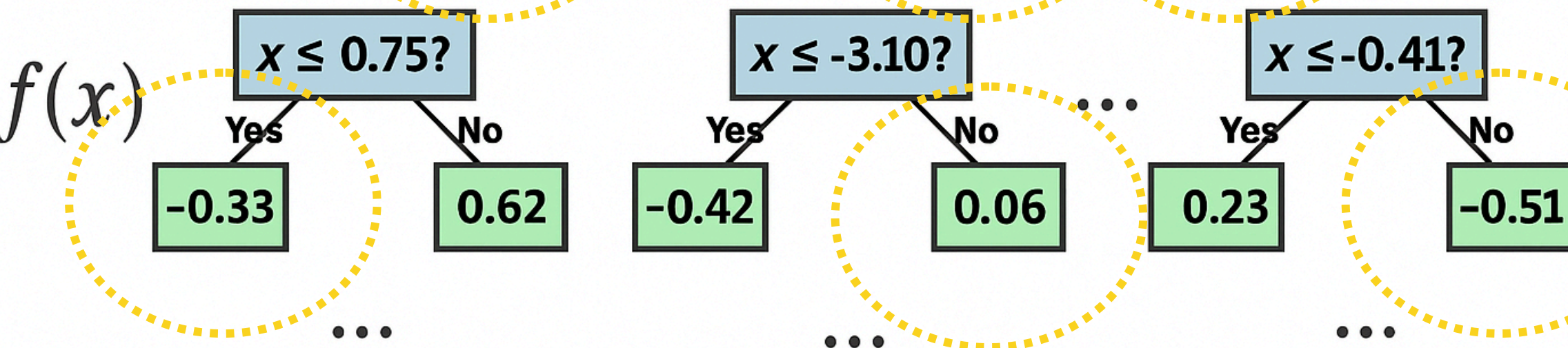
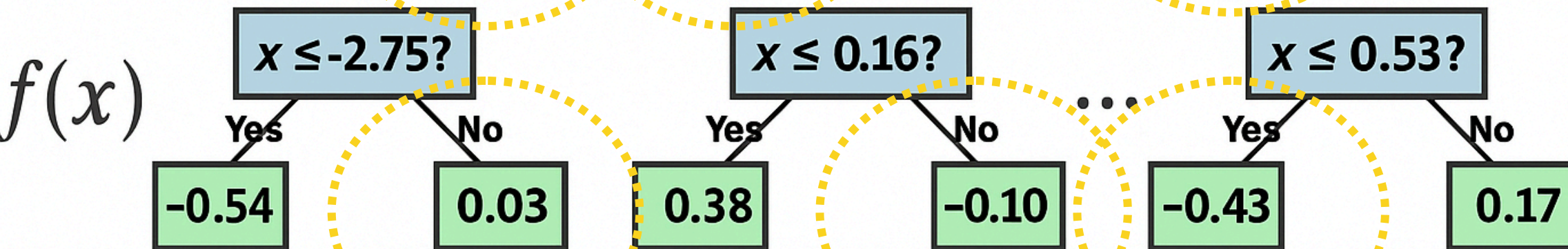
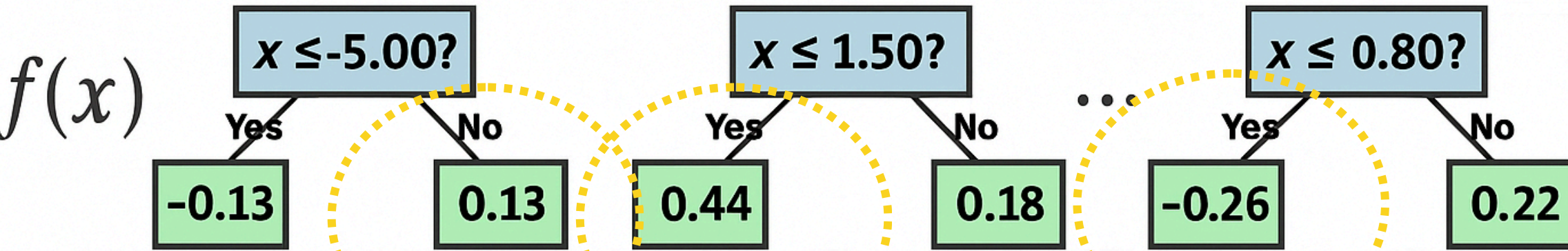


