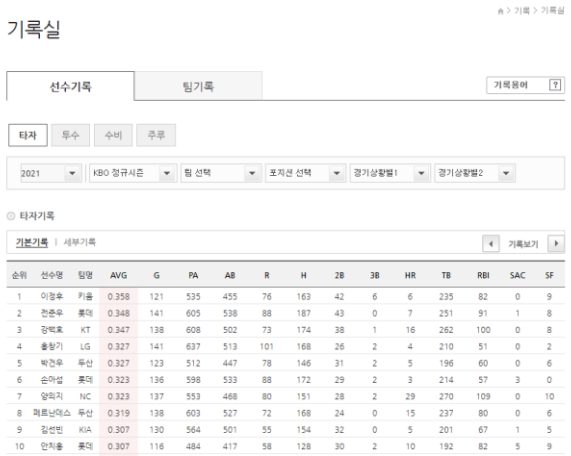
Class 6. SQL로 야구 스탯 직접 계산해보기

KBO 홈페이지 - 기록실

https://www.koreabaseball.com/



기록실

선수기록 | 팀기록

타자 | 투수 | 수비 | 주루

타자기록

기본기록 | 세부기록

순위	선수명	팀명	AVG	G	PA	AB	R	H	2B	3B	HR	TB	RBI	SAC	SF
1	이정후	키움	0.358	121	535	455	76	163	42	6	6	235	82	0	9
2	전준우	롯데	0.348	141	605	538	88	187	43	0	7	251	91	1	8
3	강백호	KT	0.347	138	608	502	73	174	38	1	16	262	100	0	8
4	홍창기	LG	0.327	141	637	513	101	168	26	2	4	210	51	0	2
5	박건우	두산	0.327	123	512	447	78	146	31	2	5	196	60	0	6
6	손아섭	롯데	0.323	136	598	533	88	172	29	2	3	214	57	3	0
7	양의지	NC	0.323	137	553	468	80	151	28	2	29	270	109	0	10
8	페르난데스	두산	0.319	138	603	527	72	168	24	0	15	237	80	0	6
9	김선빈	KIA	0.307	130	564	501	55	154	32	0	5	201	67	1	5
10	안치홍	롯데	0.307	116	484	417	58	128	30	2	10	192	82	5	9

스탯티즈 - 기록실

http://www.statiz.co.kr/main.php

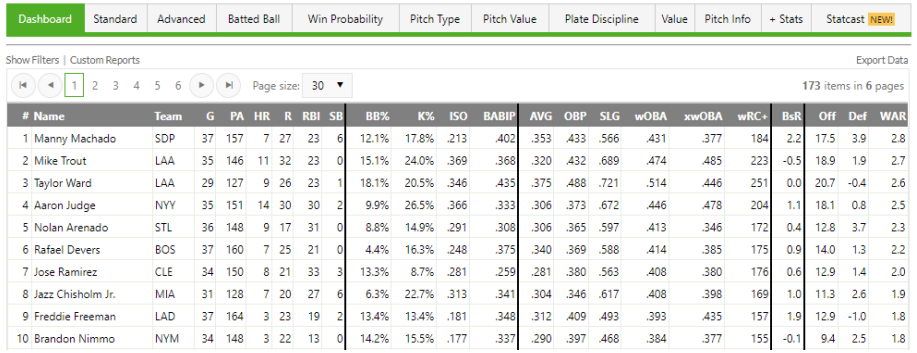
시즌기록실

시즌기록실 | 통산기록실 | 팀기록실 | 특별기록실 | 연도별상수 | WAR Special

순	이름	팀	생산력+ wRC+	타석	HR%	BB%	K%	BB/K	IsoP	IsoD	BABIP	Spd	PSN	타격 생산력 wOBA	wRC	wRC/27	wRAA	타격 생산력 (파크팩터 조정) wOBA	wRC	wRC/27	wRAA	wRC+
1	강백호	21 K 1B	164.3	608	2.63	16.1	13.8	1.17	.175	.101	.385	3.7	12.31	.442	125.1	9.71	50.1	.438	123.3	9.57	48.3	164.3
2	이정후	21 키 CF	164.0	534	1.12	11.6	6.9	1.68	.159	.079	.374	5.8	7.50	.440	108.9	9.46	43.0	.438	108.1	9.39	42.2	164.0
3	양의지	21 N DH	162.7	553	5.24	11.6	10.5	1.10	.254	.086	.312	3.1	3.74	.439	112.5	8.93	44.2	.436	111.1	8.82	42.8	162.7
4	최정	21 SK 3B	153.8	547	6.40	15.0	18.3	0.82	.286	.132	.270	3.6	13.02	.429	106.8	8.48	39.2	.422	103.9	8.25	36.3	153.8
5	홍창기	21 L CF	152.4	637	0.63	16.8	14.6	1.15	.082	.128	.392	5.3	6.82	.417	118.1	8.83	39.5	.420	119.9	8.96	41.2	152.4
6	김재환	21 두 LF	144.3	553	4.52	14.3	22.6	0.63	.220	.109	.314	3.5	3.70	.395	92.7	7.05	24.4	.408	98.5	7.49	30.2	144.3
7	전준우	21 롯 LF	139.7	605	1.16	8.8	11.4	0.77	.119	.058	.383	3.6	6.46	.406	106.8	7.73	32.1	.401	104.3	7.55	29.7	139.7
8	페르난데스	21 두 DH	139.7	603	2.49	10.6	5.6	1.88	.131	.076	.316	1.3	0.00	.393	100.1	6.89	25.6	.401	104.0	7.16	29.5	139.7
9	박건우	21 두 RF	137.7	512	0.98	9.4	13.5	0.70	.112	.074	.372	4.9	7.06	.393	85.0	7.13	21.8	.398	87.0	7.30	23.8	137.7
10	추신수	21 SK DH	136.5	571	3.68	18.0	21.0	0.86	.184	.147	.311	4.6	22.83	.400	97.9	7.47	27.4	.396	96.2	7.34	25.7	136.5

팬그래프

https://www.fangraphs.com/



Dashboard | Standard | Advanced | Batted Ball | Win Probability | Pitch Type | Pitch Value | Plate Discipline | Value | Pitch Info | + Stats | Statcast NEW!

