

Questions from old Exams

1 Section 6.1

1. Verify the identity

- (a) $\sqrt{\frac{1+\sin x}{1-\sin x}} = \frac{1+\sin x}{\cos x}, \cos x > 0.$
- (b) $\frac{1}{1-\cos x} - \frac{\cos x}{1+\cos x} = 2 \csc^2 x - 1.$
- (c) $\frac{1}{1-\sin \theta} + \frac{1}{1+\sin \theta} = 2 \sec^2 \theta.$
- (d) $\frac{\cos x \tan x + 2 \cos x - \tan x - 2}{\tan x + 2} = \cos x - 1.$
- (e) $\sqrt{\frac{1-\cos x}{1+\cos x}} = \csc x - \cot x, 0 < x < \frac{\pi}{2}.$

2. Which one of the following is an identity?

- (a) $\sqrt{\sin^2 x} = \sin x$
- (b) $\sqrt{1 - \cos^2 x} = \sin x$
- (c) $1 - \cot^2 x = \csc^2 x$
- (d) $\frac{1+\sin x}{\cos x} = \frac{\cos x}{1-\sin x}$
- (e) $\sec x = \sqrt{1 + \tan^2 x}$

2 Section 6.2

1. Find the exact value of

- (a) $\frac{\tan \frac{7\pi}{12} - \tan \frac{3\pi}{4}}{1 + \tan \frac{7\pi}{12} \tan \frac{3\pi}{4}}$
- (b) $\frac{(1 - \tan 12^\circ \tan 33^\circ)}{\tan 12^\circ + \tan 33^\circ} (\cos 13^\circ \cos 17^\circ - \cos 77^\circ \cos 73^\circ)$
- (c) $\tan 15^\circ$
- (d) $\cos\left(-\frac{7\pi}{12}\right)$
- (e) $\cos\left(\frac{19\pi}{12}\right)$
- (f) $\sin 75^\circ$
- (g) $\sin 255^\circ$
- (h) $\cos 255^\circ$
- (i) $\sin 27^\circ \cos 57^\circ - \sin 63^\circ \cos 33^\circ$
- (j) $\cos 20^\circ - \sin 70^\circ + \csc \frac{19\pi}{6} + \tan\left(-\frac{9\pi}{4}\right)$
- (k) $\cos 12^\circ \cos 42^\circ + \cos 78^\circ \cos 48^\circ$
- (l) $\sin 195^\circ$
- (m) $\frac{\tan 75^\circ - \cot 75^\circ}{1 + \cot 15^\circ \cot 75^\circ}$

(n) $\frac{\tan \frac{7\pi}{9} + \tan \frac{2\pi}{9}}{1 - \tan \frac{7\pi}{9} \tan \frac{2\pi}{9}}$

(o) $\sin \frac{\pi}{10} \cos \frac{2\pi}{5} - \cos \frac{\pi}{10} \sin \left(-\frac{2\pi}{5}\right)$

2. $\sin \frac{29\pi}{7} \cos \frac{2\pi}{7} + \cos \frac{\pi}{7} \sin \frac{16\pi}{7} =$

(a) $-\sin \frac{\pi}{7}$

(b) $\sin \frac{9\pi}{7}$

(c) $\sin \frac{3\pi}{7}$

(d) $-\cos \frac{\pi}{7}$

(e) $-\sin \frac{3\pi}{7}$

3. Simplify the following in terms of a single trigonometric function

(a) $\frac{\cos(x-y)}{\cos x \sin y} - \frac{\tan(x+y) - \tan y}{1 + \tan(x+y) \tan y}$

(b) $\frac{\tan(\alpha+\beta) + \tan(\alpha-\beta)}{1 - \tan(\alpha-\beta) \tan(\alpha+\beta)}$

(c) $\sin \beta \left[\frac{\cos(\alpha+\beta)}{\sin \beta \cos \beta} + \frac{\sin \alpha}{\cos \beta} \right]$

4. If $\alpha + \beta = \pi$, then find $\cos \alpha + \cos \beta$. Also use that to find the value of $\cos \left(\frac{\pi}{5}\right) + \cos \left(\frac{2\pi}{5}\right) + \cos \left(\frac{3\pi}{5}\right) + \cos \left(\frac{4\pi}{5}\right) + \cos \left(\frac{5\pi}{5}\right)$

5. Given $\tan \alpha = -\frac{3}{4}$ for α in quadrant *II* and $\csc \beta = -\frac{5}{4}$ for β in quadrant *IV*, find $\sec(\alpha - \beta)$.