Can only predict at supplied prediction points.

$$x = 0.4$$



$$f(x) = 0.13 + 0.44 - 0.26 = 0.31$$

$$f(x) = 0.03 - 0.10 - 0.43 = -0.50$$

$$f(x) = -0.33 + 0.06 - 0.51 = 0.24$$

GOAL: Over next two classes and some time outside of class, make a notebook (several notebooks) or Python project in any IDE with text and code describing your minimally viable product that executes the below workflow. Provide justification as text cells in your notebook or comments. Submissions accepted as pull requests to your students folder on github.

CLONE REPOSITORY TO GET DATA

<https://github.com/flyaflya/fsan830spring2025.git>

githubFolderNames

CHURCHILL DOWNS
May 2023 PP & Results
(18 Race Dates)

*Horse Racing Data - xml
for training*

rawDataForTraining

*Horse Racing Data - data
for race to predict*

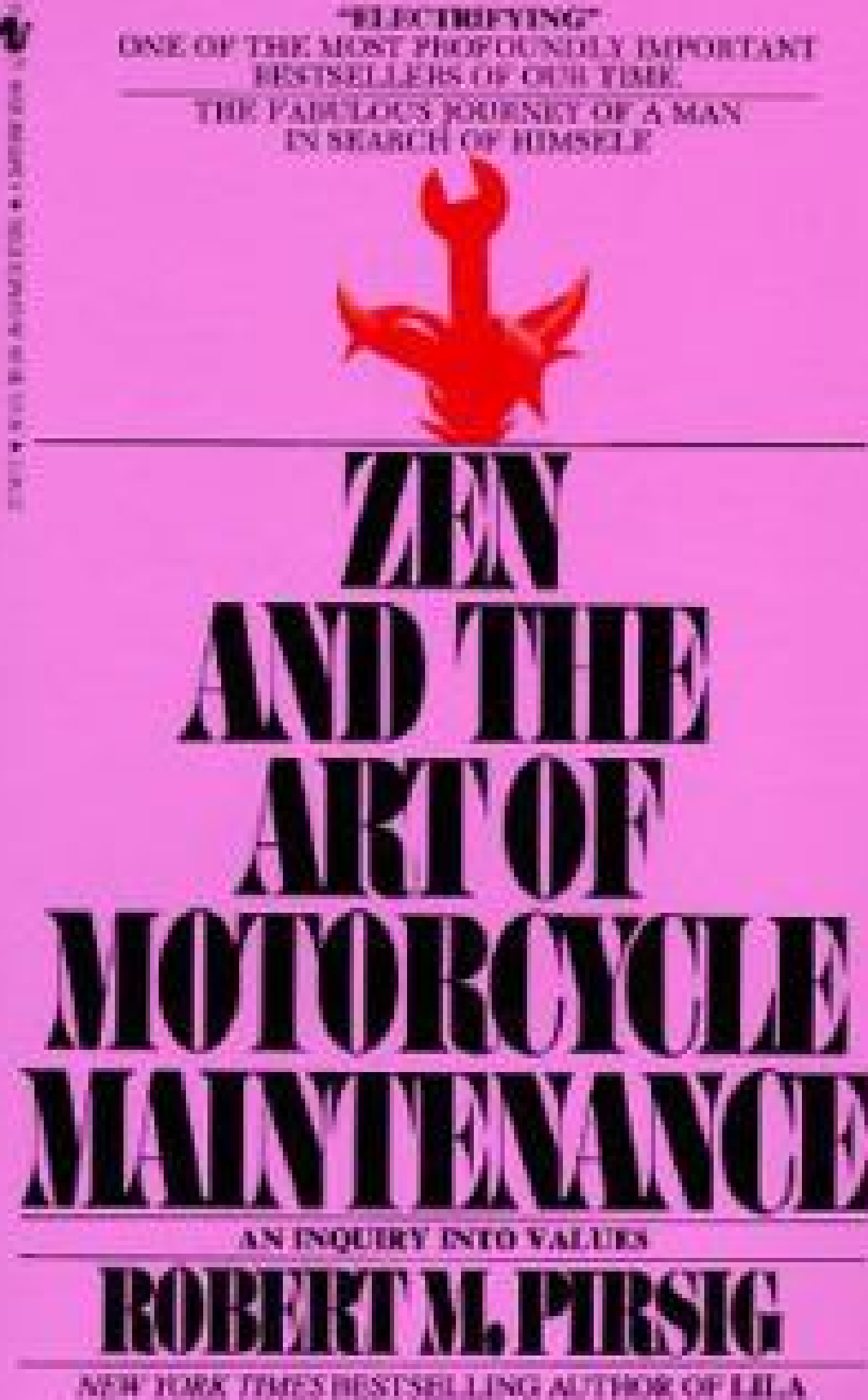
rawDataForPrediction

CHURCHILL DOWNS 10
Race Outcomes on April
26, 2025

CHURCHILL DOWNS
April 26, 2025

*PREDICT Winner? Winning Time?
Order of Finishers?
Something else we can use to make
a win, place, show, or exacta bet?
(hint: you might need an inverse
link function or some other
variable transformation)*

PYMC-BART MODEL



A student in the narrator's class is unable to write a paper. She's been assigned to write about her town, Bozeman, Montana, but she insists there's nothing to say—she simply can't begin. The narrator advises her to narrow her focus. He suggests:

“Narrow it down to the main street of Bozeman. That’s still too much. Narrow it down to one building. That’s still too much. Narrow it down to the front of the building. Still too much. Narrow it down to one brick on the building.”

At first, she’s baffled. A single brick? But the next day she returns, amazed. Once she focused on that single brick, the words began to flow. She wrote pages and pages.

CHATGPT Summary of Brick Story from Zen and The Art of Motorcycle Maintenance

