47) If the graph of the function $f(x) = \cos x$ is	48) If the graph of the function $f(x) = \cos x$ is			
stretched vertically by a factor of 2 , then the new graph	compressed vertically by a factor of $\frac{1}{2}$ , then the new graph			
represented the graph of the function is	represented the graph of the function is			
Solution:	Solution:			
$2\cos x$	$\frac{1}{-\cos x}$			
	$\frac{1}{2}\cos x$			
49) If the graph of the function $f(x) = \cos x$ is	50) If the graph of the function $f(x) = \cos x$ is stretched			
compressed horizontally by a factor of 2, then the new	horizontally by a factor of $\frac{1}{2}$ , then the new graph			
graph represented the graph of the function is Solution:	represented the graph of the function is			
$\cos 2x$	Solution:			
	$\cos\frac{\pi}{2}$			
51) The graph of the function $f(x) = \sqrt{x}$ is reflected	52) The graph of the function $f(x) = \sqrt{x}$ is reflected			
about the $x - axis$ if	about the $y-axis$ if			
Solution:	Solution:			
$f(x) = -\sqrt{x}$ 53) If the graph of the function $f(x) = e^x$ is shifted a	$f(x) = \sqrt{-x}$ 54) If the graph of the function $f(x) = e^x$ is shifted a			
distance 2 units upwards , then the new graph	distance 2 units downwards , then the new graph			
represented the graph of the function is	represented the graph of the function is			
Solution: $e^x + 2$	Solution: $e^x - 2$			
55) If the graph of the function $f(x) = e^x$ is shifted a	$e^{x} - 2$ 56) If the graph of the function $f(x) = e^{x}$ is shifted a			
distance 2 units to the right , then the new graph	distance 2 units to the left , then the new graph			
represented the graph of the function is	represented the graph of the function is			
Solution:	Solution:			
e <sup>x-2</sup>	$e^{x+2}$			
57) $\frac{2\pi}{3}$ rad $=\frac{2\pi}{3} \times \frac{180^{\circ}}{\pi} = 120^{\circ}$	58) $\frac{5\pi}{6}$ rad $=\frac{5\pi}{6} \times \frac{180}{\pi} = 150^{\circ}$			
59) $\frac{7\pi}{6}$ rad = $\frac{7\pi}{6} \times \frac{180^{\circ}}{\pi} = 210^{\circ}$	60) $\frac{3\pi}{2}$ rad $=\frac{3\pi}{2} \times \frac{180^{\circ}}{\pi} = 270^{\circ}$			
$\frac{e^{x-2}}{57}$ $\frac{2\pi}{3} \text{ rad} = \frac{2\pi}{3} \times \frac{180^{\circ}}{\pi} = 120^{\circ}$ $59) \frac{7\pi}{6} \text{ rad} = \frac{7\pi}{6} \times \frac{180^{\circ}}{\pi} = 210^{\circ}$ $61) 120^{\circ} = 120 \times \frac{\pi}{180^{\circ}} = \frac{2\pi}{3} \text{ rad}$ $63) \frac{5\pi}{12} \text{ rad} = \frac{5\pi}{12} \times \frac{180^{\circ}}{\pi} = 75^{\circ}$ $65) 150^{\circ} = 150 \times \frac{\pi}{180^{\circ}} = \frac{5\pi}{6} \text{ rad}$	$e^{x+2}$ 58) $\frac{5\pi}{6}$ rad $=\frac{5\pi}{6} \times \frac{180^{\circ}}{\pi} = 150^{\circ}$ 60) $\frac{3\pi}{2}$ rad $=\frac{3\pi}{2} \times \frac{180^{\circ}}{\pi} = 270^{\circ}$ 62) $270^{\circ} = 270 \times \frac{\pi}{180^{\circ}} = \frac{3\pi}{2}$ rad $64) \frac{5\pi}{6}$ rad $=\frac{5\pi}{2} \times \frac{180^{\circ}}{180^{\circ}} = 150^{\circ}$ (Repeated)			
63) $\frac{5\pi}{12}$ rad $=\frac{5\pi}{12} \times \frac{180^{\circ}}{\pi} = 75^{\circ}$	64) $\frac{5\pi}{6}$ rad $=\frac{5\pi}{6} \times \frac{180^{\circ}}{\pi} = 150^{\circ}$ (Repeated) 66) $210^{\circ} = 210 \times \frac{\pi}{180^{\circ}} = \frac{7\pi}{6}$ rad			
65) $150^{\circ} = 150 \times \frac{\pi}{180^{\circ}} = \frac{5\pi}{6}$ rad	66) $210^{\circ} = 210 \times \frac{\pi}{180^{\circ}} = \frac{7\pi}{6}$ rad			
$67) \frac{1}{\sec x} = \cos x$	$68) \frac{1}{\csc x} = \sin x$			
(69) $\frac{1}{1} = \tan x$	70) $\frac{\sin x}{\cos x} = \tan x$			
$71) \frac{\cot x}{\cos x} = \cot x$	cos x			
72) If $\cos x = \frac{3}{5}$ and $0 < x < \frac{\pi}{2}$ , then $\cot x =$	73) If $\cos x = \frac{3}{5}$ and $0 < x < \frac{\pi}{2}$ , then $\tan x = \frac{\pi}{2}$			
Solution:	Solution:			
$\cos x = \frac{3}{5} = \frac{adj}{hyp}$	$\cos x = \frac{3}{5} = \frac{adj}{hvp}$			
Now, we should find the length of the opposite side using	Now, we should find the length of the opposite side using			
the Pythagorean Theorem, so	the Pythagorean Theorem, so			
$ \text{opposite}  = \sqrt{5^2 - 3^2} = \sqrt{25 - 9} = \sqrt{16} = 4$	$ \text{opposite}  = \sqrt{5^2 - 3^2} = \sqrt{25 - 9} = \sqrt{16} = 4$			
	$\therefore \tan x = \frac{1}{\cot x} = \frac{opp}{adj} = \frac{4}{3}$			
$\therefore \cot x = \frac{1}{\tan x} = \frac{adj}{opp} = \frac{3}{4}$	$\int_{-\infty}^{\infty} \frac{dx}{dx} = \frac{1}{adj} = \frac{1}{3}$			