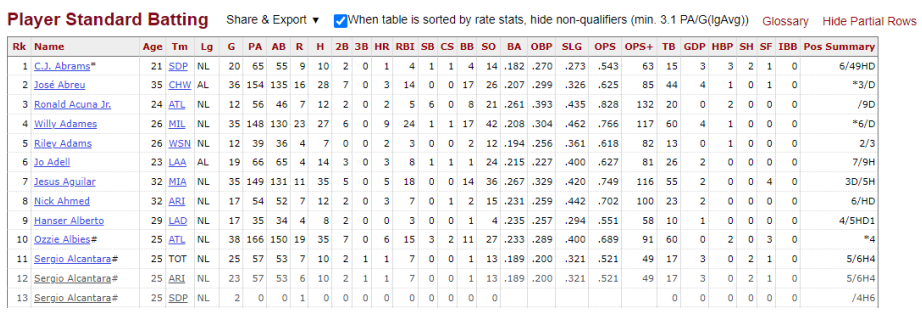
Show Filters | Custom Reports | Export Data

1 2 3 4 5 6 | Page size: 30 | 173 items in 6 pages

#	Name	Team	G	PA	HR	R	RBI	SB	BB%	K%	ISO	BABIP	AVG	OBP	SLG	wOBA	xwOBA	wRC+	BsR	Off	Def	WAR
1	Manny Machado	SDP	37	157	7	27	23	6	12.1%	17.8%	.213	.402	.353	.433	.566	.431	.377	184	2.2	17.5	3.9	2.8
2	Mike Trout	LAA	35	146	11	32	23	0	15.1%	24.0%	.369	.368	.320	.432	.689	.474	.485	223	-0.5	18.9	1.9	2.7
3	Taylor Ward	LAA	29	127	9	26	23	1	18.1%	20.5%	.346	.435	.375	.488	.721	.514	.446	251	0.0	20.7	-0.4	2.6
4	Aaron Judge	NYY	35	151	14	30	30	2	9.9%	26.5%	.366	.333	.306	.373	.672	.446	.478	204	1.1	18.1	0.8	2.5
5	Nolan Arenado	STL	36	148	9	17	31	0	8.8%	14.9%	.291	.308	.306	.365	.597	.413	.346	172	0.4	12.8	3.7	2.3
6	Rafael Devers	BOS	37	160	7	25	21	0	4.4%	16.3%	.248	.375	.340	.369	.588	.414	.385	175	0.9	14.0	1.3	2.2
7	Jose Ramirez	CLE	34	150	8	21	33	3	13.3%	8.7%	.281	.259	.281	.380	.563	.408	.380	176	0.6	12.9	1.4	2.0
8	Jazz Chisholm Jr.	MIA	31	128	7	20	27	6	6.3%	22.7%	.313	.341	.304	.346	.617	.408	.398	169	1.0	11.3	2.6	1.9
9	Freddie Freeman	LAD	37	164	3	23	19	2	13.4%	13.4%	.181	.348	.312	.409	.493	.393	.435	157	1.9	12.9	-1.0	1.8
10	Brandon Nimmo	NYM	34	148	3	22	13	0	14.2%	15.5%	.177	.337	.290	.397	.468	.384	.377	155	-0.1	9.4	2.5	1.8

베이스볼 레퍼런스

https://www.baseball-reference.com/

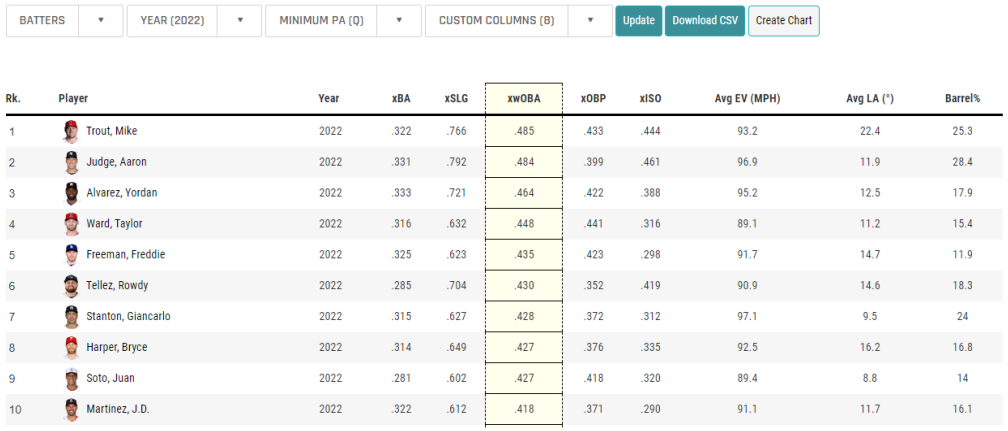


Player Standard Batting Share & Export ▾ When table is sorted by rate stats, hide non-qualifiers (min. 3.1 PA/G(lgAvg)) Glossary Hide Partial Rows

Rk	Name	Age	Tm	Lg	G	PA	AB	R	H	2B	3B	HR	RBI	SB	CS	BB	SO	BA	OBP	SLG	OPS	OPS+	TB	GDP	HBP	SH	SF	IBB	Pos Summary
1	C.J. Abrams*	21	SDP	NL	20	65	55	9	10	2	0	1	4	1	1	4	14	.182	.270	.273	.543	63	15	3	3	2	1	0	6/49HD
2	José Abreu	35	CHW	AL	36	154	135	16	28	7	0	3	14	0	0	17	26	.207	.299	.326	.625	85	44	4	1	0	1	0	*3/D
3	Ronald Acuna Jr.	24	ATL	NL	12	56	46	7	12	2	0	2	5	6	0	8	21	.261	.393	.435	.828	132	20	0	2	0	0	0	/9D
4	Willy Adames	26	MIL	NL	35	148	130	23	27	6	0	9	24	1	1	17	42	.208	.304	.462	.766	117	60	4	1	0	0	0	*6/D
5	Riley Adams	26	WSN	NL	12	39	36	4	7	0	0	2	3	0	0	2	12	.194	.256	.361	.618	82	13	0	1	0	0	0	2/3
6	Jo Adell	23	LAA	AL	19	66	65	4	14	3	0	3	8	1	1	1	24	.215	.227	.400	.627	81	26	2	0	0	0	0	7/9H
7	Jesus Aguilar	32	MIA	NL	35	149	131	11	35	5	0	5	18	0	0	14	36	.267	.329	.420	.749	116	55	2	0	0	4	0	3D/5H
8	Nick Ahmed	32	ARI	NL	17	54	52	7	12	2	0	3	7	0	1	2	15	.231	.259	.442	.702	100	23	2	0	0	0	0	6/HD
9	Hanser Alberto	29	LAD	NL	17	35	34	4	8	2	0	0	3	0	0	1	4	.235	.257	.294	.551	58	10	1	0	0	0	0	4/5HD1
10	Ozzie Albies#	25	ATL	NL	38	166	150	19	35	7	0	6	15	3	2	11	27	.233	.289	.400	.689	91	60	0	2	0	3	0	*4
11	Sergio Alcantara#	25	TOT	NL	25	57	53	7	10	2	1	1	7	0	0	1	13	.189	.200	.321	.521	49	17	3	0	2	1	0	5/6H4
12	Sergio Alcantara#	25	ARI	NL	23	57	53	6	10	2	1	1	7	0	0	1	13	.189	.200	.321	.521	49	17	3	0	2	1	0	5/6H4
13	Sergio Alcantara#	25	SDP	NL	2	0	0	1	0	0	0	0	0	0	0	0	0						0	0	0	0	0	0	/4H6

