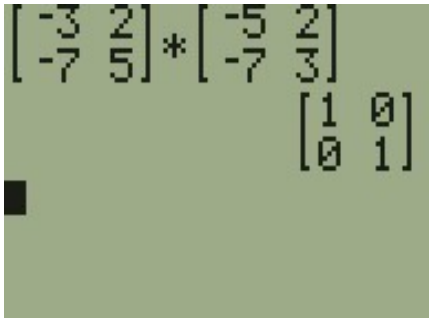
Alpha ZOOM

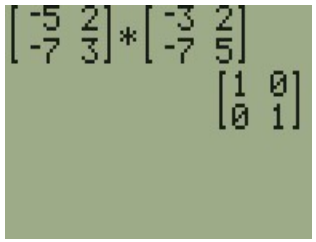
1. Demonstrate that matrix $[A]$ and matrix $[B]$ are inverses of one another by finding the following products.

$$A=\begin{bmatrix}-3 & 2\\ -7 & 5\end{bmatrix} \qquad B=\begin{bmatrix}-5 & 2\\ -7 & 3\end{bmatrix}$$

a. $[A]\cdot[B]=$

b. $[B]\cdot[A]=$





The determinant of a square matrix is a unique number that has many helpful mathematical uses.

2. Find the suggested determinants.

a. Given $[A]=\begin{bmatrix}5 & -4\\ 3 & -3\end{bmatrix}$,

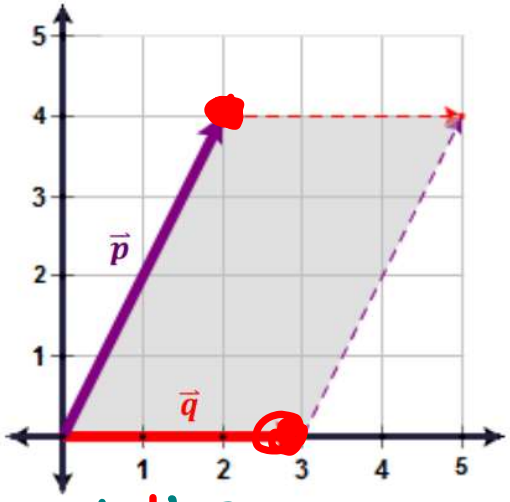
find the determinant of $[A]$

b. $\begin{vmatrix}6 & 3\\ 8 & 4\end{vmatrix}=$

The determinant can be used to find the area of a parallelogram defined by the sum of two vectors.

3. Find the **area** of the following parallelograms.

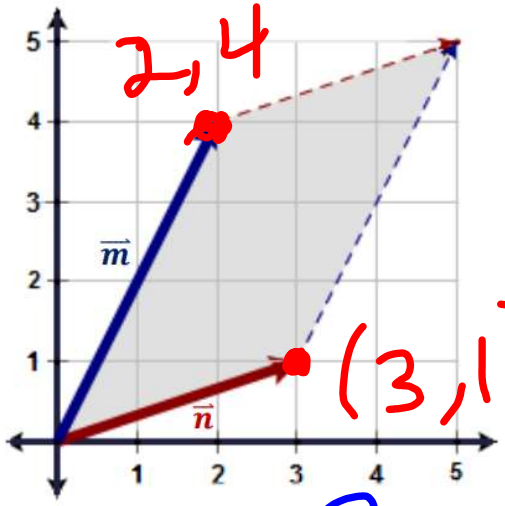
a. Vectors: $\vec{p}: \langle 2, 4 \rangle$ and $\vec{q}: \langle 3, 0 \rangle$



