King Fahd University of Petroleum and Minerals
Prep-Year Math Program
Math (002)-Term (172)
Recitation (2.8)

Question 1: Which one of following functions has an inverse?

(a) $f(x) = x^2 + 5$

(b) $f(x) = |x + 1| - 2, \quad x \geq -2$

(c) $f(x) = \sqrt{1 - x^2}$

(d) $f(x) = (x + 3)^2 - 5\,, x \geq -3$

Question 2: For the following functions, find $f^{-1}(x)$ and state its domain and range

(a) $f(x) = -\sqrt{4 - x^2}$ for $-2 \leq x \leq 0$

(b) $f(x) = 2 + \sqrt{3 + x}$ for $x \geq -3$

(c) $f(x) = \frac{2x+3}{x-1}$

Question 3: If $f(x) = -x^2 + 4x,\ x \leq 2,\ then\ \ f^{-1}(x)$ is

(a) $y = 2 \pm \sqrt{4 - x}\,, x \leq 4$

(b) $y = 2 - \sqrt{x - 4}\,, x \geq 4$

(c) $y = 2 - \sqrt{4 - x}\,, x \leq 4$

(d) $y = 2 + \sqrt{4 - x}\,, x \leq 4$

(e) $y = 2 + \sqrt{x - 4}\,, x \geq 4$

Question 4: Let $f(x) = \frac{3x-k}{x-2}$ and $f^{-1}(x)$ exists. If $f^{-1}(-2) = 1$, then the value of $k =$

(a) -1 b) 1 c) -2 d) 2

King Fahd University of Petroleum and Minerals
Prep-Year Math Program
Math (002)-Term (172)
Recitation (4.1&4.2)

Question 1: If the function $y = 4^{x+2} - 5$ is written as $y = k\left(\frac{1}{2}\right)^{bx} + c$, then $k + b + c =$

(a) 11 (b) 7 (c) 9 (d) 13 (e) 12

Question 2: Find the intersection points of the graphs of $y = \left(\frac{1}{3}\right)^{2x+5}$ *and* $y = 27$

Question 3: Graph the function. State the domain, range, and asymptote:

a) $y = 3 - 10^{-x}$
b) $f(x) = e^{-|x|} - 1$

Question 4: The adjacent figure represents the graph of:

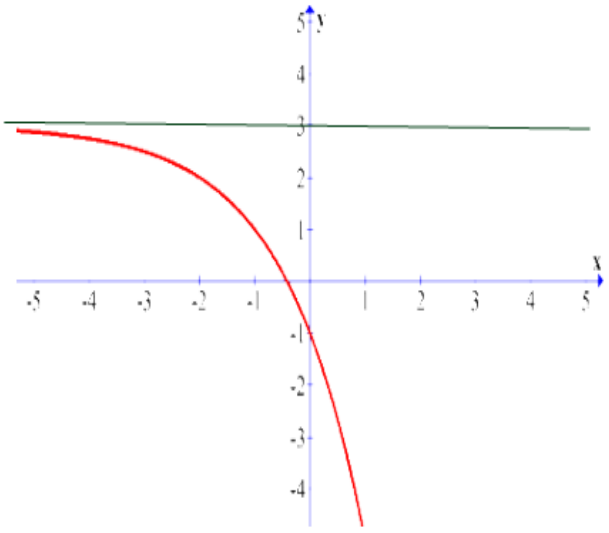
(a) $y = -\left(\frac{1}{2}\right)^{x+2} + 3$

(b) $y = \left(\frac{1}{2}\right)^{x+2} - 3$

(c) $y = -(2)^{x+2} + 3$

(d) $y = (2)^{x} + 3$

(e) $y = (2)^{x-2} + 3$



King Fahd University of Petroleum and Minerals
Prep-Year Math Program
Math (002)-Term (172)
Recitation (4.3)

Question 1: Use the definition of the logarithmic function to find x.

a) $\log_x 25 = 2$
b) $\log_7 \frac{1}{49} = 3x$

Question 2: Find the domain of the following functions:

a) $f(x) = \ln x + \ln(2 - x)$
b) $f(x) = \log_3 \left(\frac{(x-1)^2}{\sqrt{x^2+6x+9}}\right)$

Question 3: Graph the function. State the domain, range, and asymptote:

a) $y = 1 - \log_{10} x$
b) $y = |\ln x|$

Question 4: The graph of $y = \log_3|x - 3| - 1$ is below the x-axis on the intervals