베이스볼 서번트

https://baseballsavant.mlb.com/



BATTERS | YEAR (2022) | MINIMUM PA (Q) | CUSTOM COLUMNS (8) | Update | Download CSV | Create Chart

Rk.	Player	Year	xBA	xSLG	xwOBA	xOBP	xISO	Avg EV (MPH)	Avg LA (°)	Barrel%
1	Trout, Mike	2022	.322	.766	.485	.433	.444	93.2	22.4	25.3
2	Judge, Aaron	2022	.331	.792	.484	.399	.461	96.9	11.9	28.4
3	Alvarez, Yordan	2022	.333	.721	.464	.422	.388	95.2	12.5	17.9
4	Ward, Taylor	2022	.316	.632	.448	.441	.316	89.1	11.2	15.4
5	Freeman, Freddie	2022	.325	.623	.435	.423	.298	91.7	14.7	11.9
6	Tellez, Rowdy	2022	.285	.704	.430	.352	.419	90.9	14.6	18.3
7	Stanton, Giancarlo	2022	.315	.627	.428	.372	.312	97.1	9.5	24
8	Harper, Bryce	2022	.314	.649	.427	.376	.335	92.5	16.2	16.8
9	Soto, Juan	2022	.281	.602	.427	.418	.320	89.4	8.8	14
10	Martinez, J.D.	2022	.322	.612	.418	.371	.290	91.1	11.7	16.1

야구 스탯 sqlite3로 계산해보기

1. 타율

안타/타수 = 안타/(타석수 – 볼넷 – 사구 – 희생번트 – 희생플라이 – 타격방해 – 주루방해)

예제1. 추신수 선수 2019년 타율을 구해보자

Step1. 우선 추신수 선수의 playerID 확인하기

- 선수들의 playerID는 people 테이블에서 확인 가능
- 성이 Choo인 선수를 찾아보자

```
SELECT * FROM people WHERE nameLast = 'Choo';
```

```
choosh01|1982|7|13|South Korea|Busan|Busan||||||
|Shin-Soo|Choo|Shin-Soo|210|71|L|L|2005-04-21|20
19-09-29|choos001|choosh01|1982-07-13|2005-04-21
|2019-09-29|
```

.schema people

```
sqlite> .schema people
CREATE TABLE IF NOT EXISTS "people" (
        "playerID" VARCHAR(9) NOT NULL,
        "birthYear" INTEGER NULL,
        "birthMonth" INTEGER NULL,
        "birthDay" INTEGER NULL,
        "birthCountry" VARCHAR(255) NULL,
        "birthState" VARCHAR(255) NULL,
        "birthCity" VARCHAR(255) NULL,
        "deathYear" INTEGER NULL,
        "deathMonth" INTEGER NULL,
        "deathDay" INTEGER NULL,
        "deathCountry" VARCHAR(255) NULL,
        "deathState" VARCHAR(255) NULL,
        "deathCity" VARCHAR(255) NULL,
        "nameFirst" VARCHAR(255) NULL,
        "nameLast" VARCHAR(255) NULL,
        "nameGiven" VARCHAR(255) NULL,
        "weight" INTEGER NULL,
        "height" INTEGER NULL,
        "bats" VARCHAR(255) NULL,
        "throws" VARCHAR(255) NULL,
        "debut" VARCHAR(255) NULL,
        "finalGame" VARCHAR(255) NULL,
        "retroID" VARCHAR(255) NULL,
        "bbrefID" VARCHAR(255) NULL,
        "birth_date" DATE NULL,
        "debut_date" DATE NULL,
        "finalgame_date" DATE NULL,
        "death_date" DATE NULL,
        PRIMARY KEY ("playerID")
);
```

야구 스탯 sqlite3로 계산해보기

1. 타율
안타/타수 = 안타/(타석 – 볼넷 – 사구 – 희생번트 – 희생플라이 – 타격방해 – 주루방해)

Step2. 추신수 선수의 2019년 타율 계산해서 조회

```
SELECT playerID, H, AB, H/AB FROM batting WHERE yearID = 2019 and playerID = 'choosh01';
```

```
playerID    H           AB          H/AB
----------  ----------  ----------  ----------
choosh01    149         563         0
```

왜 0이 나왔지?

Sqlite3에서
정수/정수 = 정수
실수/정수 = 실수
정수/실수 = 실수

야구 스탯 sqlite3로 계산해보기

1. 타율

안타/타수 = 안타/(타석 – 볼넷 – 사구 – 희생번트 – 희생플라이 – 타격방해 – 주루방해)

Step3. 추신수 선수의 2019년 타율 계산해서 조회(형변환1)

```
SELECT playerID, CAST(H AS REAL)/AB AS AVG FROM batting WHERE yearID = 2019 and playerID = 'choosh01';
```

```
playerID   AVG
---------  ------------------
choosh01   0.2646536412078152
```

2014	31	TEX	AL	123	529	455	58	110	19	1	13	40	3	4	58	131	.242	.340	.374	.714
2015	32	TEX	AL	149	653	555	94	153	32	3	22	82	4	2	76	147	.276	.375	.463	.838
2016	33	TEX	AL	48	210	178	27	43	7	0	7	17	6	3	25	46	.242	.357	.399	.756
2017	34	TEX	AL	149	636	544	96	142	20	1	22	78	12	3	77	134	.261	.357	.423	.780
2018 ★	35	TEX	AL	146	665	560	83	148	30	1	21	62	6	1	92	156	.264	.377	.434	.810
2019	36	TEX	AL	151	660	563	93	149	31	2	24	61	15	1	78	163	.265	.371	.455	.826
2020	37	TEX	AL	33	127	110	13	26	3	0	5	15	6	2	13	33	.236	.323	.400	.723

cast() 함수

형변환(type casting)에 사용되는 함수. 형변환이란 자료형을 다른 형태로 변경하는 것을 의미.

ex) SELECT CAST(1.25 AS INT);

```
sqlite> SELECT CAST(1.25 AS INT);
1
sqlite> SELECT CAST(1 AS REAL);
1.0
```

AS 별칭

Alias의 약어. 별명이라는 뜻.
컬럼의 이름을 별도의 별칭으로 지정하고 싶을 때 사용.

ex) SELECT CAST(H AS REAL)/AB AS AVG;

야구 스탯 sqlite3로 계산해보기

1. 타율
안타/타수 = 안타/(타석 – 볼넷 – 사구 – 희생번트 – 희생플라이 – 타격방해 – 주루방해)

Step4. 추신수 선수의 2019년 타율 계산해서 조회(형변환2)

```
SELECT playerID, (H + 0.0)/AB AS AVG FROM batting WHERE yearID = 2019 and playerID = 'choosh01';
```

```
playerID   AVG
---------  ----------------
choosh01   0.264653641207815
```