DEEPER MEANING: The paralysis she felt was a result of too broad a scope—too many options, too much pressure.

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<ul style="list-style-type: none"> ★ Chance to improve while trying Dirt ★ 33% trainer: 1st after clm 	<ul style="list-style-type: none"> ● Beaten by weaker (on AW) in last race
---	---

DATE	TRK	DIST	RR	RACETYPE	CR	E1	E2	LP	SP	PD	P1	1C	2C	Str	FIN	JOCKEY	ODDS	Winner	
Claimed from P. J. Samuel, Baez Sergio Trainer (as of 03/29/2023): (34 12-4 35%)																			
29Mar24	W06	1 1/4	ft	112	116	88	77	71	72	9	25	23	94	2	863	693	SrpAntm121	Lb 17.7	SantAntm512
13Mar25	TP4	1 1/8	ft	112	116	88	77	71	72	9	25	23	94	2	863	693	DLUzrIm121	Lb 3.0	PHFactor32
Claimed from Conestoga Stable Inc, Conestoga Cipriano Trainer (as of 02/26/2023): (263, 53-31 33 20%)																			
26Feb25	TP8	1 1/8	ft	110	116	88	77	71	72	9	25	23	94	2	863	693	SrpNtS120	Lb 3.9	NoahsArknk10
Claimed from Sierra Farm LLC and Winslow Farm LLC, Brisset Rodolphe Trainer (as of 01/26/2025): (243 42-38-31 17%)																			
18Jan25	TP4	1 1/8	ft	112	116	88	77	71	72	9	25	23	94	2	863	693	MchdLn121	Lb 4.9	TrsMrccr32
Previously trained by Altard Kevin (as of 10/27/2024): (323 61-50-52 19%)																			
27Oct24	W01	1 1/8	ft	31113	OC32kNt1x-N	113	62	70	88	80	11	912	910	77	6	963	45AstrN116	Lb 6.8	Meyer232
10-27-24 Outs ahead one; 3wrum3 third flight kept pace; mnti15w316 stalled																			
19Sep24	W06	1 1/8	ft	31110	Cm25000N3L	113	79	84	89	83	4	5	3	22	1	HmzrHm121	Lb 2.2	NoahsArk1	
17Aug24	W02	1 1/8	ft	31112	OC40k	112	87	89	69	78	1	2	23	2	37	HmzrHm121	Lb 4.1	JmsHospk6	
20Jul24	W02	1 1/8	ft	31110	OC40k	113	91	93	70	81	2	2	23	2	15	121	HmzrHm1119	Lb 2.2	NoahsArk1
Previously trained by Brisset Rodolphe (as of 02/02/2024): (156 36-20-19 23%)																			
02Feb24	TP7	1 1/8	ft	110	AW50000N	109	77	73	72	68	9	4	63	7	121	AchrdrA120	Lb 4.6	Krwhnnr123	
18Jan24	TP3	1 1/8	ft	110	OC50kNt1x-N	110	76	78	80	76	9	1073	1056	64	493	AchrdrA120	L	5.2	MsmRady12

