

Tableplop: Hacking a Free VTT for OSR via Curve Fitting

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Disclaimer: This is not so much a talk about a Cybersecurity Hack, more a talk about a Hack for fun (and profit?)



Why OSR, Why VTT, Why Free?

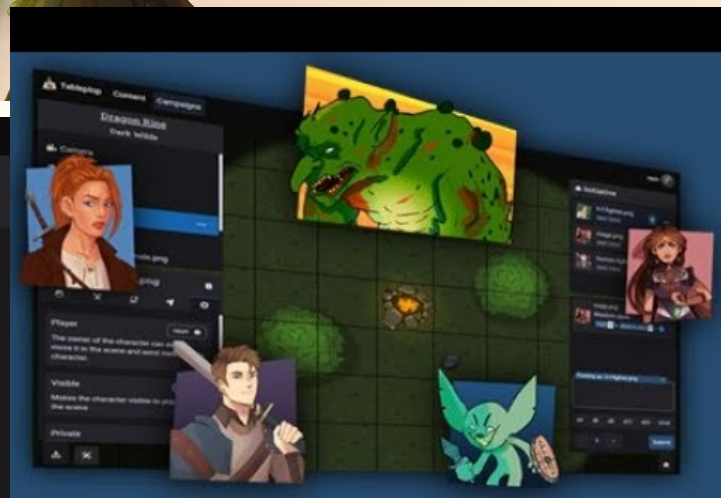
- Playing/DM'ing since late 1970's
- No Edition Wars here - simply what I know best
- Move from in-person to remote play
- Tried Play-by-Post, interesting, not satisfying
- I'm cheap
- Started with BECMI/Rules Cyclopedia, moved to Basic Fantasy RPG - an OSR based on original B/X rules, but... modern concepts - Ascending AC, Separation of Race/Class, etc.
- It's Free:
<https://basicfantasy.org/>



What is Tableplot?

- Community supported VTT
- Modern and Lightweight
- Free/Patreon
- <https://tableplop.com/>
- Default 5e character templates
- Build your own character templates

<https://tableplot.com/>



Saving Throw Tables by Class

Cleric					
Level	Death Ray or Poison	Magic Wands	Paralysis or Petrify	Dragon Breath	Spells
1	1	12	14	16	18
2-3	10	11	13	15	17
4-5	9	10	13	15	14
6-7	9	10	12	14	13
8-9	8	9	12	14	13
10-11	8	9	11	13	12
12-13	7	8	11	13	12
14-15	7	8	10	12	11
16-17	6	7	9	12	11
18-19	6	7	8	11	10
20	5	6	7	11	10

Fighter					
Monster Hit Dice	Death Ray or Poison	Magic Wands	Paralysis or Petrify	Dragon Breath	Spells
less than 1	10	3	15	16	18
1	25	10	14	15	17
2	75	25	14	15	17
3	145	36	14	15	16
4	240	40	13	14	15
5	360	45	12	14	15
6	500	55	12	13	14
7	670	65	12	13	14
8	875	70	12	12	13
9	1,075	75	10	12	13
10	1,300	90	10	12	13
11	1,575	95	9	10	11
12	1,875	100	9	10	11
13	2,175	110	9	10	11
14	2,500	115	8	9	10
15	2,850	125	8	9	10
16	3,250	135	8	9	10
17	3,600	145	8	9	10
18	4,000	150	8	9	10
19	4,500	155	8	9	10
20	5,250	160	8	9	10
21	6,000	165	8	9	10
22	6,750	170	8	9	10
23	7,500	175	8	9	10
24	8,250	180	8	9	10
25	9,000	185	8	9	10

Attack Bonus Table

Fighter Level	Cleric or Thief Level	Magic-User Level	Monster Hit Dice	Attack Bonus
NM			less than 1	+0
1	1-2	1-3	1	+1
2-3	3-4	4-5	2	+2
4	5-6	6-8	3	+3
5-6	7-8	9-12	4	+4
7	9-11	13-15	5	+5

Thief Abilities

Thief Level	Open Locks	Remove Traps	Pick Pockets	Move Silently	Climb Walls	Hide	Listen
1	25	20	30	25	80	10	30
2	30	25	35	30	85	15	35
3	35	30	40	35	90	20	40

