Epsilon School

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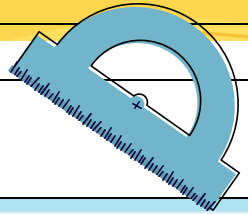
Agenda



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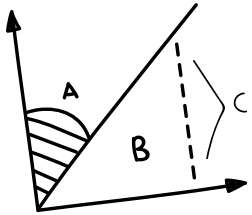
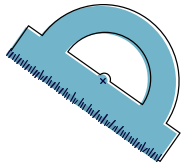


01

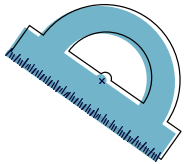


$(-3\sqrt{2}) - 4(3)(-3M+2)$

Problem Statement

$$\frac{3 \sin 4/8}{\sqrt{3.2.4+2}}$$

The Epsilon School of Math and Science is planning to receive 140 more students than their graduating class the previous year. In order to accommodate for this increase, they plan on hiring 7 new teachers to maintain the size of their classes. **What department should these faculty be assigned to achieve this in the fairest manner?**



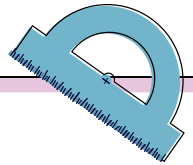
$$C = \sin^2\left(\frac{2}{3}\right)$$
$$= \sin^3 \times 0.747$$
$$= 7{,}38$$

$$A^3C^24^B = 9^3 + 5^B + 7^C$$
$$5^C = 54718{,}32.$$

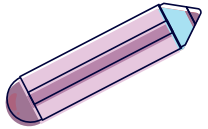
02

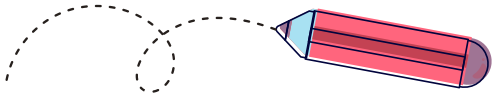
Backgroun d

Essential info



1) Total student population goes from 490 to 630
2) 140 more incoming sophomores than the graduating senior population (+ dropouts)
3) 5% of incoming class drops out prior to graduation
4) Foreign language teachers can teach multiple languages
5) 7 new teachers must be hired





September 2024 Enrollments Pt 1

Department	10th	11th	12th
Art	31	33	99
Biology	198	95	319
Chemistry	59	126	294
English	183	155	490
French	41	32	122
German	19	22	51

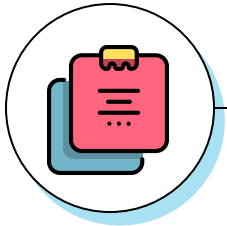
September 2024 Enrollments Pt 2

Department	10th	11th	12th
Spanish	51	26	110
Mathematics	184	201	647
Music	50	56	155
Physics	50	58	291
Social Studies	183	131	373

Assumptions

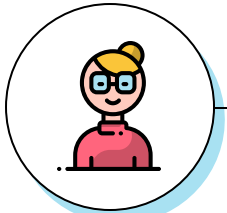
$$B^3 = CD + DA$$
$$B^3 = (D - (\sin B)$$
$$B^3 = D^2 - 3A \cos B^3 + A \sin B$$
$$B^3 = D^2 - 4A \cos B^3 + C \sin B$$
$$B^3 = C^3 - A^2 - 3 \cos B$$

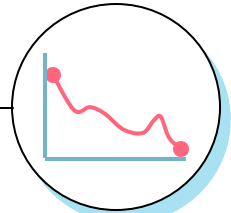
Course selection follows a grade-based trend