분자 또는 분모에 0.0을 더해서 형변환

2014	31	TEX	AL	123	529	455	58	110	19	1	13	40	3	4	58	131	.242	.340	.374	.714
2015	32	TEX	AL	149	653	555	94	153	32	3	22	82	4	2	76	147	.276	.375	.463	.838
2016	33	TEX	AL	48	210	178	27	43	7	0	7	17	6	3	25	46	.242	.357	.399	.756
2017	34	TEX	AL	149	636	544	96	142	20	1	22	78	12	3	77	134	.261	.357	.423	.780
2018 ★	35	TEX	AL	146	665	560	83	148	30	1	21	62	6	1	92	156	.264	.377	.434	.810
2019	36	TEX	AL	151	660	563	93	149	31	2	24	61	15	1	78	165	.265	.371	.455	.826
2020	37	TEX	AL	33	127	110	13	26	3	0	5	15	6	2	13	33	.236	.323	.400	.723

```
SELECT playerID, ROUND((H + 0.0)/AB, 3) AS AVG FROM batting WHERE yearID = 2019 and playerID = 'choosh01';
```

파이썬의 round 함수와 거의 동일

```
playerID    AVG
----------  ----------
choosh01    0.265
```

round() 함수

반올림해서 소수점 아래 몇 자리까지 보여줄지 결정

야구 스탯 sqlite3로 계산해보기

2. 장타율 (Slugging Percentage, SLG)
(1루타 + 2*2루타 + 3*3루타 + 4*홈런) / 타수

예제2. 추신수 선수 2019년 장타율을 구해보자

숫자로 시작하는 컬럼은 쌍따옴표로 감싸줌

```
SELECT playerID, CAST(((H - "2B" - "3B" - HR)  + 2*"2B" + 3*"3B" + 4*HR) AS REAL)/AB AS SLG FROM batting
WHERE yearID = 2019 and playerID = 'choosh01';
```

```
playerID  SLG
--------  ------------------
choosh01  0.454706927175844
```

2014	31	TEX	AL	123	529	455	58	110	19	1	13	40	3	4	58	131	.242	.340	.374	.714
2015	32	TEX	AL	149	653	555	94	153	32	3	22	82	4	2	76	147	.276	.375	.463	.838
2016	33	TEX	AL	48	210	178	27	43	7	0	7	17	6	3	25	46	.242	.357	.399	.756
2017	34	TEX	AL	149	636	544	96	142	20	1	22	78	12	3	77	134	.261	.357	.423	.780
2018 ★	35	TEX	AL	146	665	560	83	148	30	1	21	62	6	1	92	156	.264	.377	.434	.810
2019	36	TEX	AL	151	660	563	93	149	31	2	24	61	15	1	78	165	.265	.37	.455	.826
2020	37	TEX	AL	33	127	110	13	26	3	0	5	15	6	2	13	33	.236	.32		.723

3. 출루율 (On Base Percentage, OBP)
(안타 + 볼넷 + 사구) / (타수 + 볼넷 + 사구 + 희생플라이)

예제3. 추신수 선수 2019년 출루율을 구해보자

```
SELECT playerID, CAST((H + BB + HBP) AS REAL)/(AB + BB + HBP + SF) AS OBP FROM batting WHERE yearID
= 2019 and playerID = 'choosh01';
```

```
playerID  OBP
--------  ------------------
choosh01  0.371212121212121
```

2014	31	TEX	AL	123	529	455	58	110	19	1	13	40	3	4	58	131	.242	.340	.374	.714
2015	32	TEX	AL	149	653	555	94	153	32	3	22	82	4	2	76	147	.276	.375	.463	.838
2016	33	TEX	AL	48	210	178	27	43	7	0	7	17	6	3	25	46	.242	.357	.399	.756
2017	34	TEX	AL	149	636	544	96	142	20	1	22	78	12	3	77	134	.261	.357	.423	.780
2018 ★	35	TEX	AL	146	665	560	83	148	30	1	21	62	6	1	92	156	.264	.377	.434	.810
2019	36	TEX	AL	151	660	563	93	149	31	2	24	61	15	1	78	165	.265	.371	.455	.826
2020	37	TEX	AL	33	127	110	13	26	3	0	5	15	6	2	13	33	.236	.323	.400	.723

야구 스탯 sqlite3로 계산해보기

4. OPS (On-base Plus Slugging)
장타율 + 출루율

예제4-1. 추신수의 2019년 OPS를 구해보자

```
SELECT playerID, CAST(((H - "2B" - "3B" - HR) + 2*"2B" + 3*"3B" + 4*HR) AS REAL)/AB + CAST((H + BB + HBP) AS REAL)/(AB + BB + HBP + SF) AS OPS FROM batting WHERE yearID = 2019 and playerID = 'choosh01';
```

```
playerID    OPS
----------  ----------------
choosh01    0.825919048387965
```

2014	31	TEX	AL	123	529	455	58	110	19	1	13	40	3	4	58	131	.242	.340	.374	.714
2015	32	TEX	AL	149	653	555	94	153	32	3	22	82	4	2	76	147	.276	.375	.463	.838
2016	33	TEX	AL	48	210	178	27	43	7	0	7	17	6	3	25	46	.242	.357	.399	.756
2017	34	TEX	AL	149	636	544	96	142	20	1	22	78	12	3	77	134	.261	.357	.423	.780
2018 ★	35	TEX	AL	146	665	560	83	148	30	1	21	62	6	1	92	156	.264	.377	.434	.810
2019	36	TEX	AL	151	660	563	93	149	31	2	24	61	15	1	78	165	.265	.371	.455	.826
2020	37	TEX	AL	33	127	110	13	26	3	0	5	15	6	2	13	33	.236	.323	.400	.723

잘 구했지만 OPS를 구하는 식이 너무 길어서 복잡함.
장타율(SLG)과 출루율(OBP)을 각각 조회한 것을 더하는 방법은 없을까?