Clerics vs. Undead Table

Cleric Level	Skeleton 1 Hit Die	Zombie 2 Hit Dice	Ghoul 3 Hit Dice	Wight 4 Hit Dice	Wraith 5 Hit Dice	Mummy 6 Hit Dice	Spectre 7 Hit Dice	Vampire 8 Hit Dice	Ghost 9+ Hit Dice
1	13	17	19	No	No	No	No	No	No
2	14	18	20	No	No	No	No	No	No
3	15	19	21	No	No	No	No	No	No
4	7	11	15	18	20	No	No	No	No
5	8	12	16	19	21	No	No	No	No
6	9	13	17	20	22	No	No	No	No
7	10	14	18	21	23	No	No	No	No
8	11	15	19	22	24	No	No	No	No
9	12	16	20	23	25	No	No	No	No
10	13	17	21	24	26	No	No	No	No
11	14	18	22	25	27	No	No	No	No
12	15	19	23	26	28	No	No	No	No
13	16	20	24	27	29	No	No	No	No
14	17	21	25	28	30	No	No	No	No
15	18	22	26	29	31	No	No	No	No
16	19	23	27	30	32	No	No	No	No
17	20	24	28	31	33	No	No	No	No
18	21	25	29	32	34	No	No	No	No
19	22	26	30	33	35	No	No	No	No
20	23	27	31	34	36	No	No	No	No

Cleric

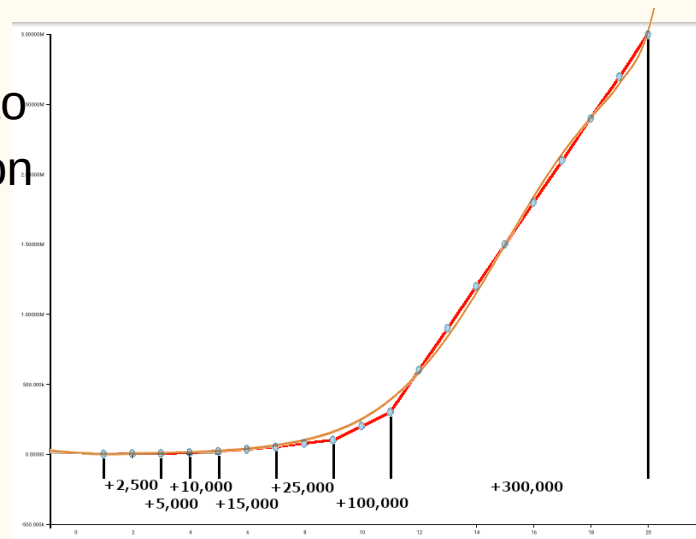
Level	Exp. Points	Spells					
		Hit Dice	1	2	3	4	5 6
1	0	1d6	-	-	-	-	-
2	1,500	2d6	1	-	-	-	-
3	3,000	3d6	2	-	-	-	-
4	6,000	4d6	2	1	-	-	-
5	12,000	5d6	2	2	-	-	-
6	24,000	6d6	2	2	1	-	-
7	48,000	7d6	3	2	2	-	-
8	90,000	8d6	3	2	2	1	-
9	180,000	9d6	3	3	2	2	-
10	270,000	9d6+1	3	3	2	2	1
11	360,000	9d6+2	4	3	3	2	2
12	450,000	9d6+3	4	4	3	2	2
13	540,000	9d6+4	4	4	3	3	2
14	630,000	9d6+5	4	4	4	3	2
15	720,000	9d6+6	4	4	4	3	3
16	810,000	9d6+7	5	4	4	3	3
17	900,000	9d6+8	5	5	4	3	3
18	990,000	9d6+9	5	5	4	4	3
19	1,080,000	9d6+10	6	5	4	4	3
20	1,170,000	9d6+11	6	5	5	4	3

Fighter

Level	Exp. Points	Hit Dice				
1	0	1d8				
2	2,000	2d8				
3	4,000	3d8				
4	8,000	4d8				
5	16,000	5d8				
Dwarf, Elf, Human						Halfling
Strength	Light Load	Heavy Load	Light Load	Heavy Load		
3	25	60	20	40		
4-5	35	90	30	60		
6-8	50	120	40	80		
9-12	60	150	50	100		
13-15	65	165	55	110		
16-17	70	180	60	120		
18	80	195	65	130		
17	1,200,000		9d8+16			
18	1,320,000		9d8+18			
19	1,440,000		9d8+20			
20	1,560,000		9d8+22			

Challenge: OSR Tables (cont.)