74)	lf	cos x	$=\frac{3}{5}$	and	0 < x	$<\frac{\pi}{2}$	then	$\sin x =$
- 1								

$$\cos x = \frac{3}{5} = \frac{adj}{hyp}$$

Now, we should find the length of the opposite side using the Pythagorean Theorem, so

$$|opposite| = \sqrt{5^2 - 3^2} = \sqrt{25 - 9} = \sqrt{16} = 4$$

$$\therefore \sin x = \frac{opp}{hyp} = \frac{4}{5}$$

76) 
$$\sin\left(\frac{5\pi}{6}\right) =$$

$$\frac{5\pi}{6} \text{ rad} = \frac{5\pi}{6} \times \frac{180^{\circ}}{\pi} = 150^{\circ}$$

So, we deduce now that  $\sin\left(\frac{5\pi}{6}\right)$  is in the second quarter.

$$\sin\left(\frac{5\pi}{6}\right) = \sin(150^{\circ}) = \sin(180^{\circ} - 30^{\circ}) = \sin(30^{\circ}) = \sin\pi 6 = 12$$

78) 
$$\tan\left(\frac{5\pi}{6}\right) =$$

$$\frac{5\pi}{6} \text{ rad} = \frac{5\pi}{6} \times \frac{180^{\circ}}{\pi} = 150^{\circ}$$