야구 스탯 sqlite3로 계산해보기

4. OPS (On-base Plus Slugging)
장타율 + 출루율

예제4-2. 추신수의 2019년 OPS를 구해보자

서브쿼리(subquery): 쿼리문 안에 포함되어 있는 또 다른 쿼리문

```
SELECT playerID, CAST(((H - "2B" - "3B" - HR) + 2*"2B" + 3*"3B" + 4*HR) AS REAL)/AB AS SLG, CAST((H + BB + HBP) AS REAL)/(AB + BB + HBP + SF) AS OBP FROM batting WHERE yearID = 2019 and playerID = 'choosh01';
```

playerID	SLG	OBP
choosh01	0.454706927175844	0.371212121212121

서브쿼리 메인쿼리

```
SELECT playerID, (SLG + OBP) AS OPS FROM (위에서 조회한 결과 테이블);
```

```
SELECT playerID, (SLG + OBP) AS OPS FROM (SELECT playerID, CAST(((H - "2B" - "3B" - HR) + 2*"2B" + 3*"3B" + 4*HR) AS REAL)/AB AS SLG, CAST((H + BB + HBP) AS REAL)/(AB + BB + HBP + SF) AS OBP FROM batting WHERE yearID = 2019 and playerID = 'choosh01');
```

playerID	OPS
choosh01	0.825919048387965

2014	31	TEX	AL	123	529	455	58	110	19	1	13	40	3	4	58	131	.242	.340	.374	.714
2015	32	TEX	AL	149	653	555	94	153	32	3	22	82	4	2	76	147	.276	.375	.463	.838
2016	33	TEX	AL	48	210	178	27	43	7	0	7	17	6	3	25	46	.242	.357	.399	.756
2017	34	TEX	AL	149	636	544	96	142	20	1	22	78	12	3	77	134	.261	.357	.423	.780
2018 ★	35	TEX	AL	146	665	560	83	148	30	1	21	62	6	1	92	156	.264	.377	.434	.810
2019	36	TEX	AL	151	660	563	93	149	31	2	24	61	15	1	78	165	.265	.371	.455	.826
2020	37	TEX	AL	33	127	110	13	26	3	0	5	15	6	2	13	33	.236	.323	.400	.723

야구 스탯 sqlite3로 계산해보기

5. BABIP(batting average on balls in play): 인플레이 타구의 안타 비율
(안타 – 홈런)/(타수 – 삼진 – 홈런 + 희생플라이)

예제5-1. 추신수의 2019년 BABIP을 구해보자

```
SELECT playerID, CAST((H - HR) AS REAL)/(AB - SO - HR + SF) AS BABIP FROM batting
WHERE yearID = 2019 and playerID = 'choosh01';
```

```
playerID    BABIP
----------  ----------------
choosh01    0.333333333333333
```

2017	34	TEX	AL	.349	103	.305	.162	3.5%	21.1%	12.1%
2018	35	TEX	AL	.368	121	.330	.170	3.2%	23.5%	13.8%
2019	36	TEX	AL	.371	116	.333	.190	3.6%	25.0%	11.8%
2020	37	TEX	AL	.321	97	.284	.164	3.9%	26.0%	10.2%

브로스 맥브라켄
"인플레이 타구가 안타가 될지 범타가 될지는 투수가 통제할 수 없다"

참고자료1: https://namu.wiki/w/BABIP

야구 스탯 sqlite3로 계산해보기

5. BABIP(batting average on balls in play): 인플레이 타구의 안타 비율
(안타 – 홈런)/(타수 – 삼진 – 홈런 + 희생플라이)
* 타수 = 타석 – 볼넷 – 사구 – 희생번트 – 희생플라이 – 타격방해 - 주루방해

예제5-2. 류현진의 2019년 BABIP을 구해보자

```
SELECT playerID, CAST((H - HR) AS REAL)/((BFP - BB - HBP - SH - SF) - SO - HR + SF)
AS BABIP FROM pitching WHERE yearID = 2019 and playerID = 'ryuhy01';
```

```
playerID    BABIP
----------  ------------------
ryuhy01     0.282051282051282
```

					Batting Against				
Year	Age	Tm	Lg	IP	BA	OBP	SLG	OPS	BAbip
2013	26	LAD	NL	192.0	.252	.299	.361	.660	.300
2014	27	LAD	NL	152.0	.257	.294	.364	.658	.323
2016	29	LAD	NL	4.2	.364	.417	.727	1.144	.412
2017	30	LAD	NL	126.2	.263	.330	.462	.792	.303
2018	31	LAD	NL	82.1	.221	.260	.362	.622	.282
2019	32	LAD	NL	182.2	.234	.263	.359	.622	.282
2020	33	TOR	AL	67.0	.234	.285	.352	.636	.303
2021	34	TOR	AL	169.0	.258	.299	.435	.733	.296

야구 스탯 sqlite3로 계산해보기

6. WHIP(이닝당 안타 및 볼넷 허용률)

(피안타 + 볼넷)/이닝

예제6. 클레이튼 커쇼의 2019년 WHIP를 구해보자

Step1. 우선 커쇼의 playerID 확인하기

```
SELECT * FROM people WHERE nameLast = 'Kershaw';
```

```
playerID   birthYear  birthMonth  birthDay  birthCountry  birthState  birthCity  deathYear  deathMonth  deathDay  deathC
ountry  deathState  deathCity  nameFirst  nameLast  nameGiven       weight  height  bats  throws  debut       finalGame
  retroID   bbrefID    birth_date  debut_date  finalgame_date  death_date
---------  ---------  ----------  ----------  --------------  ----------  ---------  ---------  ----------  --------  ------
------  ---------  ---------  ---------  --------  --------------  ------  ------  ----  ------  ----------  ----------
  --------  ---------  ----------  ----------  --------------  ----------
kershcl01  1988       3           19          USA             TX          Dallas
                                 Clayton    Kershaw   Clayton Edward  226     76      L     L       2008-05-25  2019-09-29
  kersc001  kershcl01  1988-03-19  2008-05-25  2019-09-29
```

Step2. 커쇼의 WHIP 조회하기

```
SELECT playerID, (H + BB + 0.0)/(IPouts/3.0) AS WHIP FROM pitching WHERE yearID =
2019 and playerID = 'kershcl01';
```

```
playerID   WHIP
---------  ----------------
kershcl01  1.042990654205607
```

2013 ★	25	LAD	NL	16	9	.640	***1.83***	33	33	0	3	**2**	0	236.0	164	55	48	11	52	2	**232**	3	2	12	908	***194***	2.39	***0.915***	6.3	0.4	2.0
2014 ★	26	LAD	NL	***21***	3	***.875***	***1.77***	27	27	0	***6***	2	0	198.1	139	42	39	9	31	0	239	2	2	7	749	***197***	***1.81***	***0.857***	6.3	0.4	1.4
2015 ★	27	LAD	NL	16	7	.696	2.13	33	**33**	0	***4***	***3***	0	***232.2***	163	62	55	15	42	1	***301***	5	3	9	890	173	***1.99***	0.881	6.3	0.6	1.6
2016 ★	28	LAD	NL	12	4	.750	1.69	21	21	0	3	***3***	0	149.0	97	31	28	8	11	1	172	2	3	5	544	237	1.80	0.725	5.9	0.5	0.7
2017 ★	29	LAD	NL	***18***	4	.818	**2.31**	27	27	0	1	0	0	175.0	136	49	45	23	30	0	202	0	2	4	679	**179**	3.07	0.949	7.0	1.2	1.5
2018	30	LAD	NL	9	5	.643	2.73	26	26	0	0	0	0	161.1	139	55	49	17	29	0	155	2	0	10	650	142	3.18	1.041	7.8	0.9	1.6
2019 ★	31	LAD	NL	16	5	.762	3.03	29	28	0	0	0	0	178.1	145	63	60	28	41	0	189	2	1	7	706	137	3.86	1.043	.3	1.4	2.1
2020	32	LAD	NL	6	2	.750	2.16	10	10	0	0	0	0	58.1	41	18	14	8	8	0	62	1	0	0	221	202	3.31	0.840	6.3	1.2	1.2
2021	33	LAD	NL	10	8	.556	3.55	22	22	0	0	0	0	121.2	103	51	48	15	21	0	144	3	1	7	488	115	3.00	1.019	7.6	1.1	1.6