22Feb TP 4f ft:51* B 80/106		14Feb TP 4f ft:49* B 28/41		08Feb TP 4f ft:52* B 101/104	
J/T Meet: (0 .00 +\$0.00)		J/T L365: (0 .00 +\$0.00)			
Class Rating		Speed Last Race		Best Speed at Dist	
1	Tiberius Mercurius 113.9	1	Tiberius Mercurius 81	7	Synthesis 97
7	Synthesis 113.4	7	Synthesis 80	1	Tiberius Mercurius 90
5	Peruvian Lucky 112.8	5	Peruvian Lucky 79	6	Improbable Story 85

RACETYPE STATS:						# Races	FAVORITES		S2ROI	Average Field Size	Median S2 Win Payoff	% Winners < 5/1	% Winners >=5/1 < 10/1	% Winners > 10/1
CD	3up	CLM	10000-12500	8.0f-9.0f		12	Win% 42%	ITM% 75%	+0.40	7.4	\$9.66	67%	17%	17%

Track Bias Stats

* MEET Totals *					* Week Totals *				
Dirt 8.0f					Dirt 8.0f				
# Races: 52					# Races: 12				
%Wire: 23%					%Wire: 17%				
Speed Bias: 75% 09/12 - 12/01					Speed Bias: 50% 11/25 - 12/01				
WnrAvgBL 1stCall: 2.0 2ndCall: 1.0					WnrAvgBL 1stCall: 2.9 2ndCall: 1.3				
Runstyle:	Early E	Speed E/P	Late P	Speed S	Runstyle:	Early E	Speed E/P	Late P	Speed S
	+	++				++		+	
Impact Values:	1.18	1.60	0.55	0.63	Impact Values:	1.27	0.39	1.29	0.92
%Races Won	35%	40%	10%	15%	%Races Won	42%	8%	25%	25%
Post Bias:	RAIL	1-3	4-7	8+	Post Bias:	RAIL	1-3	4-7	8+
			+	+				+	
Impact Values:	0.77	0.72	1.16	1.20	Impact Values:	0.00	0.44	1.61	0.54
Avg Win %	10%	9%	14%	12%	Avg Win %	0%	6%	20%	5%

Race Summary

#	Horse Name	ML Odds	Med Eqp	Days Since L/R	Run Style	P T S	Avg Dist/Surf PACE-SPEED			Avg Race Rting	Best Pace		Final Speed				Rcg Spd Avg	R1	R2	R3	Mud Spd	Pedigree Stats		Dam		
							E1	E2/Late	Spd		E1	E2/Late	Sp1	Sp2	Sp3	Sp4						ACL	Mud Sts	% Mud	Sire AWD	Sire's AWD
1	Tiberius Mercurius	4/1	L	28	++E/P	6	88	84/ 95	* 89*	112	90	92/100	81	82.	90.	87.	112.4	84	113	112	113	80	1351	13	6.8	7.5
7	Synthesis	7/2	L	22	++E/P	3	90	93/ 83	(87)	116			80	84	84	83	(113.9)	83	115	112	113		1557	16	6.8	7.5
5	Peruvian Lucky	5/1	L	57	++E/P	4	86	88/ 76	* 80*	112	92	92/ 77	79.	80.	74	81.	112.2	78	114	112	112		1220	14	7.5	6.6
3	Coyote Road	8/1		127	++E/P	3	84	86/ 70	(77)	111	88	87/ 94	57.	73	77.	80.	110.8	69	112	112	110	85	1376	16	7.4	6.9
1	Noahs Ark	20/1	L	28	++E/P	3	77	78/ 82	* 77*	111	91	93/ 92	72.	76.	79.	76.	111.3	76	111	112	110		70	11	7.5	6.6
8	Hoodlum	3/1	L	68	++E/P	4	84	84/ 70	(75)	114	90	97/ 96	72T	75.	85.	85	114.0	77	111	114	113		1048	15	7.5	6.8
9	I Am the Game	15/1	L	28		P 3	79	79/ 74	* 74*	109	84	82/ 93	73.	79.	68.	70.	108.9	73	111	108	109	81	333	15	7.2	7.1
10	Metatron's Muse	8/1	L	84	++E/P	4	76	65/ 88	(73)	109	87	85/ 97	65.	80.	76	73.	109.6	74	110	109	110		2583	18	6.9	7.6
4	Ready Pursuit	15/1	L	30		S 4	72	70/ 82	72	108	86	81/ 84	64	80	73	72.	(109.6)	72	111	109	110		659	13	6.5	7.0
6	Improbable Story	20/1	L	10		S 2	67	74/ 74	* 70*	112	88	82/102	64	71.	69.	78	110.7	68	110	112	112		589	14	6.5	7.1
2	Where Is Lisa	30/1	L	38	++E/P	5	78	74/ 78	* 66*	109	98	87/ 90	73	62.	66.	23.	107.7	67	108	110	108		300	17	6.8	6.8