(a) $(2,\ 3) \cup (3,\ 4)$

(b) $(-\infty,\ 0) \cup (6,\ \infty)$

(c) $(-1,\ 0) \cup (0,\ 1)$

(d) $(0,\ 3) \cup (3,\ 6)$

(e) $(-\infty,\ 2) \cup (3,\ \infty)$

King Fahd University of Petroleum and Minerals
Prep-Year Math Program
Math (002)-Term (172)
Recitation (4.4)

Question 1:

1) If $\log_{10} 2 = 0.30,\ \log_{10} 3 = 0.48,\quad then\quad \log_{10}\left(\frac{9}{25}\right) =$

(a) -0.24 (b) -0.44 (c) 0.36 (d) -0.32 (e) -0.28

2) If $\log 2 = c\ ,\ then\ \log_8 \sqrt[3]{10} =$

(a) $\frac{1}{9c}$ (b) $\frac{2}{3c}$ (c) $\frac{c}{9}$ (d) $\frac{1}{c}$ (e) $\frac{3c}{2}$

Question 2: Find the value of

(a) $\log_{1/2} \sqrt[3]{32} + \log_3 \frac{1}{\sqrt{27}}$ (b) $(\frac{1}{25})^{1-2\log_5 2}$

Question 3: Use the Laws of Logarithms to expand the following expression.

$$\log\left(\sqrt{\frac{x^2+4}{(x^2+1)(x^3-7)^2}}\right)$$

Question 4: Use the Laws of Logarithms to combine the following expression.

$$\frac{1}{3}\log(x+2)^3 + \frac{1}{2}[\log x^4 - \log(x^2-x-6)^2]$$

Question 5: If $a > 0,\ a \neq 1,\ x > 0, x \neq 1$, then simplify the expression

$$(\log_{\sqrt{10}} 1000)(\log_a \sqrt{x})(\log_{x^3} a)$$

King Fahd University of Petroleum and Minerals
Prep-Year Math Program
Math (002)-Term (172)
Recitation (4.5)

Question 1: Solve the following equations:

a) $4^{x} + 2^{1+2x} = 50$
b) $e^{x} + 15\, e^{-x} - 8 = 0$
c) $x^{2}e^{x} + x\, e^{x} = e^{x}$
d) $\log_2(\log_3 x) = 4$

Question 2: The sum of all solutions to the equation $\log_2 \sqrt{x} = \sqrt{\log_2 x}$ is

(a) 10 (b) 17 (c) 21 (d) 24 (e) 12

Question 3: The number of solutions of the equation $\log(x^3) = (\log x)^2 + 2$ is equal to:

(a) 2 (b) 3 (c) 1 (d) 0 (e) 4

Question 4: Find the inverse function of f.

a) $f(x) = 3^{x+1}$
b) $f(x) = \log_2(x - 1)$

King Fahd University of Petroleum and Minerals

Prep -Year Math Program

Math 002 - Term 172

Recitation (5.1)

Question1.

Find the least positive angle that is coterminal with the given angle.

a) $-800°$
b) 1270°
c) $\frac{51\pi}{2}$
d) 10

Question2

If the arc length $\frac{4\pi}{3}\ cm$ subtends a central angle θ in a circle with diameter $12\ cm$, find the degree measure of the angle θ.

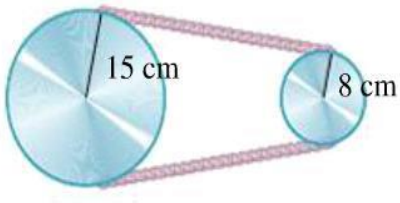
Question3

Each tire of a car has a radius of 40 cm. If the tires are rotating at 500 revolutions per minute, find the speed of the car in kilometers per hour.

Question4

Two pulleys in the figure have radii of 15cm and 8 cm respectively. If the larger pulley rotates 50 times in a minute, then the angular speed of the smaller pulley in radians per second is

A) $\frac{75\pi}{4}$ B) $\frac{25\pi}{8}$ C) $\frac{75\pi}{8}$ D) $\frac{25\pi}{4}$ E) $\frac{375\pi}{2}$



Question5

A hard disk in a computer rotates at 300 revolutions per minute. Through how many degrees does a point on the edge of the disk move in 3 seconds?

