City University of Hong Kong
Department of Mathematics

MATHEMATICS PLACEMENT TEST FOR MA1200

Sample Questions & Solutions

1. The general solution of the equation $\tan x = 1$ is

A. $x = n\pi + \frac{\pi}{4}, \quad n \in \mathbf{Z}$.

B. $x = n\pi \pm \frac{\pi}{4}, \quad n \in \mathbf{Z}$.

C. $x = n\pi + (-1)^n \frac{\pi}{4}, \quad n \in \mathbf{Z}$.

D. $x = 2n\pi + \frac{\pi}{4}, \quad n \in \mathbf{Z}$.

2. The graph of $(y-2)^2 = 4 - x^2$ is

A. a parabola.

B. a circle.

C. a point.

D. a pair of straight lines.

3. What is the remainder when $1 - x + x^2 - \ldots + x^8$ is divided by $x + 1$?

A. -1.

B. 1.

C. 8.

D. 9.

4. Which of the following is an even function of x?

A. $f(x) = \sin 2x$.

B. $f(x) = |x| \cos 3x$.

C. $f(x) = |x| \tan x$.

D. $f(x) = x^4 - 2x^2 + 1$.

5. $\dfrac{\mathrm{d}^{13}}{\mathrm{d}x^{13}}(\sin x) =$

A. $\sin x$.

B. $-\sin x$.

C. $\cos x$.

D. $-\cos x$.

6. Evaluate $\lim\limits_{x \to 1} \dfrac{\log_e x}{x^2 - 1}$.

A. 0.

B. $\dfrac{1}{2}$.

C. 1.

D. -1.

7. Differentiate $\tan^{-1}\left(\frac{1+x^2}{1-x^2}\right)$ with respect to x.

A. $\tan x$.

B. $\frac{1}{1+x^2}$.

C. $\frac{x^2}{1+x^4}$.

D. $\frac{2x}{1+x^4}$.

8. Which of the following is true regarding the function $f(x)=2x^3+3x^2-12x+6$?

A. It has no local maximum point.

B. $x=0$ is a point of inflexion.

C. It has a local maximum point at $x=2$.

D. It has a local minimum point at $x=1$.

Solutions

1. A. $x=n\pi+\frac{\pi}{4},\ n\in\mathbf{Z}$.
2. B. a circle.
3. D. 9.
4. B. $f(x)=|x|\cos 3x$.
5. C. $\cos x$.
6. B. $\frac{1}{2}$.
7. D. $\frac{2x}{1+x^4}$.
8. D. It has a local minimum point at $x=1$.