Speed Last Race	Back Speed	Current Class	Average Class Last 3	Prime Power	Early Pace Last Race	Late Pace Last Race
81 Tiberius Mercurius	90 Tiberius Mercurius	115.1 Tiberius Mercurius	113.9 Tiberius Mercurius	124.9 Tiberius Mercurius	92 Peruvian Lucky	89 Synthesis
80 Synthesis	85 Hoodlum	113.2 Peruvian Lucky	113.4 Synthesis	120.3 Synthesis	87 Where Is Lisa	85 Improbable Story
79 Peruvian Lucky	82 I Am the Game	112.0 Noahs Ark	112.8 Peruvian Lucky	120.1 Peruvian Lucky	84 Synthesis	78 Where Is Lisa
73 Where Is Lisa	81 Peruvian Lucky	111.9 Hoodlum	112.0 Hoodlum	119.2 Hoodlum	77 Hoodlum	78 Ready Pursuit
73 I Am the Game	81 Improbable Story	111.1 Improbable Story	112.0 Noahs Ark	116.4 Noahs Ark	71 Ready Pursuit	78 Metatron's Muse
72 Hoodlum	81 Noahs Ark	111.1 I Am the Game	110.9 I Am the Game	115.6 I Am the Game	71 Improbable Story	77 Peruvian Lucky
72 Noahs Ark	80 Coyote Road	109.2 Metatron's Muse	110.8 Ready Pursuit	111.9 Metatron's Muse	71 I Am the Game	77 Hoodlum
65 Metatron's Muse	80 Metatron's Muse	108.4 Ready Pursuit	110.1 Coyote Road	110.6 Coyote Road	70 Coyote Road	74 Tiberius Mercurius
64 Ready Pursuit	75 Where Is Lisa	108.0 Where Is Lisa	110.1 Improbable Story	110.5 Ready Pursuit	68 Noahs Ark	74 Coyote Road
64 Improbable Story	72 Ready Pursuit	NA Coyote Road	109.8 Metatron's Muse	109.6 Where Is Lisa	67 Tiberius Mercurius	71 I Am the Game
57 Coyote Road	NA Synthesis	NA Synthesis	108.5 Where Is Lisa	109.4 Improbable Story	65 Metatron's Muse	71 Noahs Ark

RACETYPE STATS:										# Races	FAVORITES Win% 25%	ITM% 83%	S2ROI -0.54	Average Field Size 7.4	Median S2 Win Payoff \$8.82	% Winners < 5/1 75%	% Winners >=5/1 < 10/1 8%	% Winners > 10/1 17%
CD	3up	ALW+	141000	N3X	Turf	8.0f-9.0f												