Quiz

2019년 WHIP 상위 10명의 playerID, 이닝, WHIP를 조회하라 (규정이닝을 적용할 것!)
그리고 아래와 같이 2019 WHIP를 볼 수 있는 페이지를 찾아서 검수하라

Player Standard Pitching

Share & Export ▾ ☑ Hide non-qualifiers for rate stats (min. 1 IP/G(lgAvg)) Glossary Show Partial Rows

Rk	Name	Age	Tm	Lg	W	L	W-L%	ERA	G	GS	GF	CG	SHO	SV	IP	H	R	ER	HR	BB	IBB	SO	HBP	BK	WP	BF	ERA+	FIP	WHIP ▲	H9	HR9	BB9	SO9	SO/W
1	Justin Verlander	36	HOU	AL	21	6	.778	2.58	34	34	0	2	1	0	223.0	137	66	64	36	42	0	300	6	0	4	847	179	3.27	0.803	5.5	1.5	1.7	12.1	7.14
2	Gerrit Cole	28	HOU	AL	20	5	.800	2.50	33	33	0	0	0	0	212.1	142	66	59	29	48	0	326	3	3	4	817	185	2.64	0.895	6.0	1.2	2.0	13.8	6.79
3	Jack Flaherty	23	STL	NL	11	8	.579	2.75	33	33	0	0	0	0	196.1	135	62	60	25	55	2	231	7	0	6	772	152	3.46	0.968	6.2	1.1	2.5	10.6	4.20
4	Jacob deGrom	31	NYM	NL	11	8	.579	2.43	32	32	0	0	0	0	204.0	154	59	55	19	44	1	255	7	0	2	804	169	2.67	0.971	6.8	0.8	1.9	11.3	5.80
5	Zack Greinke	35	TOT	MLB	18	5	.783	2.93	33	33	0	0	0	0	208.2	175	73	68	21	30	2	187	4	1	2	810	154	3.22	0.982	7.5	0.9	1.3	8.1	6.23
6	Hyun Jin Ryu*	32	LAD	NL	14	5	.737	2.32	29	29	0	1	1	0	182.2	160	53	47	17	24	2	163	4	0	0	723	179	3.10	1.007	7.9	0.8	1.2	8.0	6.79
7	Max Scherzer	34	WSN	NL	11	7	.611	2.92	27	27	0	0	0	0	172.1	144	59	56	18	33	2	243	7	0	0	693	154	2.45	1.027	7.5	0.9	1.7	12.7	7.36
8	Stephen Strasburg	30	WSN	NL	18	6	.750	3.32	33	33	0	0	0	0	209.0	161	79	77	24	56	4	251	10	0	8	841	135	3.25	1.038	6.9	1.0	2.4	10.8	4.48
9	Walker Buehler	24	LAD	NL	14	4	.778	3.26	30	30	0	2	0	0	182.1	153	77	66	20	37	0	215	7	0	4	737	127	3.01	1.042	7.6	1.0	1.8	10.6	5.81
10	Clayton Kershaw*	31	LAD	NL	16	5	.762	3.03	29	28	0	0	0	0	178.1	145	63	60	28	41	0	189	2	1	7	706	137	3.86	1.043	7.3	1.4	2.1	9.5	4.61

야구 스탯 sqlite3로 계산해보기

7. wOBA(가중 출루율)

스탯티즈 2022 버전: (0.72*고의4구제외한볼넷 + 0.75*사구 + 0.9*1루타 + 0.92*실책출루 + 1.24*2루타 + 1.56*3루타 + 1.95*홈런)/(타석수 –고의4구)
팬그래프 2013 버전: (0.69*고의4구제외한볼넷 + 0.72*사구 + 0.89*1루타 + 1.27*2루타 + 1.62*3루타 + 2.10*홈런)/(타수 + 고의4구제외한볼넷 + 희생플라이 + 사구)

예제7. 2013년 타자 wOBA 상위 10명을 찾아보자

```
SELECT playerID, (0.69*(BB - IBB) + 0.72*HBP + 0.89*(H - "2B" - "3B" - HR) + 1.27*"2B" + 1.62*"3B" +
2.1*HR)/(AB + BB - IBB + SF + HBP) AS wOBA FROM batting WHERE yearID = 2013 ORDER BY wOBA DESC
LIMIT 10;
```

playerID	wOBA
dukeza01	0.89
dukeza01	0.89
berryqu01	0.70555555
carsoro01	0.69
hestejo01	0.69
leagubr01	0.69
carsoma01	0.68076923
norribu01	0.59333333
fryerer01	0.506875
pegueca01	0.49833333

#	Name	Team	G	PA	HR	R	RBI	SB	BB%	K%	ISO	BABIP	AVG	OBP	SLG	wOBA	xwOBA	wRC+	BsR	Off	Def	WAR
1	Miguel Cabrera	DET	148	652	44	103	137	3	13.8%	14.4%	.288	.356	.348	.442	.636	.455		193	-6.0	62.6	-4.0	8.6
2	Mike Trout	LAA	157	716	27	109	97	33	15.4%	19.0%	.234	.376	.323	.432	.557	.423		176	8.2	70.5	0.5	10.2
3	Chris Davis	BAL	160	673	53	103	138	4	10.7%	29.6%	.348	.336	.286	.370	.634	.421		168	4.7	56.4	-12.8	7.1
4	Paul Goldschmidt	ARI	160	710	36	103	125	15	13.9%	20.4%	.249	.343	.302	.401	.551	.404		156	-0.9	43.9	-9.5	6.0
5	Jayson Werth	WSN	129	532	25	84	82	10	11.3%	19.0%	.214	.358	.318	.398	.532	.403		159	1.3	36.5	-11.8	4.4
6	Troy Tulowitzki	COL	126	512	25	72	82	1	11.1%	16.6%	.229	.334	.312	.391	.540	.400		141	-1.8	21.6	8.7	4.9
7	Joey Votto	CIN	162	726	24	101	73	6	18.6%	19.0%	.186	.360	.305	.435	.491	.400		155	-1.1	44.1	-13.4	5.7
8	David Ortiz	BOS	137	600	30	84	103	4	12.7%	14.7%	.255	.321	.309	.395	.564	.400		151	-7.7	27.0	-15.0	3.4
9	Michael Cuddyer	COL	130	540	20	74	84	10	8.5%	18.5%	.198	.382	.331	.389	.530	.396		138	1.3	24.2	-14.6	2.8
10	Andrew McCutchen	PIT	157	674	21	97	84	27	11.6%	15.0%	.190	.353	.317	.404	.508	.393		156	6.4	49.1	5.5	8.1

