

MATH 1151 PRACTICE EXAM, SPRING 2001

(1)

Let P be a point on the edge of a 33rpm record of radius 5 inches.

a) What is the linear speed of P?

b) How many inches the point P travels in 45 seconds?

(2)

Find the exact value of the following trigonometric expression

$$\sin \pi/4 + \tan(-\pi/3).$$

(3)

Let α be an acute angle such that $\cos \alpha = 1/3$. Find the exact value of $\tan(3\pi/2 - \alpha)$.

(4)

Let α be an angle such that $\cos \alpha = 1/5$ and $\sin \alpha < 0$. Find the exact value of $\csc \alpha$.

(5)

Find period and phase-shift of the function $f(t) = 2 \sin(3t - \pi/2)$.

(6)

Establish the identity

$$\frac{\sec \theta - \cos \theta}{\sec \theta + \cos \theta} = \frac{\sin^2 \theta}{1 + \cos^2 \theta}$$

(7)

Establish the identity

$$-\frac{1}{2} \cot 2\theta = \tan \theta - \cot \theta$$

(8)

Let α be an angle such that $\pi/2 < \alpha < \pi$ and $\sin \alpha = 2/3$. Find the exact value of $\sin(\alpha - \pi/4)$.

(9)

What are the domain and the range of \sin^{-1} ?

(10)

Find the exact value of $\tan^{-1}(1)$.

(11)

Find all real numbers θ solving the trigonometric equation $\cos 2\theta = 1$.

(12)

Solve the following trigonometric equation in the interval $0 \leq \theta < 2\pi$

$$\cos^2 + 2 \cos \theta - 3 = 0$$

(13)

A triangle has one side of length 4 and the two angles adjacent to this side measure 50° and 70° respectively. Solve the triangle and find its area.

(14)

Find one of the polar coordinates of the point P whose rectangular coordinates are $(x, y) = (1, \sqrt{3})$.

(15)

Write the polar equation

$$r = \frac{3}{r - 2 \sin \theta}$$

in rectangular coordinates.

(16)

Write in standard form the complex number $\frac{2+i}{3i}$

(17)

Let z be a complex number written in polar form as $z = 3(\cos 20^\circ + i \sin 20^\circ)$.
Write in standard form the number z^9 .

(18)

Find all the three roots of the cubic equation

$$x^3 + x^2 + 3x - 5 = 0$$

(19)

Find the complex roots of

$$z^3 = 1$$

and describe their position in the complex plane.

(20)

Establish if the following system of linear equations is consistent or not. If it is consistent find all its solutions.

$$\begin{cases} x + y - 3z = 1 \\ 2x - 4y + z = 5 \\ x - z = 4 \end{cases}$$