Track Bias Stats

* MEET Totals *										* Week Totals *									
Turf 8.0f					Speed Bias: 30%					Turf 8.0f					Speed Bias: 33%				
# Races: 10					09/12 - 12/01					# Races: 3					11/25 - 12/01				
%Wire: 0%					WnrAvgBL 1stCall: 3.4 2ndCall: 2.0					%Wire: 0%					WnrAvgBL 1stCall: 3.1 2ndCall: 2.8				
Runstyle:					Early E	Speed E/P	Late P	Speed S		Runstyle:					Early E	Speed E/P	Late P	Speed S	
						+	++									+	++		
Impact Values:					0.00	2.40	1.28	0.91		Impact Values:					0.00	1.97	2.14	0.00	
%Races Won					0%	30%	40%	30%		%Races Won					0%	33%	67%	0%	
Post Bias:					RAIL	1-3	4-7	8+		Post Bias:					RAIL	1-3	4-7	8+	
							+									+	+		
Impact Values:					0.00	0.64	1.50	0.70		Impact Values:					0.00	1.29	1.94	0.00	
Avg Win %					0%	7%	15%	6%		Avg Win %					0%	11%	17%	0%	

Race Summary

#	Horse Name	ML Odds	Med Eqp	Days Since L/R	Run Style	P T S	Avg Dist/Surf PACE-SPEED			Avg Race Rting	Best Pace		Final Speed				Rcg Spd Avg				Mud Spd	Pedigree Stats		Dam		
							E1	E2/Late	Spd		E1	E2/Late	Sp1	Sp2	Sp3	Sp4		ACL	R1	R2		R3	% Mud	% Trf	Sire AWD	Sire's AWD
7	No Mo Candy	2/1	L	169	+E/P	7	93	96/ 89	(93)	115	93	96/ 89	93.T	92T	81	73	115.9	89	115	113	110	82 69	18	14	7.5	7.3
5	Mission of Joy	9/5	L	203		2	84	87/ 90	(89)	118	107	115/102	83.T	76.T	95T	90.T	118.0	85	116	117	119		13	12	7.8	7.6
2	Neverwalkalone	10/1	L	55		4	89	93/ 84	(88)	116	92	96/ 94	88	86	92.T	84.T	(115.1)	89	117	115	116		13	8	8.0	6.8
4	Justifiable Belle	3/1	L	191	+E/P	5	85	92/ 83	(87)	114	82	92/ 94	82.T	82.T	90.T	88.T	115.2	85	114	115	114		20	10	7.7	8.0
3	Lucky Speech	5/1	L	191	+E/P	7	71	72/ 88	(83)	113	82	90/104	81.T	85T	82T	62	114.0	83	114	114	112		13	4	7.0	7.5
1	Jill Jitterbug	20/1	L	37..		5	85	88/ 85	(80)	115	89	92/ 98	78	73	82	69		78	114	115	112		14	8	7.0	6.8
6	Vinos Angel	30/1	L	31		P							86	74	80	83	(113.2)	80	114	115	113		15	6	7.2	7.4

Speed Last Race	Back Speed	Current Class	Average Class Last 3	Prime Power	Early Pace Last Race	Late Pace Last Race
93 No Mo Candy	100 Mission of Joy	117.5 No Mo Candy	116.9 Mission of Joy	145.8 Mission of Joy	95 Neverwalkalone	98 Vinos Angel
88 Neverwalkalone	93 No Mo Candy	NA Jill Jitterbug	116.4 Neverwalkalone	142.6 Justifiable Belle	93 No Mo Candy	89 No Mo Candy
86 Vinos Angel	92 Neverwalkalone	NA Neverwalkalone	115.8 Justifiable Belle	138.6 No Mo Candy	87 Mission of Joy	87 Neverwalkalone
83 Mission of Joy	90 Justifiable Belle	NA Lucky Speech	115.2 No Mo Candy	134.5 Lucky Speech	86 Jill Jitterbug	82 Jill Jitterbug
82 Justifiable Belle	82 Lucky Speech	NA Justifiable Belle	115.1 Lucky Speech	132.4 Neverwalkalone	82 Lucky Speech	76 Justifiable Belle
81 Lucky Speech	79 Jill Jitterbug	NA Mission of Joy	114.6 Vinos Angel	125.6 Vinos Angel	81 Justifiable Belle	76 Mission of Joy
78 Jill Jitterbug	NA Vinos Angel	NA Vinos Angel	113.5 Jill Jitterbug	120.7 Jill Jitterbug	77 Vinos Angel	73 Lucky Speech