팬그래프 2013 타자기록

왜 다르지?? 규정타석을 적용하지 않았기 때문

https://www.fangraphs.com/leaders.aspx?pos=all&stats=bat&lg=all&qual=y&type=8&season=2013&month=0&season1=2013&ind=0&team=0&rost=0&age=0&filter=&players=0&startdate=2013-01-01&enddate=2013-12-31&sort=16,d

규정타석과 규정이닝

규정타석: 타자 기록 산정을 위한 최소 타석수

MLB 규정타석: 전체 경기수(162) * 3.1, 소수 반올림 = **502타석**
NPB 규정타석: 전체 경기수(143) * 3.1, 소수 반올림 = 443타석
KBO 규정타석: 전체 경기수(144) * 3.1, 소수점 아래 버림 = 446타석

규정이닝: 투수 기록 산정을 위한 최소 이닝수

MLB 규정이닝: 전체 경기수(162) * 1 = **162이닝**
NPB 규정이닝: 전체 경기수(143) * 1 = 143이닝
KBO 규정이닝: 전체 경기수(144) * 1 = 144이닝

야구 스탯 sqlite3로 계산해보기

7. wOBA(가중 출루율)

스탯티즈 2022 버전: (0.72*고의4구제외한볼넷 + 0.75*사구 + 0.9*1루타 + 0.92*실책출루 + 1.24*2루타 + 1.56*3루타 + 1.95*홈런)/(타석수 –고의4구)
팬그래프 2013 버전: (0.69*고의4구제외한볼넷 + 0.72*사구 + 0.89*1루타 + 1.27*2루타 + 1.62*3루타 + 2.10*홈런)/(타수 + 고의4구제외한볼넷 + 희생플라이 + 사구)

예제7. 2013년 타자 wOBA 상위 10명을 찾아보자

```
SELECT playerID, (0.69*(BB - IBB) + 0.72*HBP + 0.89*(H - "2B" - "3B" - HR) + 1.27*"2B" + 1.62*"3B" +
2.1*HR)/CAST(AB + BB - IBB + SF + HBP AS REAL) AS wOBA FROM batting WHERE yearID = 2013 and
(AB + BB + HBP + SH + SF >= 502) ORDER BY wOBA DESC LIMIT 10;
```

조건에 규정타석 이상을 넣어줘야 함

playerID	wOBA
cabremi01	0.455308056872038
troutmi01	0.42300283286119
davisch02	0.420650529500756
goldspa01	0.404014492753623
werthja01	0.40289224952741
vottojo01	0.40039603960396
tulowtr01	0.400355029585799
ortizda01	0.399877835951134
cuddymi01	0.396411214953271
mccutan01	0.393006042296072

#	Name	Team	G	PA	HR	R	RBI	SB	BB%	K%	ISO	BABIP	AVG	OBP	SLG	wOBA	xwOBA	wRC+	BsR	Off	Def	WAR
1	Miguel Cabrera	DET	148	652	44	103	137	3	13.8%	14.4%	.288	.356	.348	.442	.636	.455		193	-6.0	62.6	-4.0	8.6
2	Mike Trout	LAA	157	716	27	109	97	33	15.4%	19.0%	.234	.376	.323	.432	.557	.423		176	8.2	70.5	0.5	10.2
3	Chris Davis	BAL	160	673	53	103	138	4	10.7%	29.6%	.348	.336	.286	.370	.634	.421		168	4.7	56.4	-12.8	7.1
4	Paul Goldschmidt	ARI	160	710	36	103	125	15	13.9%	20.4%	.249	.343	.302	.401	.551	.404		156	-0.9	43.9	-9.5	6.0
5	Jayson Werth	WSN	129	532	25	84	82	10	11.3%	19.0%	.214	.358	.318	.398	.532	.403		159	1.3	36.5	-11.8	4.4
6	Troy Tulowitzki	COL	126	512	25	72	82	1	11.1%	16.6%	.229	.334	.312	.391	.541	.400		141	-1.8	21.6	8.7	4.9
7	Joey Votto	CIN	162	726	24	101	73	6	18.6%	19.0%	.186	.360	.305	.435	.491	.400		155	-1.1	44.1	-13.4	5.7
8	David Ortiz	BOS	137	600	30	84	103	4	12.7%	14.7%	.255	.321	.309	.395	.564	.400		151	-7.7	27.0	-15.0	3.4
9	Michael Cuddyer	COL	130	540	20	74	84	10	8.5%	18.5%	.198	.382	.331	.389	.529	.396		138	1.3	24.2	-14.6	2.8
10	Andrew McCutchen	PIT	157	674	21	97	84	27	11.6%	15.0%	.190	.353	.317	.404	.507	.393		156	6.4	49.1	5.5	8.1

야구 스탯 sqlite3로 계산해보기

8. CS%(도루저지율)
CS% = CS / (CS + SB)

예제8. 야디어 몰리나(Yadier Molina)의 매 시즌 도루저지율을 구해보자

Step1. 우선 몰리나의 playerID 확인하기

```
SELECT playerID, nameFirst, nameLast FROM people WHERE nameLast = 'Molina';
```

```
sqlite> SELECT playerID, nameFirst, nameLast FROM people WHERE nameLast = 'Molina';
playerID    nameFirst   nameLast
----------  ----------  ----------
molinbe01   Bengie      Molina
molinga01   Gabe        Molina
molingu01   Gustavo     Molina
moliniz01   Izzy        Molina
molinjo01   Jose        Molina
molinya01   Yadier      Molina
```

Step2. 몰리나의 CS% 조회하기

```
SELECT playerID, yearID, teamID, (CS + 0.0)/(CS + SB) as CSper FROM fielding
WHERE playerID = 'molinya01' and Pos = 'C';
```

몰리나 도루 저지율

playerID	yearID	teamID	CSper
molinya01	2004	SLN	0.470588235294118
molinya01	2005	SLN	0.641025641025641
molinya01	2006	SLN	0.439393939393939
molinya01	2007	SLN	0.54
molinya01	2008	SLN	0.346153846153846
molinya01	2009	SLN	0.407407407407407
molinya01	2010	SLN	0.485294117647059
molinya01	2011	SLN	0.292307692307692
molinya01	2012	SLN	0.479452054794521
molinya01	2013	SLN	0.434782608695652
molinya01	2014	SLN	0.477272727272727
molinya01	2015	SLN	0.412698412698413
molinya01	2016	SLN	0.211764705882353
molinya01	2017	SLN	0.358208955223881
molinya01	2018	SLN	0.307692307692308
molinya01	2019	SLN	0.266666666666667