6. Which one of the following statements is FALSE?

(a) $\tan \left(\frac{\pi}{2} + \theta\right) = -\cot \theta$

(b) $\sec \left(\frac{\pi}{2} + \theta\right) = -\csc \theta$

(c) $\cot \left(\frac{\pi}{2} + \theta\right) = -\tan \theta$

(d) $\csc \left(\frac{\pi}{2} + \theta\right) = -\sec \theta$

7. If $\cos \alpha = \cos \beta = \frac{1}{2}$, then find the value of $\cos(\alpha + \beta) \cos(\alpha - \beta)$.

8. If the point $\left(-1, \frac{3}{4}\right)$ lies on the terminal side of angle θ in standard position, then find the exact value of $\tan \left(\frac{\pi}{2} - \theta\right)$.

9. Which one of the following is TRUE for all values of x for which the expressions are defined?

(a) $(\cot^2 x) (\sin^2 x - \tan^2 x) = -\sin^2 x$

(b) $\cot^2 x (1 + \tan^2 x) = \sin^2 x$

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

(d) $\cot^2 x - \csc^2 x = 1$

(e) $2 \sin x = \sin 2x$

10. Which one of the following is TRUE for all values of x and y for which the expressions are defined?

- (a) $\sec(\pi - x) = -\sec x$
- (b) $\cos(x + y) + \cos(x - y) = -2\cos x \cos y$
- (c) $\cos\left(\frac{\pi}{2} + x - y\right) = \sin(x - y)$
- (d) $\csc\left(\frac{\pi}{2} - x\right) = -\sec x$
- (e) $\cos(\pi + x - y) = \sin x \sin y - \cos x \cos y$

11. Which one of the following is TRUE for all real values of x for which the expressions are defined?

- (a) $\sqrt{\cos^2 x} = \cos x$
- (b) $\cos(-x + \pi) = -\cos x$
- (c) $\sin(-x + 2\pi) = \sin x$
- (d) $\csc x = \sqrt{1 + \cot^2 x}$
- (e) $\tan^2 x + \sec^2 x + 1 = 0$

12. If $\sin S = -\frac{4}{5}$, and $\cos t = -\frac{12}{13}$ such that S and t are in quadrant *III*, then find $\tan(S - t)$.

13. If $\cos S = -\frac{3}{5}$, and $\sin t = \frac{5}{13}$ such that S and t are in quadrant *II*, then find $\cos(S - t)$.

14. If $\cos \theta = 0.8$ and θ is in quadrant *IV*, then find $\cos\left(\theta + \frac{\pi}{6}\right)$.

15. For all positive integers n , find the value of $\cos(n + 2)\pi - \sin(2n + 3)\frac{\pi}{2}$.

16. If the terminal side of angle θ passes through $(-1, \sqrt{8})$, then find the value of $\sin\left(\frac{5\pi}{6} - \theta\right)$.

17. $\cos\left(\frac{\pi}{2} - x\right) =$

- (a) $\cos\left(\frac{\pi}{2} + x\right)$.
- (b) $\sin\left(\frac{\pi}{2} + x\right)$.
- (c) $\cos(\pi - x)$.
- (d) $\sin\left(\frac{\pi}{2} - x\right)$.
- (e) $\sin x$.

18. If the terminal side of an angle θ lies on the line $y = 3x$, $x < 0$, then find the value of $\cos\left(\theta + \frac{\pi}{4}\right)$.

19. If $\tan(x + y) = 33$, and $\tan x = 3$, then find the value of $\tan y$.

20. If $\sin x = \frac{3}{5}$, and $\cos y = -\frac{5}{13}$ where x is in quadrant *II* and y is quadrant *III*, then find the value of $\sin(x + y)$.

21. Which one of the following is NOT an identity?

- (a) $\csc(-\theta) = -\csc \theta$.
- (b) $\sec(90^\circ - \theta) = \csc \theta$.
- (c) $\cot(90^\circ - \theta) = \tan \theta$.

