4.4 day 1 p. 357 1-21 odd 29-39 odd

(#1) Amp: 2
Vertical stretch by a factor of 2

(#3) Amp: 4 w/ vertical reflection
Vertical stretch by a factor of 4

(#5) Amp: 0.73
Vertical shrink by a factor of 0.73

(#7) Per: $\frac{2\pi}{3}$
~~Horizontal~~ ~~Vertical~~ shrink by a factor of $\frac{1}{3}$

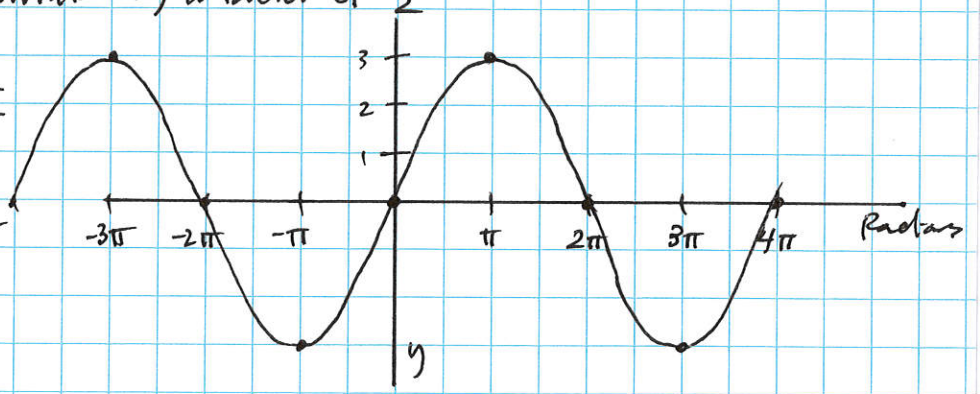
(#9) Per: $\frac{2\pi}{\frac{1}{7}}$
Horizontal shrink by a factor of $\frac{1}{7}$ w/a horizontal reflection

(#11) Per: $\frac{2\pi}{2} = \pi$

Horizontal shrink by a factor of $\frac{1}{2}$

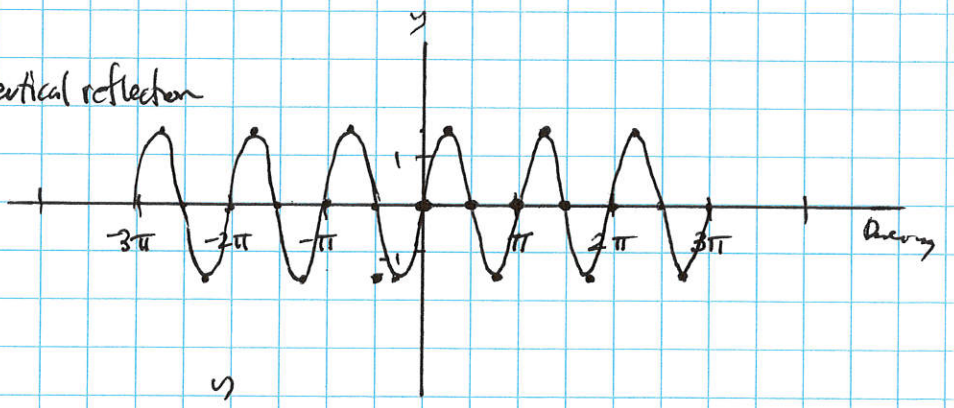
(#13) $y = 3\sin\frac{x}{2}$

Amp: 3
Per: $\frac{2\pi}{\frac{1}{2}} = 4\pi$
Frequency = $\frac{1}{4\pi}$



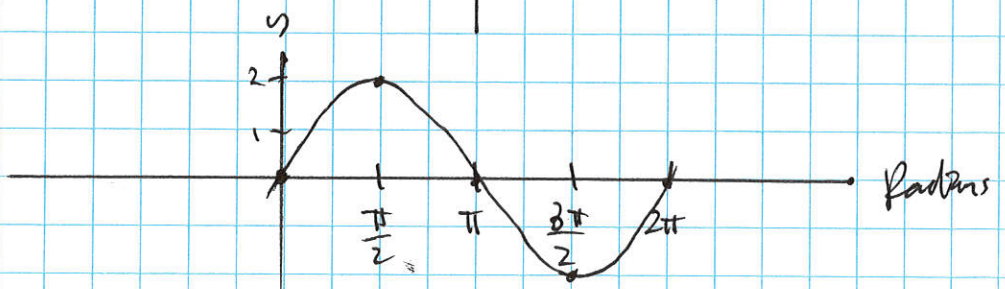
(#15) $y = -\frac{3}{2}\sin 2x$

Amp: $\frac{3}{2}$ w/ vertical reflection
Per: $\frac{2\pi}{2} = \pi$
Frequency = $\frac{1}{\pi}$