A) 7200°

B) 6400°

C) 10800°

D) 5400°

E) 1800°

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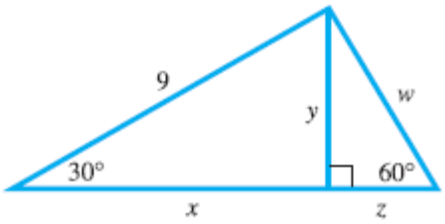
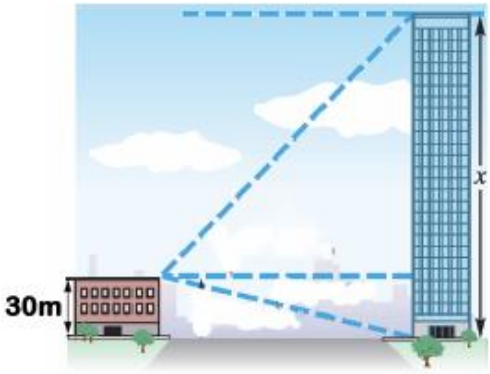
Recitation (5.2)

Question1: Find the value of $\left(\sin\frac{\pi}{3}\cos\frac{\pi}{4}-\sin\frac{\pi}{4}\cos\frac{\pi}{3}\right)^2$

Question2: Find the exact value of each labeled part with a variable in the following figure



Question3 The angle of elevation from the top of a small building to the top of a taller building is 60°, while the angle of depression to the bottom is 30°. If the shorter building is 30 m high, then the height of the taller building is



A) $\left(30+60\sqrt{3}\right)\text{m}$

B) $150\,\text{m}$

C) $100\sqrt{3}\,\text{m}$

D) $120\,\text{m}$

E) $90\sqrt{3}\,\text{m}$

Question4

If from the top of a tower 200 feet high, the angles of depression of the top and bottom of a building opposite to the tower are observed to be 30˚ and 60˚, respectively, then the height of the building is

A) $\frac{200\sqrt{3}}{3}$

B) $\frac{400}{3}$

C) $100\sqrt{3}$

D) $\frac{350}{3}$

E) $\frac{400\sqrt{3}}{3}$

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Prep-Year Math Program

Math 002 - Term 172

Recitation (5.3)

Question1: Find the reference angle for the given angle

a) 810° b) -105° c) $\frac{5\pi}{7}$ d) 20

Question2:

Suppose that the terminal side of the angle θ in the standard position is defined by $3x + 2y = 0,\ x \leq 0$, then find $\sec\theta$.

Question3:

Let θ be an acute angle satisfying $4\sin\theta = 5\cos\theta$, then find $4\tan\theta + \sec\theta$.

Question4:

If $cot^2\theta = 16$ and θ terminates in the third quadrant, then $\sec\theta =$

A) $\sqrt{17}$ B) $\frac{\sqrt{17}}{4}$ C) $-\frac{\sqrt{17}}{4}$ D) $-\frac{4}{\sqrt{17}}$ E) $-\sqrt{17}$

Question6:

Find the exact value of the following expressions:

$\cos\left(\frac{-7\pi}{6}\right) + \sin\left(\frac{17\pi}{3}\right) + 3\tan\left(\frac{5\pi}{4}\right)$

Question6: If $\cos\theta = -\frac{2}{7}$ and $tan\,\theta < 0$, find $csc\,\theta + \tan\theta$

King Fahd University of Petroleum and Minerals

Prep -Year Math Program

Math 002 - Term 172

Recitation (6.2)

Question1: Find the exact value of the following:

1. $\cos\left(\frac{-7\pi}{6}\right)$ 2- $\sin\left(\frac{-7\pi}{4}\right)$ 3- $\cot\left(\frac{-5\pi}{6}\right)$ 4- $\sec\left(\frac{11\pi}{6}\right)$

Question2: If $cos3 = a$ and $sin3 = b$, then $a - b =$

A) a positive real number.

B) a negative real number.

C) zero.

D) undefined.

Question3: Write the first expression in terms of the second

1- $\tan x$, $\sin x$ where x is in Quadrant IV
2- $\tan x$, $\sec x$ where x is in Quadrant III

Question4: Determine whether the function $f(x) = \cos(\sin x)$ is even, odd, or neither.