- (d) $\tan(-\theta) = \tan \theta$.
- (e) $\csc(\theta - 90^\circ) = -\sec \theta$.
22. If $\cot(51^\circ - 3x) = \tan(25^\circ - \frac{x}{2})$, then find the value of x .
23. If A and B are the acute angles such that $\tan A = \frac{1}{4}$ and $\tan B = \frac{3}{5}$, then
- (a) $A + B = 135^\circ$.
- (b) $A + B = 45^\circ$.
- (c) $90^\circ < A + B < 120^\circ$.
- (d) $\cot(A + B) > \tan(A + B)$.
- (e) $\sin(A + B) = \frac{3}{20}$.
24. If $\tan x = \frac{3}{4}$ and $\tan y = \frac{1}{5}$, then find the value of $\tan(x + y)$.
25. If $0^\circ < \theta < 90^\circ$ and $\cos \theta = \sin 11^\circ$, then find the value of θ .
26. Let n be any positive integer, which one of the following is FALSE?
- (a) $\sin[(4n - 3)\frac{\pi}{2}] = (-1)^{n-1}$.
- (b) $\tan[(\frac{4n+1}{4})\pi] = 1$.
- (c) $\sec(n\pi) = (-1)^n$.
- (d) $\cos[(3n - 2)\pi] = (-1)^n$.
- (e) $\sin[(2n - 1)\frac{\pi}{2}] = (-1)^{n-1}$.
27. If $P(-\frac{3}{5}, \frac{4}{5})$, is the point on the unit circle corresponding to an arc length S , then find the point on the unit circle corresponding to arc length $S + 441\frac{\pi}{2}$.
28. If $P(x, \frac{5}{13})$, $x > 0$ is the point on the unit circle corresponding to an arc length S , then find $\cos(3\pi - S)$.
29. If $P(\frac{\sqrt{3}}{6}, \frac{\sqrt{33}}{6})$ is the point on the unit circle corresponding to arc length S and $Q(b, c)$ is the point on the unit circle corresponding to arc length $S + \frac{\pi}{6}$, then find b .
30. If the point $(-\frac{2}{3}, \frac{\sqrt{5}}{3})$ on the unit circle corresponding to arc length $3\pi - S$, then find $\cos(S + \pi)$.

3 Section 6.3

1. If $\sin t = -\frac{1}{4}$, then find $\cos 2t$.
2. Find the maximum value of the function $y = 6 \sin 2t \sin(\frac{\pi}{2} - 2t)$.
3. If $\cos^2 2\theta = \frac{1}{2}(1 + 2k \cos t\theta)$, then find the values of k and t .
4. Find the period of $f(x) = \sin 2x \cos 2x$.
5. Verify the identity

- (a) $\cot 2x = \frac{\cos^4 x - \sin^4 x}{2 \sin x \cos x}$
 (b) $2 \csc 2\theta = \tan \theta + \cot \theta$
 (c) $\frac{1 - \tan^2 \beta}{1 + \tan^2 \beta} = \cos 2\beta$

6. Which one of the following is an identity:

- (a) $\sin x + \cos x = 1$
 (b) $\csc^2 x + 1 = \cot^2 x$
 (c) $\sec^2 \frac{x}{2} - \tan^2 \frac{x}{2} = 1$
 (d) $\cos \frac{x}{2} = \sqrt{\frac{1 + \cos x}{2}}$
 (e) $\sin(x - y) = \sin x - \sin y$

7. $\sqrt{\frac{1 + \cos 200^\circ}{2}} =$ a) $\cos 80^\circ$ b) $-\sin 100^\circ$ c) $\sin 100^\circ$ d) $-\cos 80^\circ$ e) $\cos 100^\circ$
 8. $-\frac{\tan \frac{x}{4}}{2 - 2 \tan^2 \frac{x}{4}} =$ a) $-\frac{1}{2} \tan \frac{x}{8}$ b) $\frac{1}{2} \tan \frac{x}{2}$ c) $-\tan \frac{x}{2}$ d) $\frac{1}{4} \tan(-\frac{x}{2})$
 9. $\sqrt{\frac{1 - \cos 400^\circ}{2}} =$ a) $\cos 400^\circ$ b) $\sin 200^\circ$ c) $\sin 20^\circ$ d) $-\cos 200^\circ$ e) $\cos 20^\circ$

10. Simplify the following in terms of a single trigonometric function

- (a) $\frac{2 \sin 2\theta - \sin 4\theta}{2 \sin 2\theta + \sin 4\theta}$
 (b) $\frac{\sin 2\theta}{\sin \theta} - \frac{\cos 2\theta}{\cos \theta}$
 (c) $\frac{2}{1 + \cos \theta} - \tan^2 \frac{\theta}{2}$
 (d) $\frac{1}{\sin^2 x + \cos 2x}$

11. If $\tan x = -\sqrt{8}$, $\frac{3\pi}{2} < x < 2\pi$, then find $\cos \frac{x}{2}$.

12. If $(-\frac{3}{5}, -\frac{4}{5})$ is the point on the unit circle corresponding to arc length t , then find the point corresponding to arc length $2t$.