(#17) $y = 2\sin x$

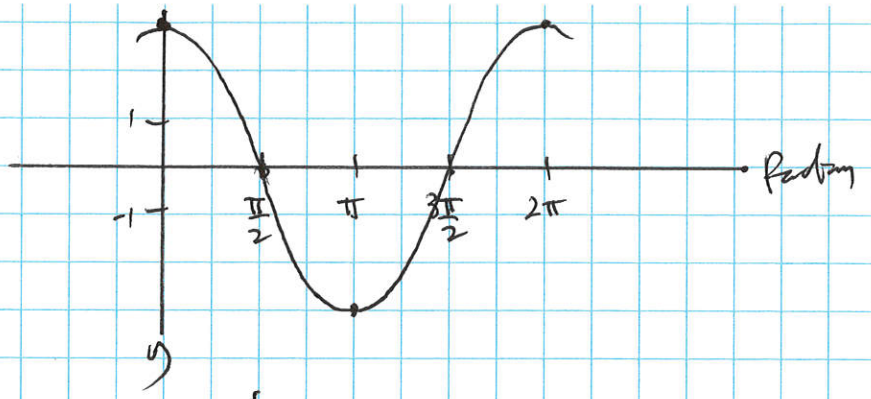
Amp: 2
Per: 2π



#19 $y = 3\cos x$

Amp: 3

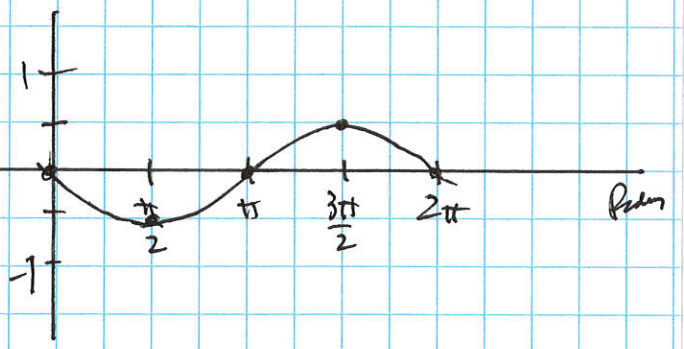
Per: 2π



#21 $y = -\frac{1}{2}\sin x$

Amp: $\frac{1}{2}$ w/ vertical reflection

Per: 2π



#29 $y = 1.5\sin 2x$

Amp = 1.5

Per = $\frac{2\pi}{2} = \pi$

$[-2\pi, 2\pi]$ $[-2, 2]$

#31 $y = -3\cos 2x$

Amp: 3 w/ vertical reflection

Per: $\frac{2\pi}{2} = \pi$

$[-2\pi, 2\pi]$ $[-4, 4]$

#33 $y = -4\sin\frac{\pi}{3}x$

Amp: 4 w/ vertical reflection

Per: $\frac{2\pi}{\frac{\pi}{3}} = 2\pi \cdot \frac{3}{\pi} = 6$

$[-3, 3]$ $[-5, 5]$

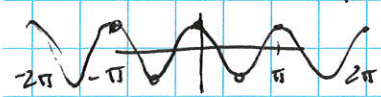
#35 $y = 2\sin x$

$(-\frac{3\pi}{2}, 2)$ $(\frac{\pi}{2}, 2)$

$(-\frac{\pi}{2}, -2)$ $(\frac{3\pi}{2}, -2)$

#37 $y = \cos 2x$

Per: $\frac{2\pi}{2} = \pi$

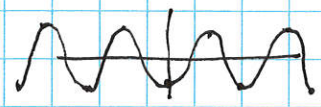


$(-2\pi, 1)$ $(-\pi, 1)$ $(0, 1)$ $(\pi, 1)$ $(2\pi, 1)$

$(-\frac{3\pi}{2}, -1)$ $(-\frac{\pi}{2}, -1)$ $(\frac{\pi}{2}, -1)$ $(\frac{3\pi}{2}, -1)$