Question5:

If $-\frac{\pi}{4} < \theta < \frac{\pi}{4}$°, then which one of the following is **TRUE?**

a) $\sin\left(\theta + \frac{\pi}{4}\right) < 0$ and $\sec\frac{\theta}{2} > 0$ b) $\sin\left(\theta + \frac{\pi}{4}\right) > 0$ and $\sec\frac{\theta}{2} < 0$

c) $\sin\left(\theta + \frac{\pi}{4}\right) > 0$ and $\sec\frac{\theta}{2} > 0$ d) $\sin\left(\theta + \frac{\pi}{4}\right) < 0$ and $\sec\frac{\theta}{2} < 0$

e) $\tan\theta < 0$ and $\cos\theta > 0$

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Math 002 - Term 172

Recitation (6.3)

Question1: Graph the following functions:

a) $f(x) = |\sin x|$

b) $f(x) = 1 + \cos\left(3x + \frac{\pi}{2}\right)$

Question2: Find the amplitude, period, and the horizontal shift of the graph of following function

$$y = \frac{1}{2} - \frac{1}{2}\cos\left(\pi x + \frac{\pi}{2}\right)$$

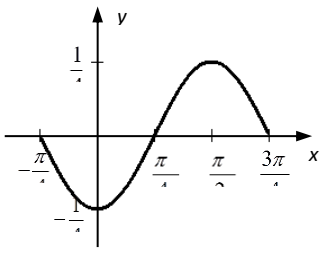
Question3:

If A is the amplitude, P is the period, M is the maximum value and m is the minimum value of the function $f(x) = -3\sin(2\pi x - 1) + 5$, then $\frac{A+P}{M+m} =$

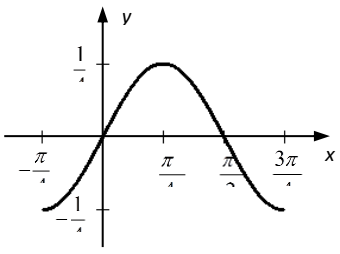
A) 3 B) $\frac{2}{5}$ C) $\frac{11}{10}$ D) $\frac{7}{10}$ E) $\frac{9}{5}$

Question4: Which one of the following is the graph of $y = \frac{1}{4}\cos 2\left(x + \frac{\pi}{4}\right)$ over one period?

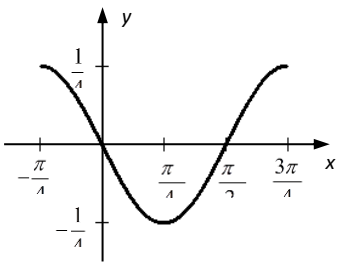
a



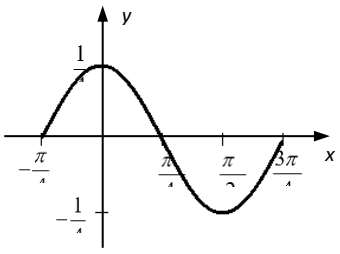
b



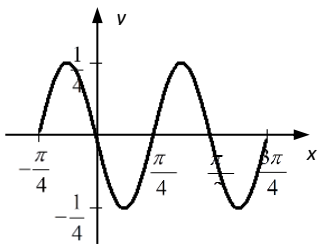
c



d



e



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Math 002 - Term 172

Recitation (6.4)

Question1:

Graph the following functions:

a) $y = 4\tan(4x - 2\pi)$

b) $y = \frac{1}{2}\sec(2\pi x - \pi)$

Question2:

Find the number of vertical asymptotes of the graph of the function $y = \frac{1}{2}cot(2x - 3\pi)$ in the interval $\left[\frac{\pi}{4}, \frac{7\pi}{4}\right]$.

Question3:

The intersection point(s) between the graph of $y = \cot(2x + \frac{\pi}{3})$ and the x-axis over the interval $\left(\frac{\pi}{12}, \frac{4\pi}{3}\right)$:

A) $\frac{7\pi}{12}$ B) $\frac{13\pi}{12}$ C) $\frac{\pi}{12}, \frac{7\pi}{12}$ D) $\frac{7\pi}{12}, \frac{13\pi}{12}$ E) $\frac{\pi}{12}, \frac{13\pi}{12}$

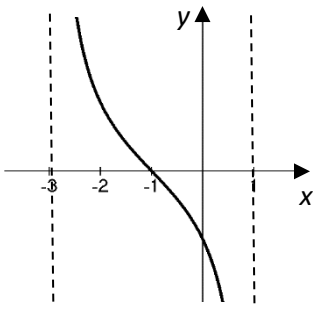
Question4:

The graph below can be represented by the trigonometric function

A) $f(x) = -2\tan\left(\frac{\pi}{4}x + \frac{\pi}{4}\right)$ B) $f(x) = 2\tan\left(\frac{\pi}{4}x + \frac{\pi}{4}\right)$

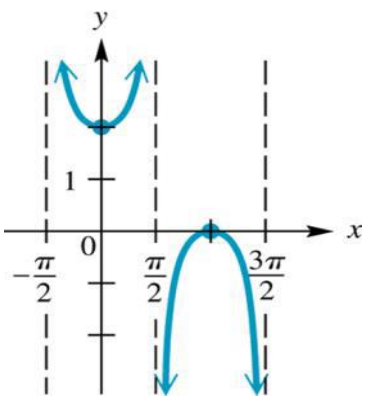
C) $f(x) = 2\cot\left(\frac{\pi}{4}x + 1\right)$ D) $f(x) = -2\tan(x + 1)$

E) $f(x) = 2\cot(x + 1)$



Question5

Write an equation of a function for the given graph



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Prep -Year Math Program

Question1

Find the exact value of each expression:

a) $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

b) $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$

c) $\tan^{-1}(-1)$

Question2

Find the exact value of

a) $\cos^{-1}(cos\frac{3\pi}{5})$ b) $\sin^{-1}(cos\frac{5\pi}{4})$ c) $\tan^{-1}(tan\frac{4\pi}{3})$ d) $\sin^{-1}\left[sin\frac{3\pi}{5}\right]$.

Question3

Find the range of $y = -\cos^{-1}(2-7x)+\pi$.

Question4

The domain of $y = 2\sin^{-1}\frac{x}{3} =$

a) $[-1,1]$ b) $[-2,2]$ c) $[-3,3]$ d) $[-6,6]$ e) $[-\frac{1}{3},\frac{1}{3}]$

Question5

$\tan[2\cos^{-1}(-\frac{4}{5})] =$

a) $\frac{-24}{7}$ b) $\frac{-25}{24}$ c) $\frac{25}{24}$ d) $\frac{7}{24}$ e) $\frac{24}{7}$

Question1: Verify the following identities:

a) $\frac{\sin x+\cos x}{\sec x+\csc x} = \sin x \cos x$

b) $\frac{1}{\sec x+\tan x} + \frac{1}{\sec x-\tan x} = 2\sec x$

c) $\frac{cos^2 x+tan^2 x-1}{sin^2 x} = tan^2 x$

Question2

If $A = 2\sin^2 2x + 2\cos^2 2x$ and $B = 3[\sec^2(-x) - \tan^2(-x)]$, find $A + B$.

Question3

If $\frac{sinx+cscx\ cos^2 x+1}{secx\ cscx-tanx} = A\ secx + B\ tanx$, find the value of $A + B$.

Question4

If $\alpha = \frac{sin\theta}{1-cot\theta}$ and $\beta = \frac{cos\theta}{1-tan\theta}$ then $\alpha+\beta=$

a) $sin\theta + cos\theta$ b) $sin\theta - cos\theta$ c) $sec\theta + csc\theta$

d) $sec\theta - csc\theta$ e) $tan\theta + cot\theta$

Question5:

If $\tan(37^\circ) = t$, then $\tan 863^\circ + \tan 307^\circ =$

A) zero B) $\frac{t^2+1}{t}$ C) $-\frac{(t^2+1)}{t}$ D) $\frac{(t^2-1)}{t}$ E) $\frac{(1-t^2)}{t}$

Question1

Find the value of

a) $\sin(-15^{\circ})$ b) $cos(\frac{13\pi}{12})$ c) $tan(\frac{17\pi}{12})$

d) $\frac{\tan 70^{\circ}+\cot 10^{\circ}}{1-\tan 80^{\circ}\cot 20^{\circ}}$

Question2: Verify the following identities:

a) $\cot(x+y)=\frac{\cot x\cot y-1}{\cot x+\cot y}$

b) $\frac{\sin(x+y)-\sin(x-y)}{\cos(x+y)+\cos(x-y)}=\tan y$

Question3

If $\alpha \; and \; \beta$ are two angles in standard position with

$sin\alpha=\frac{4}{5}$, $\frac{\pi}{2}<\alpha<\pi$ and $cos\beta=\frac{-5}{13}$, $\pi<\beta<\frac{3\pi}{2}$

