$(1/2) + i(\sqrt{3}/2)$

9 $g(z) = \frac{1}{|z|}$ $\quad g: \mathbb{C} \to \mathbb{R}$

$g(1+i)$

$\frac{1}{|1+i|} \cdot \frac{1-i}{1-i} = \frac{1-i}{|(1^2+i^2)|} \quad \frac{1-i}{|1+1|}$

10 $z = x + (x-1)i$

$= (1+i)(x-i)$