#39 $y = -\cos 2x$

Per: $\frac{2\pi}{2} = \pi$



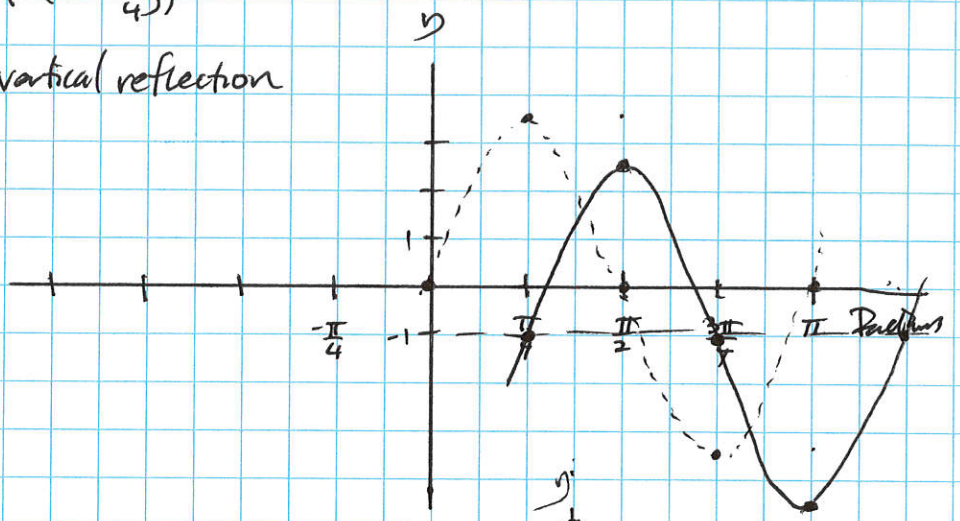
$(-\frac{3\pi}{2}, -1)$ $(-\frac{\pi}{2}, -1)$ $(\frac{\pi}{2}, -1)$ $(\frac{3\pi}{2}, -1)$

$(-2\pi, 1)$ $(-\pi, 1)$ $(0, 1)$ $(\pi, 1)$ $(2\pi, 1)$

4.4 p. 358 62-68 (even)
day 2
graphs with all

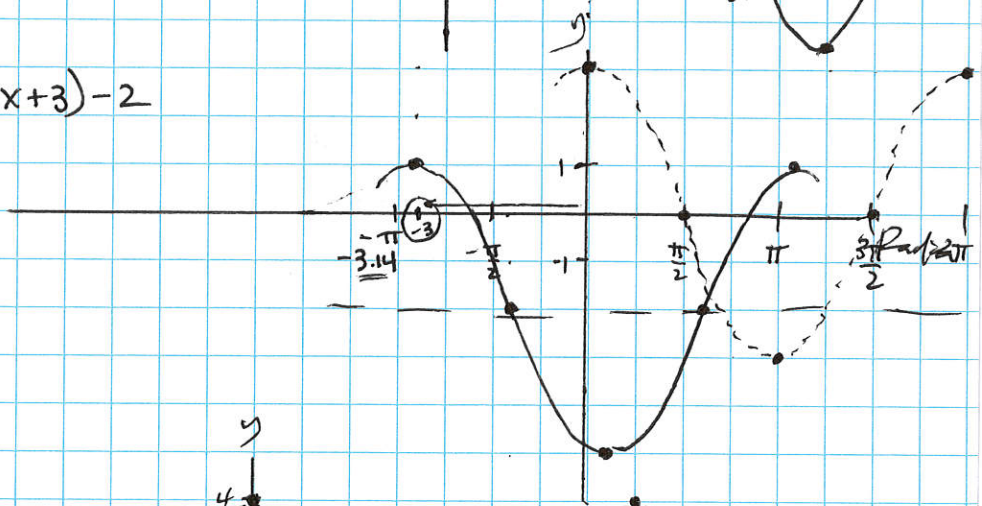
#62 $y = -3.5 \sin\left(2x - \frac{\pi}{2}\right) - 1$
$\left(2\left(x - \frac{\pi}{4}\right)\right)$

Amp: 3.5 w/ vertical reflection
Per: $\frac{2\pi}{2} = \pi$
P.S. right $\frac{\pi}{4}$
V.T. down 1