Then the terminal side of $(\alpha+\beta)$ is in the quadrant(s)

a) *I* b) *II* c) *IV* d) *I or II* e) *II or III*

Question4

Graph the following function:

$$f(x)=\cos 2x+\sqrt{3}\sin 2x$$

Question1: Verify the following identities:

a) $\cos^2 x - \sin^2 x = \cos 2x$

b) $\tan\left(\frac{x}{2}\right) + \cos x \tan\left(\frac{x}{2}\right) = \sin x$

c) $\frac{1+\sin 2x}{\sin 2x} = 1 + \frac{1}{2}\sec x \csc x$

Question2

If $\frac{sin^3x+cos^3x}{sinx+cosx} = 1 + n\ sin(mx)$, find $m + n$.

Question3

If $cos3x = A\ cos^3x + B\ cosx$, find $2A - B$.

Question4

If $A = \sqrt{\frac{1+\cos 320^\circ}{2}}$ and $B = \sqrt{\frac{1-\cos 320^\circ}{2}}$, then $A + B =$

a) $cos160^\circ - sin160^\circ$ b) $-cos160^\circ + sin160^\circ$

$c)\ cos160^\circ + sin160^\circ$ d) $-cos160^\circ - sin160^\circ$ e) 0

Question5

$cos13^\circ\ cos9.5^\circ - sin13^\circ\ sin9.5^\circ =$

a) $\frac{1}{2}\sqrt{2+\sqrt{2}}$ b) $\frac{1}{2}\sqrt{2-\sqrt{2}}$ c) $\frac{1}{2}\sqrt{\sqrt{2}-2}$

$d)$ $\frac{-1}{2}\sqrt{2}$ e) $\frac{1}{2}\sqrt{2}$

Question1 Solve the following equations:

a) $3\,sin^2\theta - 7\sin\theta + 2 = 0$
b) $\sin 2\,\theta + \cos\theta = 0$
c) $\tan\frac{\theta}{2} - \sin\theta = 0$

Question2

The sum of all solution(s) of the equation

$sinx = cos\frac{x}{2}$ in the interval $[0^\circ, 270^\circ)$ is

a) π b) $3\,\pi$ c) $\frac{4\pi}{3}$ d) $\frac{\pi}{3}$ e) $\frac{8\pi}{3}$

Question3

The number of solution(s) of $\sin x - \sqrt{3}\cos x = 1$, $0 \le x < 2\pi$, is

a) 1 b) 2 c) 3 d) 4 e) 5

Question1

Are the vectors $\vec{u} =< 2cos85^{\circ}, 2sin85^{\circ} >$ and $\vec{v} = 3 < cos25^{\circ}, sin25^{\circ} >$ orthogonal?

Question2

Let $\vec{u} = 2i - 4j$ and $\vec{w} = 3i - 3j$

a) Find a unit vector in the opposite direction of $\vec{u}$.
b) Find a vector of magnitude 2 in the direction of $\vec{w}$.

Question3

Find the value of k such that the two vectors $\vec{u} =< 3,4 >$ and $\vec{v} =< 2, k >$ have the same direction.

Question4

If $\vec{u} =< -2,7 >$, then a nonzero vector that is perpendicular to $\vec{u}$ is:

a) $< 14,4 >$ b) $< -1,1 >$ c) $< 2, -7 >$ d) $< 1, -1 >$ e) $< 7, -2 >$

Question1 Solve the following systems:

a) $\begin{cases} x - y = 4 \\ 2x + y = 2 \end{cases}$

b) $\begin{cases} -\frac{1}{3}x - \frac{1}{6}y = -1 \\ \frac{2}{3}x + \frac{1}{6}y = 3 \end{cases}$

c) $\begin{cases} -\frac{1}{10}x + \frac{1}{2}y = 4 \\ 2x - 10y = -80 \end{cases}$

Question2

If the following system is dependent, find $a + b$.

$$\begin{cases} \frac{3}{2}x - \frac{1}{3}y = \frac{b}{7} \\ \frac{a}{4}x - y = 2 \end{cases}$$

Question3

If the system of linear equations

$$\begin{cases} -4x + 4y + 3 = 0 \\ 2x - ky + 2 + k = 0 \end{cases}$$

is inconsistent, then k =

a) 2 b) 3 c) 4 d) 5 e) 6

Question1

The following system of non-linear equations

$$\begin{cases} 5x^2 + 3y^2 = 23 \\ x^2 - y^2 = 3 \end{cases}$$

has:

a) No solutions b) One solution c) Two solutions d) Three solutions e)Four solutions

Question2

Solve the following system

$$\begin{cases} 2x^2 + xy + y^2 = 4 \\ 3x^2 + 2xy + y^2 = 4 \end{cases}$$

Question3

Find the point(s) of intersection of the circle $(x-1)^2 + (y-2)^2 = 8$ and the line $y = 2x + 2$.