Epsilon School is in Massachusetts, so each student takes one English course

Every teacher teaches five periods a day



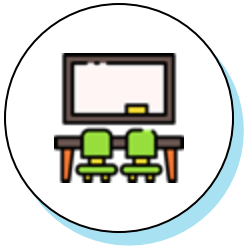


The dropout rate for 10th grade is 1%, 11th is 2%, and 12th is 2%

Considerations

Class size

A reasonable class size is about 15-20 students

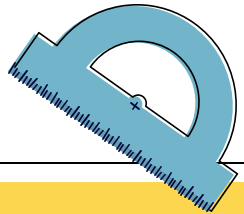


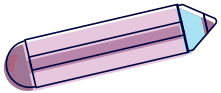
Music+Arts

Music and art class sizes will deviate from average

Student-teacher ratio

Fairness = Maintaining student-teacher ratio





03 Process

$$x_1 + 2_A = 3\sqrt{5+2AB}$$
$$= 9\sqrt{12}$$

Process Overview

Step #01

Find the predicted 2025 enrollments using a grade-based trend

01

Step #02

Calculate the expected class size of each department prior to hiring additional faculty

02

Step #03

Determine which departments should receive additional faculty

03

Step #04

Calculate the new class sizes after hiring additional faculty

04

September 2024 Avg. Class Sizes Pt 1

Department	Total Enrollments	# of Teachers	Avg. class size = Enrollments/(5×Teachers)
Art	99	1	19.8
Biology	319	4	15.95
Chemistry	294	3	19.6
English	490	5	19.6
French	122	1.2	20.33
German	51	0.6	17

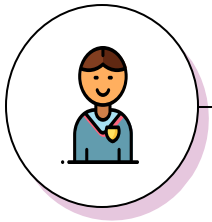
September 2024 Avg. Class Sizes Pt 2

Department	Total Enrollments	# of Teachers	Avg. class size = Enrollments/(5×Teachers)
Spanish	110	1.2	18.33
Mathematics	647	6	21.57
Music	155	1	31
Physics	291	3	19.4
Social Studies	373	5	14.92

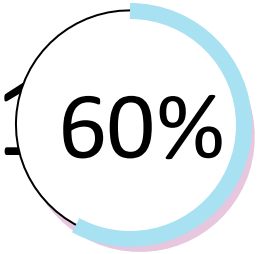
About the Language Teachers...

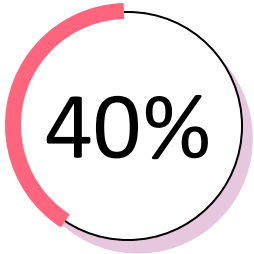
Teacher 1:	German	German	German	Spanish	Spanish
Teacher 2:	Spanish	Spanish	Spanish	Spanish	French
Teacher 3:	French	French	French	French	French

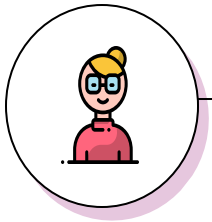
About the Language Teachers Cont.



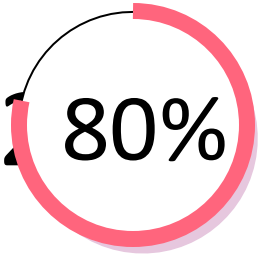
Teacher 1

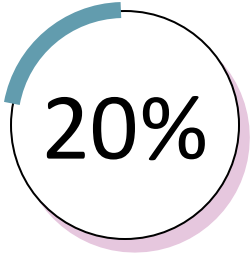


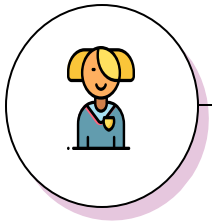




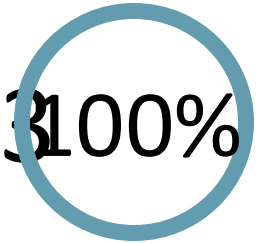
Teacher 2







Teacher 3



So, there are 1.2 French teachers, 0.6 German teachers, and 1.2 Spanish teachers (3 teachers in total)

Taking Dropouts into account

Class	10th (1%)	11th (2%)	12th (2%)
Rising Sophomores	152 + 140 + 5 dropouts = **297**		
Rising Juniors	183	183×0.99= **181**	
Rising Seniors	155/0.99= 157	155	157×.97= **152**