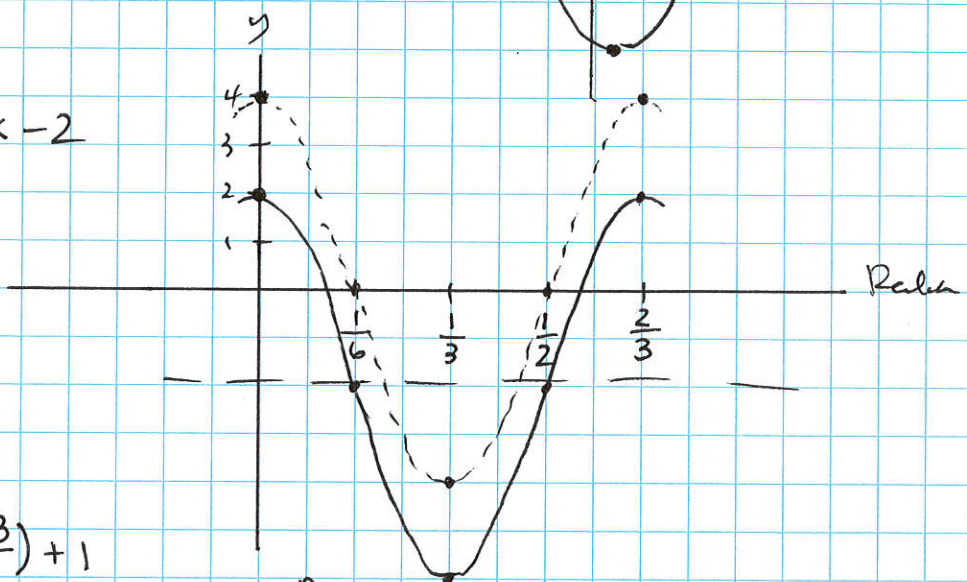
#64 $y = 3\cos(x+3) - 2$

Amp: 3
Period: 2π
P.S. left 3
V.T. down 2



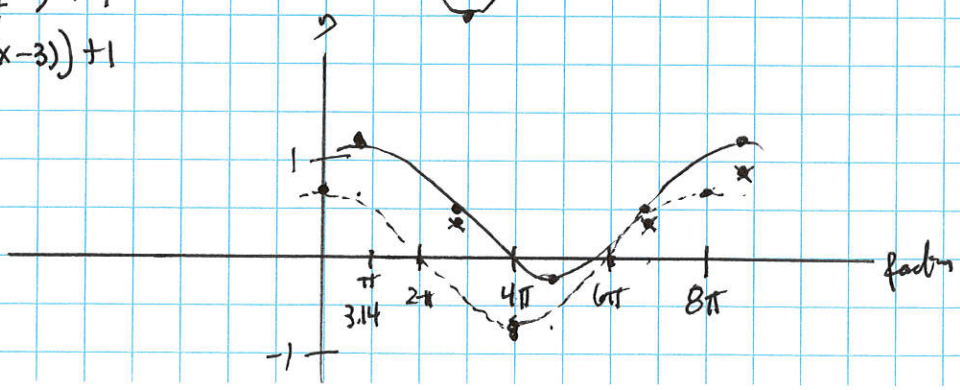
#66 $y = 4\cos 3\pi x - 2$

Amp: 4
Per: $\frac{2\pi}{3\pi} = \frac{2}{3}$
V.T. - down 2



#68 $y = \frac{2}{3}\cos\left(\frac{x-3}{4}\right) + 1$
$y = \frac{2}{3}\cos\left(\frac{1}{4}(x-3)\right) + 1$

Amp: $\frac{2}{3}$
Per: $\frac{2\pi}{\frac{1}{4}} = 8\pi$
P.S. right 3
V.T. up 1



4.4 (day 3) p. 357 45-49, 51-59 odd, 69

#45 $y = -\frac{2}{3}\cos\frac{x}{3}$

Amp: $\frac{2}{3}$ w/ vertical reflection
Per: $\frac{2\pi}{\frac{1}{3}} = 6\pi$

SO There is a vertical shrink by a factor of $\frac{2}{3}$, a vertical reflection and a horizontal stretch by a factor of 3.