Question4

Find the solution set of the system

$$\begin{cases} \frac{2}{x} - \frac{3}{y} = 1 \\ \frac{7}{y} - \frac{4}{x} = 1 \end{cases}$$

Question5 Solve the following system

$$\begin{cases} x + \sqrt{y} = 0 \\ y^2 - 4x^2 = 12 \end{cases}$$

Question1 Determine whether the following system is independent, inconsistent or dependent

$$i)\begin{cases} x-2y+z=1 \\ y+2z=5 \\ x+y+3z=8 \end{cases}$$

$$ii)\begin{cases} x+y+z=2 \\ y-3z=1 \\ 2x+y+5z=0 \end{cases}$$

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

Question2: Use the Gauss Jordan method to solve the following linear system

$$\begin{cases} x+y+6z=3 \\ x+y+3z=3 \\ x+2y+4z=7 \end{cases}$$

Question3

If the echelon form of the linear system

$$\begin{cases} x-3y+z=8 \\ 2x-5y-3z=6 \\ x-6y+7z=-7 \end{cases} \quad \text{is} \quad \left[\begin{array}{ccc|c} 1 & -3 & 1 & 8 \\ 0 & 1 & m & n \\ 0 & 0 & 1 & p \end{array}\right], \quad \text{then} \quad (\text{m, n, p}) =$$

$a)\ (-5\ ,-10\ ,5)$ $b)\ (3,-6,-3)$ $c)\ (-5,10,-3)$ $d)\ (-2\ ,7,-1)$
$e)\ (-3,6,-2)$

Question1

If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 4 \end{bmatrix}$, and $B = \begin{bmatrix} 2 & 3 & 5 \\ 0 & -4 & 2 \\ 0 & 0 & -3 \end{bmatrix}$, then find

a) A + B
b) BA
c) B^2

Question2 If $A, B \text{ and } C$ are $square$ matrices and I_n is the identity matrix, which one of the following statement is True?

i. $(A+B)(A^2 - AB + B^2) = A^3 + B^3$
ii. $(A+I_n)(A-I_n) = A^2 - I_n$
iii. $(A-B)^2 = A^2 - 2AB + B^2$
iv. $AB = 0 \ implies A = 0 \ or \ B = 0$
v. $I_n A = I_n$

Question3

If $A = \begin{bmatrix} 1 & 3 & 4 \\ -2 & 2 & 5 \\ 1 & 3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 6 & 0 & 2 \\ 0 & 1 & 3 \\ -1 & 2 & 5 \end{bmatrix}$, and $C = AB$, then $c_{32} + c_{13} =$

a) 52 b) 11 c) 38 d) -15 e) 9

Question4

If $A = \begin{bmatrix} 1 & 2 & 4 \\ -1 & 0 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 2 & 1 \\ 3 & -1 & 2 \end{bmatrix}$, then find the matrix X that satisfies $4X + B = 2X + 3A$.

Question1

Find the inverse of the matrix if it exists

(a) $A = \begin{bmatrix} 2 & 4 & 1 \\ -1 & 1 & -1 \\ 1 & 4 & 0 \end{bmatrix}$

(b) $B = \begin{bmatrix} 3 & 2 \\ 6 & 4 \end{bmatrix}$.

Question2

Use the inverse of the coefficient matrix to solve the following system

$$\begin{cases} 2x + y = -7 \\ 3x + 2y = 19 \end{cases}$$

Question3

Given that $M = \begin{bmatrix} 2 & 9 \\ 1 & 5 \end{bmatrix}$ and $N = \begin{bmatrix} -1 & -1 \\ 4 & 3 \end{bmatrix}$, find the sum of the elements in the second column of $(MN)^{-1}$.