157-152 = 5 total rising senior dropouts

September 2025 projected Enrollments Pt 1

calculated by multiplying total # of students in current class by % of previous year's students who took a course in a particular department

Department	10th	11th	12th
Art	50	39	35
Biology	321	111	26
Chemistry	96	147	109
English	297	181	152
French	67	37	49
German	31	25	10

September 2025 projected Enrollments Pt 2

Department	10th	11th	12th
Spanish	83	30	33
Mathematics	299	235	262
Music	81	65	49
Physics	81	68	183
Social Studies	297	153	59

September 2025 Avg. Class Sizes without new faculty Pt 1

Department	Total Enrollments	# of Teachers	Avg. class size = Enrollments/(5×Teachers)
Art	124	1	24.8
Biology	458	4	22.9
Chemistry	352	3	23.4
English	630	5	25.2
French	153	1.2	25.5
German	66	0.6	22

September 2025 Avg. Class Sizes without new faculty Pt 2

Department	Total Enrollments	# of Teachers	Avg. class size = Enrollments/(5×Teachers)
Spanish	146	1.2	24.33
Mathematics	796	6	26.53
Music	194	1	38.8
Physics	332	3	22.13
Social Studies	509	5	20.36

Which departments need additional faculty?

Chemistry

The average class size is currently 23.4

English

The average class size is currently 25.2

french

The average class size is currently 25.5

Spanish

The average class size is currently 24.33

Math

The average class size is currently 26.53, so we decided to add 2 additional teachers

$A^3C^24^B = 9^3+5^B+7^C$

$5^C = 54718,32.$

Biology

The average class size is similar to physics' class size, but we prioritized biology because it has more students overall.

Although the music and art departments have larger avg class sizes, they typically can afford to be larger and will not receive additional faculty.

New Language Department $(-3\sqrt{2}) - 4(3)(-3M+2)$

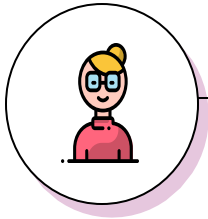
Teacher 1:	German	German	German	Spanish	Spanish
Teacher 2:	Spanish	Spanish	Spanish	Spanish	French
Teacher 3:	French	French	French	French	French
Teacher 4:	French	French	French	Spanish	Spanish

New Language Department Cont.

Teacher 1

60%

40%



Teacher 2

80%

20%

Teacher 3

100%

NEW TEACHER

60%

40%

So, there are now 1.8 French teachers, 0.6 German teachers, and 1.6 Spanish teachers (4 teachers in total)

Conclu sion

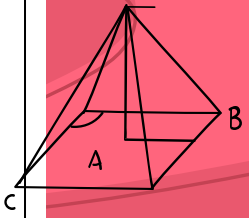
04

$$C = \frac{B^3 + C^2 + A}{3BA}$$

$$= \frac{C^3 + 5CA}{2CA}$$

$$= C^4 + 2 + D$$

$$= 3C4$$



September 2025 Avg. Class Sizes with new faculty Pt 1

Department	Total Enrollments	# of Teachers	Avg. class size = Enrollments/(5×Teachers)
Art	124	1	24.8
Biology	458	4+1	18.32
Chemistry	352	3+1	17.6
English	630	5+1	21
Language (French, German, Spanish)	365	3+1	17, 22, 18.25

September 2025 Avg. Class Sizes with new faculty Pt 2

Department	Total Enrollments	# of Teachers	Avg. class size = Enrollments/(5×Teachers)
Mathematics	796	6+2	19.9
Music	194	1	38.8
Physics	332	3+1	16.6
Social Studies	509	5	20.36

Solution

(Additional faculty for each department)

Art:	0
Biology:	1
Chemistry:	1
English:	1
Language:	1
Mathematics:	2
Music	0
Physics:	1
Social Studies:	0

THANK

You

Do you have any questions?