#46 $y = \frac{3}{4}\sin\frac{x}{5}$

There is a vertical shrink by a factor of $\frac{3}{4}$ and a horizontal stretch by a factor of 5.

Amp: $\frac{3}{4}$
Per: $\frac{2\pi}{\frac{1}{5}} = 10\pi$

#47 $y = 3\cos\frac{2\pi x}{3}$

There is a vertical stretch by a factor of 3 and a horizontal shrink by a factor of $\frac{3}{2\pi}$

Amp: 3
Per: $\frac{2\pi}{\frac{2\pi}{3}} = 2\pi \cdot \frac{3}{2\pi} = 3$

#48 $y = -2\sin\frac{\pi x}{4}$

There is a vertical stretch by a factor of 2, a vertical reflection, and a horizontal stretch by a factor of $\frac{4}{\pi}$.

Amp: 2 w/ vertical reflection
Per: $\frac{2\pi}{\frac{\pi}{4}} = 2\pi \cdot \frac{4}{\pi} = 8$

#49 $y_1 = \cos 2x \quad y_2 = \frac{5}{3}\cos 2x$

There is a vertical stretch by a factor of $\frac{5}{3}$ from y_1 to y_2.

#51 $y_1 = 2\cos \pi x \quad y_2 = 2\cos 2\pi x$

Per $= \frac{2\pi}{\pi} = 2$ Per $= \frac{2\pi}{2\pi} = 1$

There is a horizontal shrink by a factor of $\frac{1}{2}$ from y_1 to y_2.

#53 a and b

#55 a and b

#69 $a = 2$
$b = \frac{2\pi}{\pi} = 2$
$y = 2\sin 2x$

#57 Amp: 3 $a = 3$
Per: π $b = \frac{2\pi}{\pi} = 2$
(0, 0)
$y = 3\sin 2x$

#59 Amp: 1.5 $a = 1.5$
Per: $\frac{\pi}{6}$ $b = \frac{2\pi}{\frac{\pi}{6}} = 2\pi \cdot \frac{6}{\pi} = 12$
(1, 0)
$y = 1.5\sin(12(x-1))$