Question4

If A and B are 3x3 matrices such that $|A| = 5$ and $|B| = -2$,
then $|3(A\,B^2)^{-1}|$ =

a) 27/20 b) 15/10 c) -30/4 d) 10/27 e) 540

Question1

If $A = \begin{bmatrix} 2 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \\ 1 & 6 & 2 & 2 \\ 1 & 1 & -2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 & 2 & 1 \\ 3 & 0 & 1 & -1 \\ -1 & 2 & -2 & 1 \\ -3 & 2 & 3 & 2 \end{bmatrix}$, then

a) Find the sum of the cofactors of A_{23} and B_{44} .
b) Find |A|.

Question2

Evaluate the following determinants

a) $\begin{vmatrix} 3 & 5 \\ 2 & 4 \end{vmatrix}$ b) $\begin{vmatrix} 2 & 0 & 0 \\ 4 & 1 & 0 \\ 7 & 3 & -2 \end{vmatrix}$ c) $\begin{vmatrix} 3 & 0 & 0 \\ 2 & 1 & 1 \\ 1 & 2 & 2 \end{vmatrix}$

d) $\begin{vmatrix} 4 & 0 & 2 & 1 \\ 5 & 0 & 4 & 2 \\ 2 & 0 & 3 & 4 \\ 1 & 0 & 2 & 3 \end{vmatrix}$ e) $\begin{vmatrix} 5 & -13 & -3 \\ -2 & 5 & 1 \\ -2 & 6 & 2 \end{vmatrix}$

Question3 Let *A* and *B* be 4x4 invertible matrices. Which one of the following statement is false

a) $|A^2| = |A|^2$
b) $|2B| = 16|B|$
c) $|A.B| = |A|.|B|$
d) $|A + B| = |A| + |B|$
e) $|I_n| = 1$

Question4

If $\det(M - xI) = 0$, $M = \begin{bmatrix} 2 & -1 \\ 1 & 0 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then $x =$

a) 1 b) 2 c) 3 d) -1 e) -1/2

Question1

Which one of the following is the equation in standard form of the parabola with directrix $y = 7$ and focus (1,3)

a) $y - 5 = -\frac{1}{8}(x-1)^2$

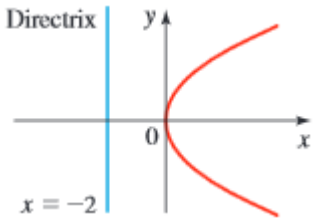
b) $x - 5 = -\frac{1}{8}(x-1)^2$

c) $y - 5 = \frac{1}{8}(x-1)^2$

d) $x - 1 = \frac{1}{8}(y-4)^2$

e) $y - 5 = \frac{1}{4}(x-1)^2$

Question2 Find an equation of the parabola from the given graph



Question3

Find the vertex, focus, and directrix of the parabola given by the equation:

$$3x^2 - 12x - y + 14 = 0$$

Question4

Which of the following points lies on the parabola that has vertex (2 , 1) and focus (2 , 3)?

A) (4 , 2) B) (6 , 3) C) (5,3)

D) (1 , -3) E) (-1 , 3)

Question1

Find the center, the vertices, foci, and eccentricity of the ellipse given by the equation

a) $3x^2 + 2y^2 - 6x + 12y = -15$
b) $3y^2 + 2x^2 - 6y + 12x = -15$

Question2

1) Find the equation of the ellipse that has vertices at (3,8) and (3,-2), and foci at (3,6) and (3,0).
2) Find the equation in standard form, of the ellipse with foci at (-1,2) and (3,2) that passes through the point (3,5).

Question3

Find the points of intersection of the ellipse $\frac{(x+1)^2}{16} + \frac{(y-2)^2}{9} = 1$, and the hyperbola $\frac{(x+1)^2}{16} - \frac{(y-2)^2}{9} = 1$.

Question4

Find the eccentricity of the hyperbola with asymptotes $y = \pm\frac{4}{5}x + 5$ and one vertex at (5,5) .

a) $\frac{\sqrt{41}}{5}$ b) $\frac{\sqrt{35}}{5}$ c) $\frac{3}{2}$ d) $-\frac{5}{2}$ e) $\frac{1}{3}$

Question5

Find the equation in standard form of the hyperbola with vertices (-1,0) and (-1,-4), and eccentricity $e = \frac{\sqrt{5}}{2}$.

Question6

Write the following equations in standard form and identify the corresponding conics

a) $x^2 - 4x + y^2 + 2y + 2 = 0$
b) $2x^2 - 8x - 2y^2 - 4y = 0$
c) $27x^2 + 36y^2 + 18x + 36y - 96 = 0$