- In Tabletop and most VTTs, there is no mechanism for storing/accessing tables, simple formulas only are supported
- In many OSR games, there is no rhyme or reason why the tables were built or populated as they are (“because Gygax wrote it that way”)
- Ex: D&D Original Edition (1974) Magic-User XP per Level:
- Solution: Represent the table values with a mathematical function. This requires being able to represent the table values to the function curve on a graph. Discovering that function is known as “Curve Fitting”
- *Works for any game with tables/rules that are copyrighted, because this is just math and copyright protection does not apply.*

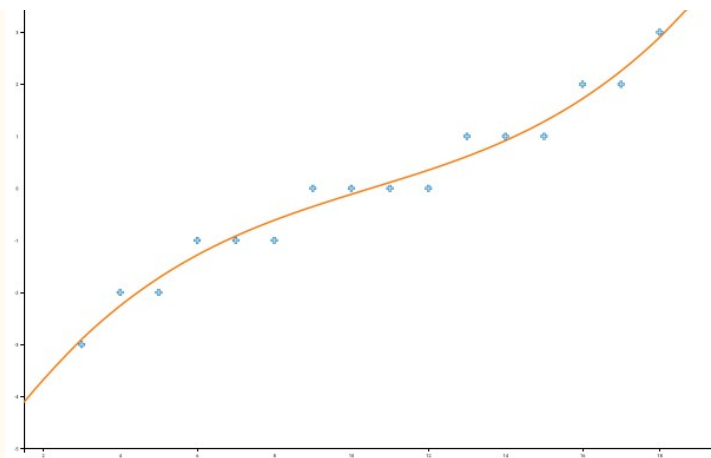


A Simple Example: Ability Bonus/Penalty

- The Classics: Strength, Intelligence, Wisdom, Constitution, Dexterity, Charisma
- 5e Formula: $\text{=floor}((\text{ability-score}-10)/2)$
- A Curve Fitting Calculator:
<https://planetcalc.com/8735/>
 - 5-th order polynomial
 - 7 digit precision
 - Use ROUND() function to output a whole integer

- Result: $\text{=round}((-7.483032) + (2.396571 * \text{ability-score}) - (0.3875923 * (\text{ability-score}^2)) + (0.03564341 * (\text{ability-score}^3)) - (0.001667064 * (\text{ability-score}^4)) + (0.00003175359 * (\text{ability-score}^5)))$

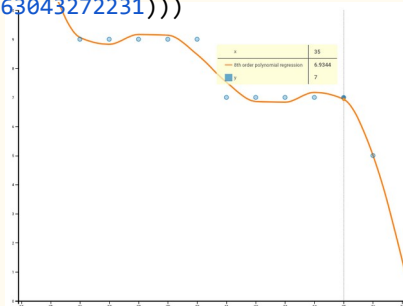
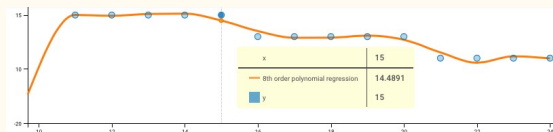
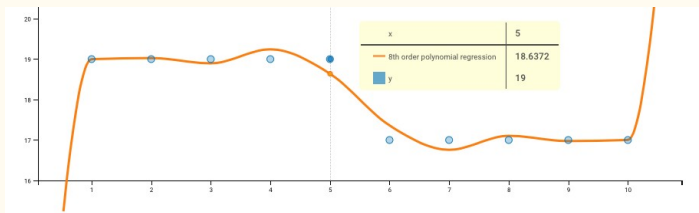
Ability Score	Bonus/Penalty
3	-3
4-5	-2
6-8	-1
9-12	0
13-15	+1
16-17	+2
18	+3