So, we deduce now that  $\tan\left(\frac{5\pi}{6}\right)$  is in the second

$$\tan\left(\frac{5\pi}{6}\right) = \tan(150^{\circ}) = \tan(180^{\circ} - 30^{\circ})$$
$$= -\tan(30^{\circ}) = -\tan\left(\frac{\pi}{6}\right) = -\tan\left(\frac{\pi}{6}$$

$$= -\tan(30^{\circ}) = -\tan\left(\frac{\pi}{6}\right) = -\frac{1}{\sqrt{3}}$$
80) If  $\sin x = \frac{2}{3}$  and  $0 < x < \frac{\pi}{2}$ , then  $\sec x = \frac{\pi}{3}$ 

$$\sin x = \frac{2}{3} = \frac{opp}{hyp}$$



Now, we should find the length of the adjacent side using the Pythagorean Theorem, so

|adjacent| = 
$$\sqrt{3^2 - 2^2} = \sqrt{9 - 4} = \sqrt{5}$$

$$\therefore \sec x = \frac{1}{\cos x} = \frac{hyp}{adj} = \frac{3}{\sqrt{5}}$$

 $\therefore \sec x = \frac{1}{\cos x} = \frac{hyp}{adj} = \frac{3}{\sqrt{5}}$ 82) If  $\sin x = \frac{3}{4}$  and  $0 < x < \frac{\pi}{2}$ , then  $\cos x = \frac{3}{2}$ 

$$\frac{1}{\sin x} = \frac{3}{4} = \frac{opp}{hyp}$$



Now, we should find the length of the adjacent side using the Pythagorean Theorem, so

$$|adjacent| = \sqrt{4^2 - 3^2} = \sqrt{16 - 9} = \sqrt{7}$$

$$\therefore \cos x = \frac{adj}{hyp} = \frac{\sqrt{7}}{4}$$

75) If  $\cos x = \frac{3}{5}$  and  $0 < x < \frac{\pi}{2}$ , then  $\csc x = \frac{\pi}{2}$ 

$$\cos x = \frac{3}{5} = \frac{adj}{hyp}$$

Now, we should find the length of the opposite side using the Pythagorean Theorem, so

$$|\text{opposite}| = \sqrt{5^2 - 3^2} = \sqrt{25 - 9} = \sqrt{16} = 4$$

$$\therefore \csc x = \frac{1}{\sin x} = \frac{hyp}{opp} = \frac{5}{4}$$

77) 
$$\cos\left(\frac{5\pi}{6}\right) =$$

$$\frac{5\pi}{6} \text{ rad} = \frac{5\pi}{6} \times \frac{180^{\circ}}{\pi} = 150$$

 $\frac{5\pi}{6} \text{ rad} = \frac{5\pi}{6} \times \frac{180^{\circ}}{\pi} = 150^{\circ}$ So, we deduce now that  $\cos\left(\frac{5\pi}{6}\right)$  is in the second quarter.

$$\cos\left(\frac{5\pi}{6}\right) = \cos(150^{\circ}) = \cos(180^{\circ} - 30^{\circ})$$
$$= -\cos(30^{\circ}) = -\cos\left(\frac{\pi}{6}\right) = -\frac{\sqrt{3}}{2}$$

79) 
$$\cot\left(\frac{5\pi}{6}\right) =$$

$$\frac{5\pi}{6} \text{ rad} = \frac{5\pi}{6} \times \frac{180^{\circ}}{\pi} = 150^{\circ}$$

So, we deduce now that  $\cot\left(\frac{5\pi}{6}\right)$  is in the second quarter.

$$\cot\left(\frac{5\pi}{6}\right) = \cot(150^{\circ}) = \cot(180^{\circ} - 30^{\circ})$$
$$= -\cot(30^{\circ}) = -\cot\left(\frac{\pi}{6}\right) = -\sqrt{3}$$

81) If 
$$\sin x = \frac{2}{3}$$
 and  $0 < x < \frac{\pi}{2}$ , then  $\csc x = \frac{\pi}{2}$ 

$$\sin x = \frac{2}{3} = \frac{opp}{hyp}$$

Now, we should find the length of the adjacent side using the Pythagorean Theorem, so

$$|adjacent| = \sqrt{3^2 - 2^2} = \sqrt{9 - 4} = \sqrt{5}$$

$$\therefore \csc x = \frac{1}{\sin x} = \frac{hyp}{opp} = \frac{3}{2}$$

 $\therefore \csc x = \frac{1}{\sin x} = \frac{hyp}{opp} = \frac{3}{2}$ 83) If  $\sin x = \frac{3}{4}$  and  $0 < x < \frac{\pi}{2}$ , then  $\cot x = \frac{\pi}{2}$ 