13. If $\cos x = \frac{1}{3}$, then find $\cos 2x$.

14. $\frac{4 \tan 2x}{1 + \tan^2 2x} =$ a) $2 \cos 4x$ b) $2 \cos(\frac{\pi}{2} - 4x)$ c) $2 \cos 2x$ d) $2 \sin 2x$ e) $\sin 4x$

15. If $\sin \theta = \frac{1}{4}$, $\frac{\pi}{2} < \theta < \pi$, then find $\sin 2\theta$.

16. Given $\cos \theta = -\frac{3}{5}$ and θ terminates in quadrant *II*, then find $\tan \frac{\theta}{2}$.

17. If $\tan \theta = \frac{4}{3}$, which one of the following must be TRUE? a) $\sin 2\theta = \frac{24}{25}$ b) $\sin \theta > \cos \theta$ c) $\cot(\theta - \pi) = -\frac{3}{4}$ d) $|\sin \theta - \cos \theta| = 1$ e) $\cot 2\theta = \frac{25}{24}$

18. If $3 - 3 \cos 4\theta = k \sin^2 t\theta$, then find the values of k and $|t|$.

19. On the unit circle, if the arc length $\frac{\pi}{12}$ terminates at the point (a, b) , then find ab .

20. If $5 \sin^2 5\theta - 5 \cos^2 5\theta = 2k \cos t\theta$, then find the values of k and t .
21. $\sqrt{\frac{1 - \sin 440^\circ}{2}} =$ a) $\cos 5^\circ$ b) $\sin 5^\circ$ c) $\cos 175^\circ$ d) $\sin 95^\circ$ e) $\sin 220^\circ$
22. $\frac{2 \sin \theta - \sin 2\theta \cos \theta}{2 \sin \theta (1 - \sin^2 \theta)} =$ a) $1 + \tan^2 \theta$ b) $\cos 2\theta$ c) $\tan 2\theta$ d) $\sec^2 \theta - 1$ e) $\sec \theta$
23. Find the value of $\cos \frac{17\pi}{3} + (\sin 75^\circ + \cos 75^\circ)^2$
24. If $\frac{\sin^3 x + \cos^3 x}{\sin x + \cos x} = 1 + k \sin tx$, then find the values of k and t .
25. If $\cos 2\theta = \frac{7}{25}$, where $\frac{3\pi}{2} < 2\theta < 2\pi$, then find $\cos \theta$.
26. If $\tan x = -\frac{1}{2}$, $\frac{\pi}{2} < x < \pi$, then find $\cos(\frac{\pi}{2} - 2x)$.
27. Find the value of $(\sin \frac{\pi}{12} + \cos \frac{\pi}{12})^2$.
28. If $\tan \theta = -\frac{3}{4}$, and $90^\circ < \theta < 180^\circ$, then find $\cos \frac{\theta}{2}$.
29. Which one of the following is an identity?
- (a) $\cos^2 x - \sin^2 x = \sin 2x$
 (b) $\cos(-x) \sec x = -1$
 (c) $\cos^2 \frac{x}{2} - \sin^2 \frac{x}{2} = \cos x$
 (d) $\tan^2 x - \sec^2 x = 1$
 (e) $\frac{1}{2} \sin 2x = \sin x$
30. $\sin \frac{x}{2} = -\sqrt{\frac{1 - \cos x}{2}}$ is an identity if a) $0 \leq x \leq 2\pi$ b) $0 \leq x \leq \pi$ c) $\pi \leq x \leq 2\pi$ d) $2\pi \leq x \leq 4\pi$ e) $\pi \leq x \leq 3\pi$
31. Find the exact value of
- (a) $\tan \frac{7\pi}{8}$
 (b) $\sin \frac{\pi}{12} \cos \frac{\pi}{12}$
32. If $\cot \alpha = -\frac{3}{4}$, α in quadrant *IV*, and $\sec \beta = -\frac{13}{12}$, β in quadrant *III*, then find $\csc(\alpha + \beta)$ and $\cos \frac{\alpha}{2}$.
33. If $\cos \theta = \frac{3}{5}$, $\sin \theta < 0$, $0 \leq \theta \leq 2\pi$, then find $\tan \frac{\theta}{2}$.
34. Find the exact value of $\tan 15^\circ$.
35. $-\sqrt{\frac{1 + \cos 378^\circ}{2}} =$ a) $-\cos 189^\circ$ b) $\sin 189^\circ$ c) $-\sin 189^\circ$ d) $-\tan 189^\circ$ e) $\cos 189^\circ$
36. $\sin 80^\circ$ is equal to a) $\sqrt{\frac{1 + \cos 920^\circ}{2}}$ b) $\sqrt{\frac{1 + \cos 880^\circ}{2}}$ c) $\sqrt{\frac{1 - \cos 880^\circ}{2}}$ d) $\sqrt{\frac{1 - \cos 40^\circ}{2}}$
37. Find the exact value of $\sin \frac{\alpha}{2}$, when $\csc \alpha = -\frac{5}{3}$, $\frac{7\pi}{2} < \alpha < 4\pi$.
38. The expression $2 \csc x \cos \frac{x}{2}$ simplifies to: a) $\sec \frac{x}{2}$ b) $\tan \frac{x}{2}$ c) $\cot \frac{x}{2}$ d) $\csc \frac{x}{2}$