4.5 (day 1) p. 365 5-27 odd

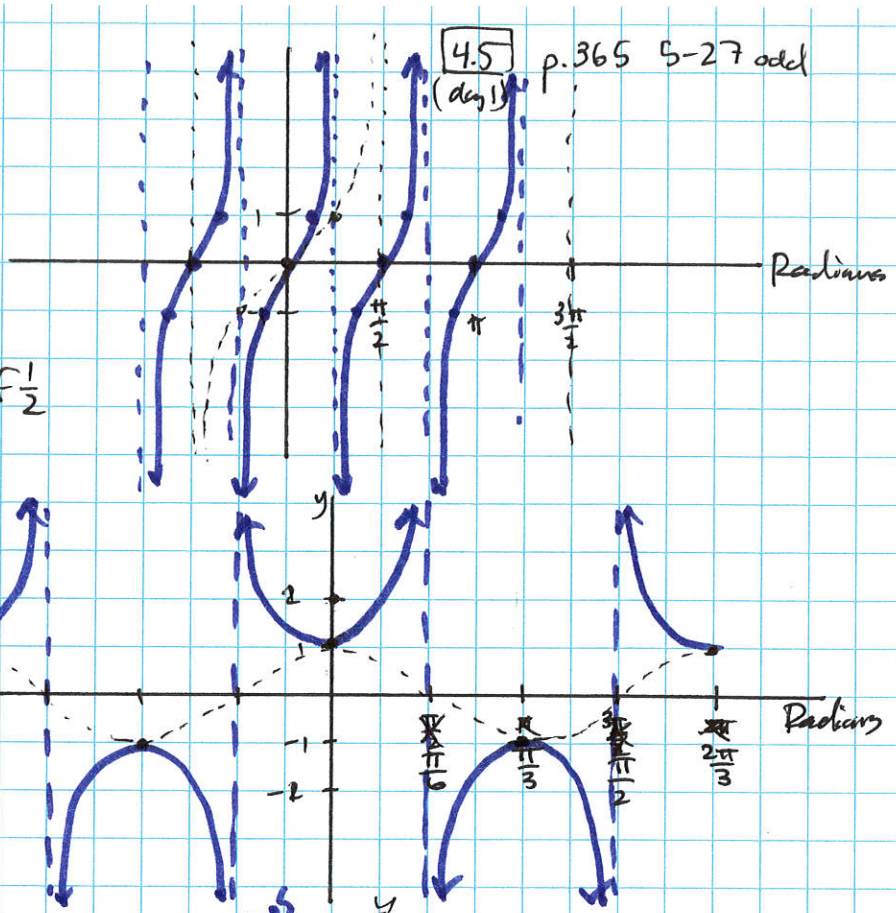
(#5) $y = \tan 2x$

$a = 1$

per: $\frac{\pi}{2}$

There is a horizontal shrink by a factor of $\frac{1}{2}$

V.A. @ $x = \frac{\pi}{4} + \frac{\pi}{2}k$



(#7) $y = \sec 3x$

$a = 1$

Per: $\frac{2\pi}{3}$

Theres is a horizontal shrink by a factor of $\frac{1}{3}$

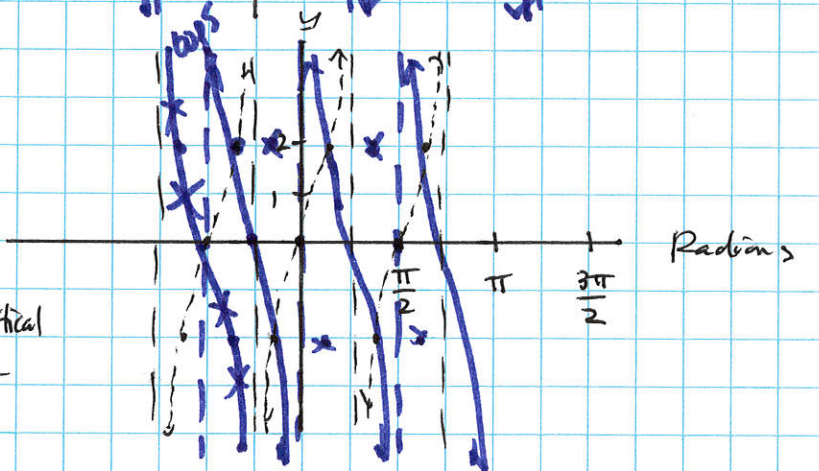
V.A. @ $x = \frac{\pi}{6} + \frac{\pi}{3}k$

(#9) $y = 2\cot 2x$

$a = 2$

Per = $\frac{\pi}{2}$

$y = 2\tan 2x$ like #5



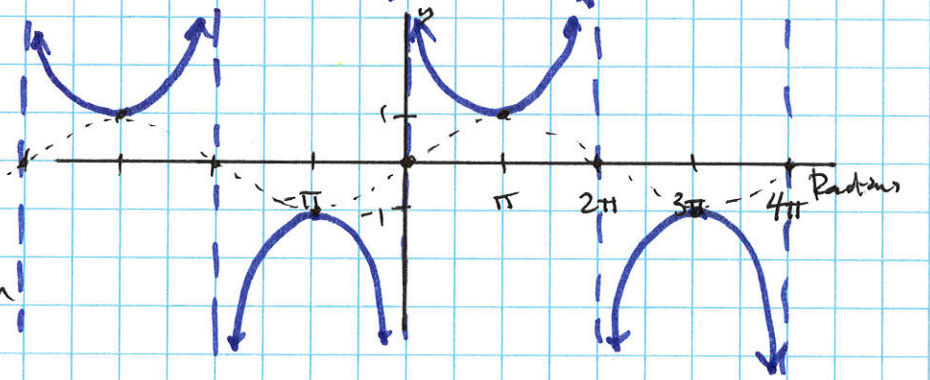
There is a horizontal shrink by a factor of $\frac{1}{2}$ and a vertical stretch by a factor of 2

v.A. @ $x = 0 + \frac{\pi}{2}k$

(#11) $y = \csc \frac{x}{2}$

$a = 1$

Per = $\frac{2\pi}{\frac{1}{2}} = 4\pi$



There is a horizontal stretch by a factor of 2

V.A. @ $x = 0 + 2\pi k$

#13 $y = -2\tan x$

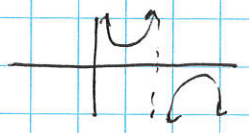
a

$[-\pi, \pi]$

#15 $y = \sec 2x$

c

$[-\pi, \pi]$



#17 $f(x) = \cot x$

D: $\mathbb{R}$ except $x = \pi k$

R: $(-\infty, \infty)$

Continuous on its domain

Decreasing on each interval of Domain

Odd symmetry

Not bounded

No extrema

V.A. @ $x = \pi k$

No end behavior

#19 $f(x) = \csc x$

D: $\mathbb{R}$ except $x = \pi k$

R: $(-\infty, -1] \cup [1, \infty)$

Continuous on its domain

Decreasing on $(0 + 2\pi k, \frac{\pi}{2} + 2\pi k) \cup$ and $(\frac{3\pi}{2} + 2\pi k, 2\pi + 2\pi k)$