Standard Fielding

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Year	Age	Tm	Pos	Lg	G	GS	CG	Inn	Ch	PO	A	E	DP	Fld%	Rtot	Rdrs	Rtot/yr	Rdrs/yr	RF/9	RF/G	lgFld%	lgRF9	lgRFG	PB	WP	SB	CS	CS%	lgCS%	PO	Awards
2004	21	STL	C	NL	51	39	27	344.0	274	256	16	2	1	.993	3	2	10	7	7.12	5.33	.993	7.45	7.40	4	11	9	8	47%	28%	1	
2005	22	STL	C	NL	114	111	94	959.1	757	684	66	7	4	.991	13	11	16	14	7.04	6.58	.992	7.26	7.16	**8**	26	14	25	***64%***	29%	9	
2005	22	STL	1B	NL	1	0	0	1.0	0	0	0	0	0		0	0	0	0	0.00	0.00		9.90	9.50								
2006	23	STL	C	NL	127	118	101	1037.1	817	734	79	4	6	.995	14	14	16	17	7.05	6.40	.992	7.37	7.32	7	25	37	29	44%	28%	8	
2006	23	STL	1B	NL	4	0	0	5.0	6	5	0	1	1	.833	-1	-1	-192	-216	9.00	1.25	.993	9.36	9.35								
2007	24	STL	C	NL	107	101	89	861.1	651	582	63	6	8	.991	12	15	17	21	6.74	6.03	.991	7.39	7.36	7	24	23	27	***54%***	25%	2	
2007	24	STL	1B	NL	1	0	0	1.0	1	1	0	0	0	1.000	0	0	-360	0	9.00	1.00	.990	9.00	9.20								
2008	25	STL	C	NL	119	114	103	1002.0	733	653	70	10	7	.986	6	3	7	4	6.49	6.08	.993	7.65	7.60	5	34	34	18	35%	27%	7	GG
2008	25	STL	1B	NL	2	1	0	11.0	16	13	3	0	1	1.000	1	0	65	0	13.09	8.00	.992	9.33	9.30								GG
2008	25	STL	DH	NL	1	1																									GG
2009	26	STL	C	NL	138	136	118	1176.2	971	884	82	5	6	.995	11	9	11	9	7.39	7.00	.993	7.77	7.70	4	36	32	22	41%	29%	9	AS,MVP-23,GG
2009	26	STL	1B	NL	6	0	0	10.0	11	10	1	0	2	1.000	0	1	24	144	9.90	1.83	.993	9.27	9.22								AS,MVP-23,GG
2010	27	STL	C	NL	135	130	112	1138.0	979	895	79	5	10	.995	16	20	17	21	7.70	7.21	.992	8.05	7.97	7	27	35	33	***49%***	29%	3	AS,GG
2010	27	STL	1B	NL	7	0	0	7.0	7	7	0	0	2	1.000	0	0	0	0	9.00	1.00	.993	9.26	9.13								AS,GG
2011	28	STL	C	NL	137	131	112	1150.0	929	857	67	5	5	.995	6	5	6	5	7.23	6.74	.992	7.98	7.96	6	35	46	19	29%	28%	3	AS,MVP-21,GG
2011	28	STL	1B	NL	2	0	0	2.0	4	3	0	1	0	.750	-1	0	-300	0	13.50	1.50	.995	9.45	9.30								AS,MVP-21,GG
2012	29	STL	C	NL	136	133	114	1161.1	1053	962	88	3	12	.997	14	29	14	30	8.14	7.72	.992	8.36	8.26	6	36	38	35	48%	27%	5	AS,MVP-4,GG
2012	29	STL	1B	NL	3	0	0	9.0	13	11	2	0	0	1.000	1	0	80	0	13.00	4.33	.992	9.30	9.17								AS,MVP-4,GG
2013	30	STL	C	NL	131	128	108	1115.1	1043	976	63	4	11	.996	13	30	14	32	8.38	7.93	.993	8.10	8.10	3	22	26	20	43%	28%	2	AS,MVP-3,GG,SS
2013	30	STL	1B	NL	5	2	1	18.0	18	17	1	0	1	1.000	-1	0	-67	0	9.00	3.60	.994	9.40	9.42								AS,MVP-3,GG,SS
2014	31	STL	C	NL	107	106	94	931.2	868	810	56	2	10	.998	13	8	17	10	8.37	8.09	.992	8.41	8.39	3	22	23	21	***48%***	28%	4	AS,GG
2014	31	STL	DH	NL	2	2																									AS,GG
2014	31	STL	1B	NL	1	1	1	9.0	11	10	1	0	0	1.000	0	0	-13	0	11.00	11.00	.993	9.30	9.30								AS,GG
2015	32	STL	C	NL	134	131	108	1149.2	1127	1064	56	7	9	.994	9	10	9	10	8.77	8.36	.993	8.47	8.41	4	34	37	26	41%	28%	2	AS,GG
2015	32	STL	DH	NL	1	1																									AS,GG
2016	33	STL	C	NL	146	142	110	1218.1	1175	1113	60	2	5	.998	-2	1	-2	1	8.67	8.03	.993	8.81	8.75	8	42	67	18	21%	27%	1	MVP-23
2016	33	STL	1B	NL	2	1	0	7.0	11	10	1	0	0	1.000	0	0	51	0	14.14	5.50	.994	9.00	9.00								MVP-23
2017	34	STL	C	NL	133	133	105	1125.2	1144	1082	55	7	13	.994	12	5	13	5	9.09	8.55	.993	9.03	8.93	6	32	43	24	36%	27%	6	AS
2017	34	STL	1B	NL	1	0	0	2.0	4	4	0	0	0	1.000	0	0	0	0	18.00	4.00	.995	9.00	8.80								AS
2018	35	STL	C	NL	121	120	95	1017.2	1010	966	42	2	8	.998	6	-3	7	-4	8.91	8.33	.993	9.17	9.14	4	39	27	12	31%	28%	2	AS,GG
2018	35	STL	1B	NL	5	0	0	12.0	12	9	2	1	3	.917	0	0	-40	0	8.25	2.20	.994	8.63	8.64								AS,GG
2019	36	STL	C	NL	111	108	93	939.1	947	916	30	1	5	.999	4	1	5	1	9.06	8.52	.993	9.49	9.43	4	31	22	8	27%	26%	1	
2019	36	STL	1B	NL	4	0	0	8.0	6	6	0	0	1	1.000	0	0	0	0	6.75	1.50	.993	8.55	8.53								
2019	36	STL	3B	NL	1	0	0	1.0	0	0	0	0	0		0	0	0	0	0.00	0.00		2.70	2.50								

TRY

관심 있는 선수들의 스탯 5개 계산해보기(OPS, BABIP, WHIP, FIP, wOBA 등)

강의자료에서 공식을 소개하지 않은 스탯의 경우 공식을 직접 찾아보고 쿼리로 구해볼 것!