$$\sin x = \frac{3}{4} = \frac{opp}{hyp}$$

Now, we should find the length of the adjacent side using the Pythagorean Theorem, so

$$|adjacent| = \sqrt{4^2 - 3^2} = \sqrt{16 - 9} = \sqrt{7}$$

$$\therefore \cot x = \frac{1}{\tan x} = \frac{adj}{opp} = \frac{\sqrt{7}}{3}$$

84) If 
$$\csc x = -\frac{5}{3}$$
 and  $\frac{3\pi}{2} < x < 2\pi$ , then  $\cos x = -\frac{5}{3}$ 

$$\csc x = \frac{5}{3} = \frac{1}{\sin x} = \frac{hyp}{opp}$$



Now, we should find the length of the adjacent side using the Pythagorean Theorem, so

$$|adjacent| = \sqrt{5^2 - 3^2} = \sqrt{25 - 9} = \sqrt{16} = 4$$

$$\therefore \cos x = \frac{adj}{hyp} = \frac{4}{5}$$

$$\cos x = \frac{adj}{hyp} = \frac{4}{5}$$
86) If  $\csc x = -\frac{5}{3}$  and  $\frac{3\pi}{2} < x < 2\pi$ , then  $\cot x = \frac{5\pi}{3}$ 

Solution:

$$\frac{5}{\csc x = \frac{5}{3}} = \frac{1}{\sin x} = \frac{hyp}{opp}$$

Now, we should find the length of the adjacent side using the Pythagorean Theorem, so

$$|adjacent| = \sqrt{5^2 - 3^2} = \sqrt{25 - 9} = \sqrt{16} = 4$$

$$\cot x = \frac{1}{\tan x} = \frac{adj}{opp} = -\frac{4}{3}$$
88) If  $f(x) = \sin x$ , then  $D_f = \mathbb{R}$ 

88) If 
$$f(x) = \sin x$$
, then  $D_f = \mathbb{R}$ 

88) If 
$$f(x) = \sin x$$
, then  $R_f = [-1,1]$ 

85) If  $\csc x = -\frac{5}{3}$  and  $\frac{3\pi}{2} < x < 2\pi$ , then  $\sec x =$ 

$$\csc x = \frac{5}{3} = \frac{1}{\sin x} = \frac{hyp}{opp}$$

Now, we should find the length of the adjacent side using the Pythagorean Theorem, so

$$|adjacent| = \sqrt{5^2 - 3^2} = \sqrt{25 - 9} = \sqrt{16} = 4$$

$$\therefore \sec x = \frac{1}{\cos x} = \frac{hyp}{adj} = \frac{5}{4}$$

|adjacent| = 
$$\sqrt{5^2 - 3^2} = \sqrt{25 - 9} = \sqrt{16} = 4$$
  
 $\therefore \sec x = \frac{1}{\cos x} = \frac{hyp}{adj} = \frac{5}{4}$   
87) If  $\csc x = -\frac{5}{3}$  and  $\frac{3\pi}{2} < x < 2\pi$ , then  $\tan x =$   
Solution:

$$\overline{\csc x = \frac{5}{3}} = \frac{1}{\sin x} = \frac{hyp}{opp}$$

Now, we should find the length of the adjacent side using the Pythagorean Theorem, so

$$|adjacent| = \sqrt{5^2 - 3^2} = \sqrt{25 - 9} = \sqrt{16} = 4$$

$$\therefore \tan x = \frac{1}{\cot x} = \frac{opp}{adj} = -\frac{3}{4}$$
89) If  $f(x) = \cos x$ , then  $D_f = \mathbb{R}$ 

89) If 
$$f(x) = \cos x$$
, then  $D_f = \mathbb{R}$ 

88) If 
$$f(x) = \sin x$$
, then  $R_f = [-1,1]$