

Washington University in St. Louis

## Washington University Open Scholarship

---

Spring 2017

Washington University  
Senior Honors Thesis Abstracts

---

Spring 2017

### On Solutions to $\varphi(n) + s = \varphi(n + s)$

Ethan Farber

*Washington University in St. Louis*

Follow this and additional works at: [https://openscholarship.wustl.edu/wushta\\_spr2017](https://openscholarship.wustl.edu/wushta_spr2017)

---

#### Recommended Citation

Farber, Ethan, "On Solutions to  $\varphi(n) + s = \varphi(n + s)$ " (2017). *Spring 2017*. 31.  
[https://openscholarship.wustl.edu/wushta\\_spr2017/31](https://openscholarship.wustl.edu/wushta_spr2017/31)

This Abstract for College of Arts & Sciences is brought to you for free and open access by the Washington University Senior Honors Thesis Abstracts at Washington University Open Scholarship. It has been accepted for inclusion in Spring 2017 by an authorized administrator of Washington University Open Scholarship. For more information, please contact [digital@wumail.wustl.edu](mailto:digital@wumail.wustl.edu).

ON SOLUTIONS TO  $\varphi(n) + s = \varphi(N + s)$ *Ethan Farber**Mentors: Matt Kerr and John Shareshian*

We investigate the set of solutions to  $\varphi(n) + s = \varphi(n + s)$ , where  $\varphi$  is Euler's totient function and  $s$  varies over the positive even integers. Our main theorems describe the effect of the factorization of  $s$  upon the type and abundance of solutions, and we prove in certain cases the nonexistence of all or part of the solution sets. We generalize the question to the setting of polynomial rings, and confront some interesting transformations of the problem in that setting.