39. If $0 \leq \alpha < 2\pi$, then find the value of $\sec \frac{\alpha}{2}$ given that $\cos \alpha = \frac{4}{5}$ and α is in quadrant *IV*.
40. Find the exact value of $\tan(-22.5^\circ)$.
41. If $\sin \theta = \frac{4}{5}$ and θ in quadrant *II*, then find $\cot 2\theta$
42. Find the value of $\cos 13^\circ \cos 9.5^\circ - \sin 13^\circ \sin 9.5^\circ$.
43. If $\cos(-\theta) = \frac{-1}{\sqrt{5}}$, and $\csc \theta < 0$, then evaluate $\cos 3\theta$.
44. If $\cot A = \frac{2}{\sqrt{5}}$, and $\cos A < 0$, then find $\cos \frac{A}{2}$.
45. Select the value of each expression in list *I*, from the values listed in List *II*.

List <i>I</i>	List <i>II</i>
1. $\cos\left(\frac{2n+1}{2}\pi\right)$, $n = 0, \pm 1, \pm 2$	a) 1
2. $\sec^2 20^\circ - \tan^2 20^\circ$	b) $-\sqrt{3}$
3. $\sqrt{\frac{1-\cos 40^\circ}{2}}$	c) $\tan 120^\circ$
4. $\frac{\tan 115^\circ + \tan 5^\circ}{1 - \tan 115^\circ \tan 5^\circ}$	d) 0
5. $\cot 20^\circ \sec 20^\circ$	e) $\cos 20^\circ$
	f) $\csc 20^\circ$
	g) $\cos 70^\circ$

4 Section 6.4

- Which one of the following is TRUE for $f(x) = \sin x + \cos x$?
 - $f(x)$ is even.
 - $f(x)$ is odd
 - The maximum value of $f(x)$ is $\sqrt{2}$
 - The Amplitude of $f(x)$ is 2
 - The period of $f(x)$ is 4π
- Find the minimum value of $f(x) = 5 \sin x + 12 \cos x$
- When using the reduction identity, then find the Phase Shift of $y = -3 \sin 2x + 3 \cos 2x$.
- If $2 \sin x - 2\sqrt{3} \cos x = k \sin(x + t)$, then find k and t .
- Which one of the following is equivalent to $y = 3 \sin x - 3 \cos x$?
 - $y = 3 \sin x$
 - $y = 3\sqrt{2} \cos\left(x - \frac{\pi}{4}\right)$
 - $y = \sqrt{2} \sin 3x$
 - $y = \sqrt{2} \cos 3x$