Increasing on $(\frac{\pi}{2} + 2\pi k, \pi + 2\pi k) \cup (\pi + 2\pi k, \frac{3\pi}{2} + 2\pi k)$

Odd symmetry

Not bounded

minimums at $x = \frac{\pi}{2} + 2\pi k$

maximums at $x = \frac{3\pi}{2} + 2\pi k$

V.A. @ $x = \pi k$

No end behavior

#21 $y = 3\tan x$

vertical stretch by a factor of 3

#23 $y = 3\csc x$

Vertical stretch by a factor of 3

#25 $y = -3\cot \frac{1}{2} x$

Vertical stretch by a factor of 3 w/ vertical reflection and a horizontal stretch by a factor of 2

#27 $y = -\tan \frac{\pi}{2} x + 2$

Vertical reflection and a horizontal shrink by a factor of $\frac{2}{\pi}$ plus a vertical shift up 2 units

4.5 (day 2) p. 366 29-40

#29 $\sec x = 2 \quad 0 \le x \le \frac{\pi}{2}$

$x = \frac{\pi}{3}$

#30 $\csc x = 2 \quad \frac{\pi}{2} \le x \le \pi$

$x = \frac{5\pi}{6}$

#31 $\cot x = -\sqrt{3} \quad \frac{\pi}{2} \le x \le \pi$

$x = \frac{5\pi}{6}$

#32 $\sec x = -\sqrt{2} \quad \pi \le x \le 3\pi/2$

$x = \frac{5\pi}{4}$

#33 $\csc x = 1 \quad 2\pi \le x \le \frac{5\pi}{2}$

$x = \frac{5\pi}{2}$

#34 $\cot x = 1 \quad -\pi \le x \le -\pi/2$

$x = -\frac{3\pi}{4}$

#35 $\tan x = 1.3 \quad 0 \le x \le \frac{\pi}{2}$

$x = 0.92$

#36 $\sec x = 2.4 \quad 0 \le x \le \frac{\pi}{2}$

$x = 1.14$

#37 $\cot x = -0.6 \quad \frac{3\pi}{2} < x \le 2\pi$

$x = 5.25$

#38 $\csc x = -1.5 \quad \pi \le x \le \frac{3\pi}{2}$

$x = 3.87$

#39 $\csc x = 2 \quad 0 \le x \le 2\pi$

$x = 0.52$ and 2.62

#40 $\tan x = 0.3 \quad 0 \le x \le 2\pi$

$x = 0.29$ and 3.43

4.7 p.385 1-20, 33-36 (day 1)