More Complex Example: THAC0 Attack Table

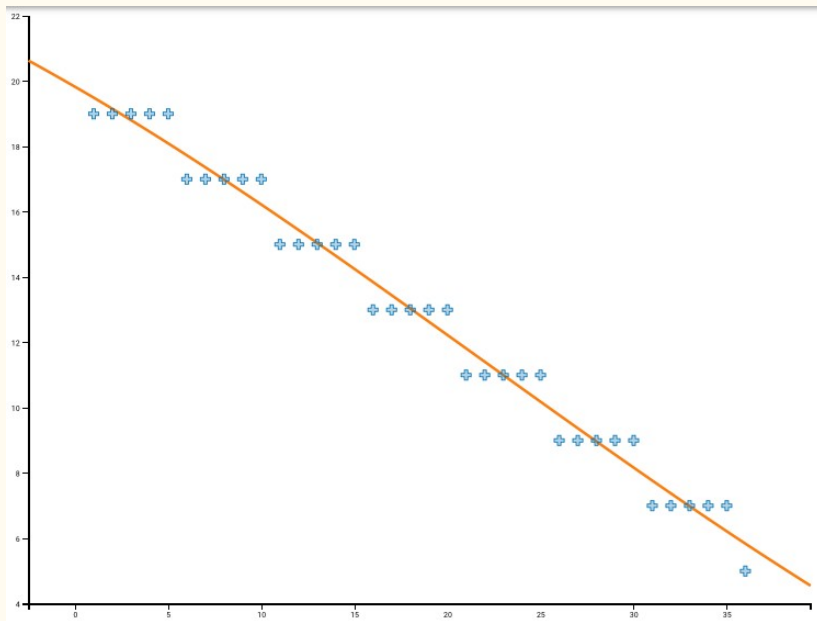
- 3 functions for smaller ranges (1-10, 11-24, 24+ Hit Dice)
- 8th-order polynomials
- 12 digit precision
- Curve Fitting (BECMI Magic-User THAC0):

```
=if(1v<11,round(0.0000979010024957*(1v^8)-
0.0037701484098117*(1v^7)+0.0585601565116233*(1v^6)-0.470831183288496*(1v^5)+2.09994463764019*(1v^4)-
5.21393817229583*(1v^3)+6.8936121164948*(1v^2)-4.35177853567679*1v+19.998376236763),if(1v>24,round(-
0.0000002816508653*(1v^8)+0.00012511414154*(1v^7)-0.0193577908855009*(1v^6)+1.54068450049682*(1v^5)-
72.0234056905753*(1v^4)+2066.24868704549*(1v^3)-35920.5086979828*(1v^2)+348299.783251627*1v-1448542.05949315),round(-
0.0000019574045683*(1v^8)+0.0002302221698072*(1v^7)-0.0110955503602492*(1v^6)+0.275551515097848*(1v^5)-
3.48834091630104*(1v^4)+13.7088413619814*(1v^3)+71.11095383838*(1v^2)-2171.25709582529*1v+7232.63043272231)))
```



Think Outside the Box: THAC0 Attack Table

- Noticed a trend, y values were the same in each set of 5 numbers



- Easily solved using the CEILING function:
$$=-2*\text{ceiling}(\text{hd}/5)+2$$


Character & Monster Templates

<https://github.com/broocifer/tableplop-content>

BFRPG Monster Template by Brucifer - version 1.21

BFRPG Character Template by Brucifer - version 1.35

T Resources Campaigns > Castle Amber > The West Wing the-party



(Jerome) the Holy

Wisdom +3 18

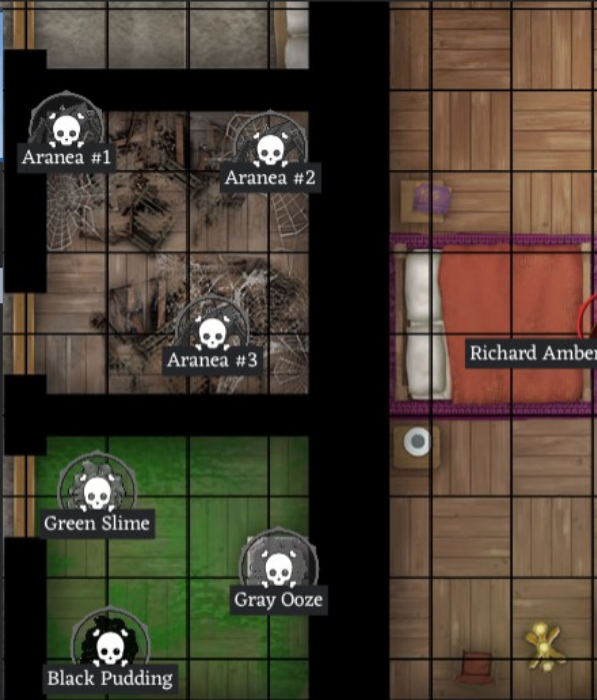
Dexterity +0 11

Constitution +2 17

Saving Throw vs Spells

Missile Attack Roll & AC Adjustment

Hit Points per Level



Scene

(Rupert) Flintsworn 3 months ago

Primary Melee Weapon Battle Axe +1 To Hit: 23 Damage: 9

Primary Melee Weapon Battle Axe +1 To Hit: 16 Damage: 4

(Wish) 3 months ago Listen: Success

(Ogre) 3 months ago 3

(Wish) 3 months ago Listen: Failure

(Jerome) the Holy

d4 d6 d8 d10 d12 d20 d100

- 0 + adv dis hidden Send

Thank You!

- <https://basicfantasy.org/>
- <https://tableplop.com/>
- <https://planetcalc.com/8735/>
- <https://github.com/broocifer/tableplop-content>

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