(e) $y = 3\sqrt{2} \sin(x - \frac{\pi}{4})$

- Find the range of the function $f(x) = \sin 3x + \cos 3x$.
- Using the reduction identity, the expression $\frac{\sqrt{3}}{2} \sin x - \frac{1}{2} \cos x =$
a) $\cos(x - \frac{\pi}{6})$ b) $\sin(x + \frac{\pi}{3})$ c) $\sin(x - \frac{\pi}{3})$ d) $\sin(x + \frac{\pi}{6})$ e) $\sin(x - \frac{\pi}{6})$
- When $y = \cos x - \sqrt{3} \sin x$ is expressed in the form $y = a \sin(x + \alpha)$ where $0 \leq \alpha \leq 2\pi$, then find a and α .
- Find the Amplitude and the Period of the function $y = 3 \sin \frac{x}{2} + 4 \cos \frac{x}{2}$.
- Given $g(x) = \sin 3x - \cos 3x + 2$. Find the range and the phase shift of the graph of $g(x)$.
- When writing $-\sin x - \sqrt{3} \cos x$ in the form $A \sin(x + \alpha)$, $0 \leq \alpha \leq 2\pi$, find A , and α .
- Using the reduction identity, rewrite $f(x) = \frac{\sqrt{3}}{2} \sin 2x - \frac{1}{2} \cos 2x$. Also, find a) range of f b) period of f c) amplitude of f d) phase shift of f .
- Rewrite the function $f(x) = \sin x - \sqrt{3} \cos x$ in the form $k \sin(x + \alpha)$. Then find the amplitude, the period and the phase shift of the graph of $f(x)$.
- If the amplitude of the function $f(x) = \sqrt{3} \sin(2x) + 2 \cos(2x)$ is A and the period is B , then find $\frac{A^2}{\pi} B$.
- Find the maximum value of the function $f(x) = 3 \sin x - 4 \cos x$.
- Apply the reduction identity on the function $y = \sqrt{3} \sin 4x - \cos 4x$ to find its a) amplitude b) period c) phase shift d) range.

5 Section 6.5

- Write $\sec(\arccos x) + \sin(\arccos x)$ in terms of x .
- Find the domain and the range of the function $y = \arcsin(2x) + \frac{\pi}{2}$.
- Find the value of $\cos(\arctan(-\frac{1}{4}))$.
- Find the domain and the range of the function $y = \arcsin(3x + 1) - \pi$
- Find the value of $\tan[\arcsin(\frac{3}{5}) + \arccos(-\frac{4}{5})]$
- Find the value of $\sin[\frac{\pi}{2} - \arcsin(\frac{4}{5}) + \arctan(-\frac{3}{4})]$
- Which one of the following is TRUE for all values for which the variables are defined?
 - $2 \arccos(x) = \arccos(2x)$
 - If $y = \arcsin(x + 2)$, then $x = -2 + \sin y$
 - $\arctan x = \frac{\arcsin x}{\arccos x}$
 - $y = \arcsin x$ is an even function
 - $\operatorname{arccot} x = \frac{1}{\arctan x}$

8. Find the domain and the range of the function $y = \cos(\arcsin 2x)$
9. Find the value of $\operatorname{arccsc}\left(\frac{1}{\sin\frac{3\pi}{4}}\right)$
10. The adjacent figure represents the graph of:
- $y = 3 \cos^{-1} \frac{x}{2}$
 - $y = 2 \sin^{-1} 3x$
 - $y = \frac{1}{2} \cos^{-1} 3x$
 - $y = 3 \sin^{-1} \frac{x}{2}$
 - $y = \frac{1}{2} \cos^{-1} \frac{x}{3}$
11. Write $\cos\left[\tan^{-1}\frac{\sqrt{1-x^2}}{x}\right]$ in terms of x .
12. Find the value of $\tan\left[\frac{\pi}{4} - \sec^{-1}\left(-\frac{5}{4}\right)\right]$
13. Find the value of $\cos^{-1}\left(-\frac{1}{2}\right) + \sin^{-1}\left(\sin\frac{7\pi}{6}\right)$
14. Find the value of $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right) + \sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$
15. Find the domain and the range of the function $f(x) = -3 \sin^{-1}(2x - 1)$
16. Find the solution of the equation $\sin^{-1}\frac{3}{5} + \cos^{-1}x = \pi$
17. The sum of all positive value of x and y which satisfy the equation $\cos\left(\arcsin x + \arccos\sqrt{1-y^2}\right) + \cos\left(\arcsin x - \arccos\sqrt{1-y^2}\right) = 0$ is:
 a)1 b)4 c)2 d)8 e)none of the above
18. Find the solution of the equation $\arcsin x + \arcsin\left(-\frac{20}{29}\right) = \arcsin\left(\frac{21}{29}\right)$
19. Find $\tan^{-1}\left(\tan\frac{9\pi}{5}\right)$
20. Find the exact value of $\sin\left(\frac{4\pi}{3} + \tan^{-1}(-3)\right)$
21. Find the exact value of $\sin^{-1}\left(\sin\frac{9\pi}{5}\right)$
22. Solve: $\sin^{-1}x - \tan^{-1}\left(-\frac{5}{12}\right) = \pi$
23. Evaluate $\sin\left(2 \sin^{-1}\left(-\frac{3}{5}\right)\right)$
24. Which one of the following statements is TRUE?
- The function $f(x) = x + \sin x$ is periodic
 - The amplitude of $y = \frac{3}{2} \cot\left(5x - \frac{\pi}{2}\right) + 2$ is $\frac{3}{2}$
 - The graph of $y = \sec x$ has a maximum value when $\frac{\pi}{2} < x < \frac{3\pi}{2}$
 - The equation $\arctan x = \frac{3\pi}{4}$ has a real solution