#1 $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = \frac{\pi}{3}$

#2 $\sin^{-1}\left(-\frac{1}{2}\right) = -\frac{\pi}{6}$

#3 $\tan^{-1}(0) = 0$

#4 $\cos^{-1}(1) = 0$

#5 $\cos^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{3}$

#6 $\tan^{-1}(1) = \frac{\pi}{4}$

#7 $\tan^{-1}(-1) = -\frac{\pi}{4}$

#8 $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \frac{5\pi}{6}$

#9 $\sin^{-1}\left(-\frac{1}{\sqrt{2}}\right) = -\frac{\pi}{4}$

#10 $\tan^{-1}(-\sqrt{3}) = -\frac{\pi}{3}$

#11 $\cos^{-1}(0) = \frac{\pi}{2}$

#12 $\sin^{-1}(1) = \frac{\pi}{2}$

#13 $\sin^{-1}(0.362) = 21.22°$

#14 $\arcsin 0.67 = 42.07°$

#15 $\tan^{-1}(-12.5) = -85.43°$

#16 $\cos^{-1}(-0.23) = 103.30°$

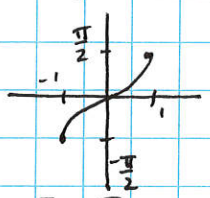
#17 $\tan^{-1}(2.37) = 1.172$

#18 $\tan^{-1}(22.8) = 1.527$

#19 $\sin^{-1}(-0.46) = -0.478$

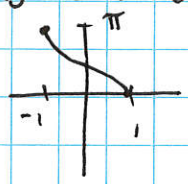
#20 $\cos^{-1}(-0.853) = 2.593$

#33 $f(x) = \sin^{-1}(x)$



D: $[-1, 1]$
R: $[-\frac{\pi}{2}, \frac{\pi}{2}]$
Continuous
Increasing
odd symmetry
Bounded
Absolute minimum @ $x = -\frac{\pi}{2}$, -1
Abs. Max @ $x = \frac{\pi}{2}$, 1
No asymp
No E.B.

#34 $f(x) = \cos^{-1}(x)$



D: $[-1, 1]$
R: $[-\frac{\pi}{2}, \frac{\pi}{2}]$
Continuous
decreasing
No symmetry (rotational at $(0, \frac{\pi}{2})$)
Bounded
Abs. min at $x = 1$
Abs. max at $x = -1$
No asymp
No E.B.

#35

#36

4.7 day2 p. 385 23-32, 48-52 even, 59-62

#23 $\cos(\sin^{-1}(\frac{1}{2}))$ $\cos(30)$ $= \boxed{\frac{\sqrt{3}}{2}}$

#24 $\sin(\tan^{-1}(1))$ $\sin(\frac{\pi}{4}) = \boxed{\frac{\sqrt{2}}{2}}$

#25 $\sin^{-1}(\cos(\frac{\pi}{4}))$ $\sin^{-1}(\frac{\sqrt{2}}{2}) = \boxed{\frac{\pi}{4}}$

#26 $\cos^{-1}(\cos(\frac{7\pi}{4}))$ $\cos^{-1}(\frac{\sqrt{2}}{2}) = \boxed{\frac{\pi}{4}}$

#27 $\cos(2\sin^{-1}(\frac{1}{2}))$ $\cos(2(\frac{\pi}{6})) = \boxed{\frac{1}{2}}$

#28 $\sin(\tan^{-1}(-1))$ $\sin(-\frac{\pi}{4}) = \boxed{-\frac{\sqrt{2}}{2}}$

#29 $\arcsin(\cos(\frac{\pi}{3}))$ $\sin^{-1}(\frac{1}{2}) = \boxed{\frac{\pi}{6}}$

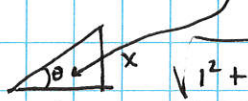
#30 $\arccos(\tan(\frac{\pi}{4}))$ $\cos^{-1}(1) = \boxed{0}$

#31 $\cos(\tan^{-1}(\sqrt{3})) = \boxed{\frac{1}{2}}$

#32 $\tan^{-1}(\cos(\pi))$ $\tan^{-1}(-1) = \boxed{-\frac{\pi}{4}}$

#48 $\cos(\tan^{-1}(x))$

$\tan^{-1}(\frac{x}{1}) = \theta$ $x = opp$, $1 = adj$



$\sqrt{1^2 + x^2} = \sqrt{hyp^2}$

$\sqrt{1+x^2} = hyp$

$\cos\theta = \boxed{\frac{1}{\sqrt{1+x^2}}}$

#50 $\cot(\arccos(x)) = \frac{adj}{opp}$

$\cos^{-1}(\frac{adj}{Hyp}) = \cos^{-1}(\frac{x}{1})$

$x = adj$ $1 = hyp$

$x^2 + opp^2 = 1^2$

$\sqrt{opp^2} = \sqrt{1-x^2}$

$opp = \sqrt{1-x^2}$

$= \boxed{\frac{x}{\sqrt{1-x^2}}}$

#52 $\sin(\arccos(3x)) =$

$\cos^{-1}(\frac{adj}{Hyp}) = \cos^{-1}(\frac{3x}{1})$

$adj = 3x$ $hyp = 1$

$(3x)^2 + opp^2 = 1^2$

$\sqrt{opp^2} = \sqrt{1-9x^2}$

$opp = \sqrt{1-9x^2}$

$= \boxed{\frac{\sqrt{1-9x^2}}{1}}$

#59 E

#60 C

#61 C

#62 E