25. Find the value of $\sin^{-1}\left(\sin\frac{4\pi}{3}\right)$
26. The equation $\cos^{-1}(x) + \sin^{-1}(3 + 4x) = \frac{\pi}{2}$ has:
- Exactly one solution which is a negative integer.
 - Two real solutions.
 - A solution $x \in (-3, -2)$.
 - A solution $x \in (0, 1]$.
 - No solution at all.

6 Section 6.6

1. Find the solution set of the following:

- $\cos 2x + \cos x = 0$ in the interval $0 \leq x \leq 2\pi$.
- $2 - 2|\cos x| = 1$ with $0 \leq x \leq \frac{3\pi}{2}$.
- $2 \sin x - \cos 2x = \frac{1}{2}$ where $0 \leq x < \pi$.
- $\cos^2 2x - 2 \cos 2x = 3$ in the interval $\pi \leq x \leq 4\pi$.
- $\sin \frac{x}{2} + \cos x = 1$ in the interval $0 \leq x \leq \pi$.
- $\sin 4x = \sin 2x$ where $0 \leq x < 2\pi$.
- $6 \sec^2 x - \sec x = 1$ where $0 \leq x < 2\pi$.
- $2 \sin x - 1 - \csc x = 0$ where $0 \leq x < 2\pi$.
- $\sin x \tan^2 x = \sin^2 x - \sin x$ where $0 \leq x < 2\pi$.
- $\sin 4x \cos x - \cos 4x \sin x = 1$ where $0 \leq x < 2\pi$.
- $\sqrt{2} \sin 2x = 1$ in the interval $[0, 2\pi)$.
- $2 \cos 3x - 2 \sec 3x + 3 = 0$ in the interval $[0, \pi)$.
- $3 \sin x = \sqrt{2} + \sin x$ where $0 \leq x < \pi$.
- $2 \sin x \cos x = \sqrt{3} \cos x$ in the interval $[0^\circ, 360^\circ)$.
- $2 \cos^2 x - 2 \sin^2 x = \sqrt{3}$ in the interval $[0, \pi)$.
- $\sec \theta + 1 = \tan^2 \theta$ where $0 \leq x < 2\pi$.
- $3 \cot^3 \theta = \cot \theta$ in the interval $[\frac{\pi}{3}, \frac{3\pi}{2}]$.
- $3 \sec^2 \frac{x}{2} = 4$ in the interval $[0, 2\pi)$.
- $\tan t \sin t = \sqrt{3} \tan t$ in the interval $[30^\circ, 210^\circ]$.
- $\csc \frac{x}{2} = \sqrt{2}$ in the interval $(\pi, 6\pi)$.
- $\sin 3x - \sin x = \cos 2x$ in the interval $(0^\circ, 360^\circ)$.
- $\cos^2 \frac{x}{2} - \sin^2 \frac{x}{2} = -\frac{\sqrt{3}}{2}$ where $0 \leq x < 2\pi$

2. Find the points of intersection between the graph of $y = 2 \sin\left(\frac{x}{2}\right)$ and the line $y = 1$ on the interval $0 \leq x \leq 2\pi$.