2 4
3 0
12
0
$0 - 12 = -12$

12

b. Vectors: $\vec{m}: \langle 2, 4 \rangle$ and $\vec{n}: \langle 3, 1 \rangle$



3 1
2 4
2
12
$12 - 2$

10

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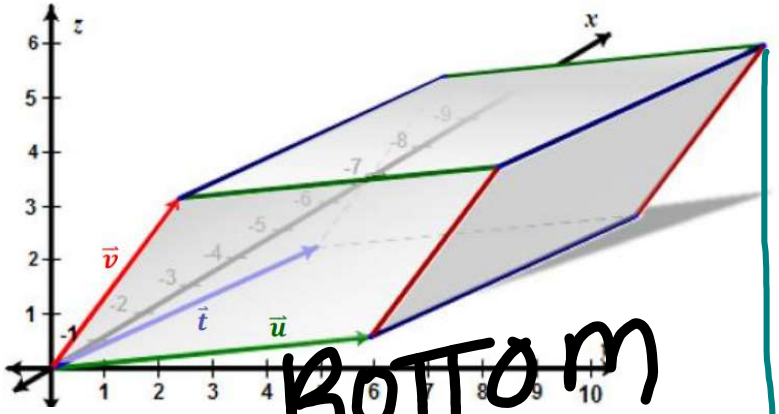
4. Find the **volume** of the parallelepiped described by the vectors: $\vec{t}: \langle -4, 1, 0 \rangle$, $\vec{u}: \langle -1, 5, 0 \rangle$, and $\vec{v}: \langle -1, 2, 3 \rangle$



det([[-4 1 0] [-1 2 3] [-1 5 0]]) = 57

Bottom − Top

−3 − (−60) =

0 −4 −60 0

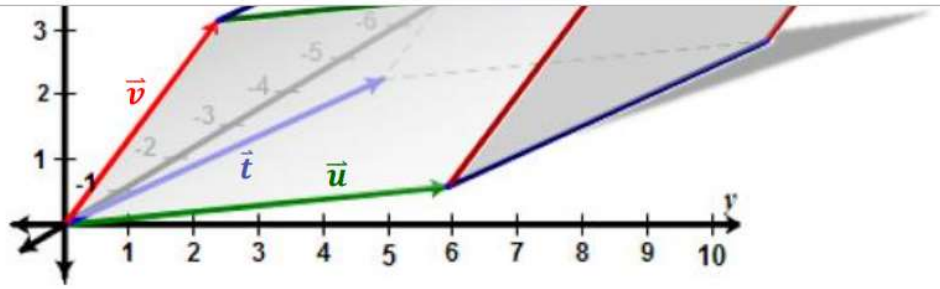
−4 1 0

−1 2 3

−1 5 0

0 −3 0 = −3

57



The determinant can be used to find the inverse of a 2×2 matrix.

5. Find the inverse of the following 2×2 matrices by hand using the formula.

a. $\begin{bmatrix} 2 & 5 \\ 2 & 6 \end{bmatrix}^{-1}$ $12 - 10 = 2$

b. $\begin{bmatrix} 4 & 8 \\ 3 & 6 \end{bmatrix}^{-1}$ 24 24

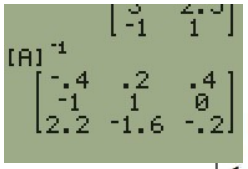
Given the matrix $[A] = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, the inverse can be found using the following formula: $[A]^{-1} = \frac{1}{\det(A)} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

$\frac{1}{2} \begin{bmatrix} 6 & -5 \\ -2 & 2 \end{bmatrix}$

~~8~~ 4 There is not an inverse

6. Using your calculator find the following inverses.

6. Using your calculator find the following inverses.



a. $\begin{bmatrix} 6 & 10 \\ 2 & 4 \end{bmatrix}^{-1}$

b. $\begin{bmatrix} 10 & 5 \\ -4 & -2 \end{bmatrix}^{-1}$

c. $\begin{bmatrix} 3 & 2 \\ 1 & 4 \\ 3 & 1 \end{bmatrix}^{-1}$

$\begin{bmatrix} 1 & -2.5 \\ -.5 & 1.5 \end{bmatrix}$ NO inverse

Systems of equations can be written as a matrix equation and solved.

7. Rewrite the following matrix equations as a system of equations.

a. $\begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 6 \\ 8 \end{bmatrix}$

b. $\begin{bmatrix} 3 & 2 & -2 \\ 4 & -2 & -3 \\ -2 & 3 & 1 \end{bmatrix} \cdot \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 3 \\ 8 \\ -7 \end{bmatrix}$

Systems of equations can be written as a matrix equation and solved.

7. Rewrite the following matrix equations as a system of equations.

a. $\begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 6 \\ 8 \end{bmatrix}$

$1x - 2y = 6$

$3x + 4y = 8$

b. $\begin{bmatrix} 3 & 2 & -2 \\ 4 & -2 & -3 \\ -2 & 3 & 1 \end{bmatrix} \cdot \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 3 \\ 8 \\ -7 \end{bmatrix}$

a b c

$3a + 2b - 2c = 3$

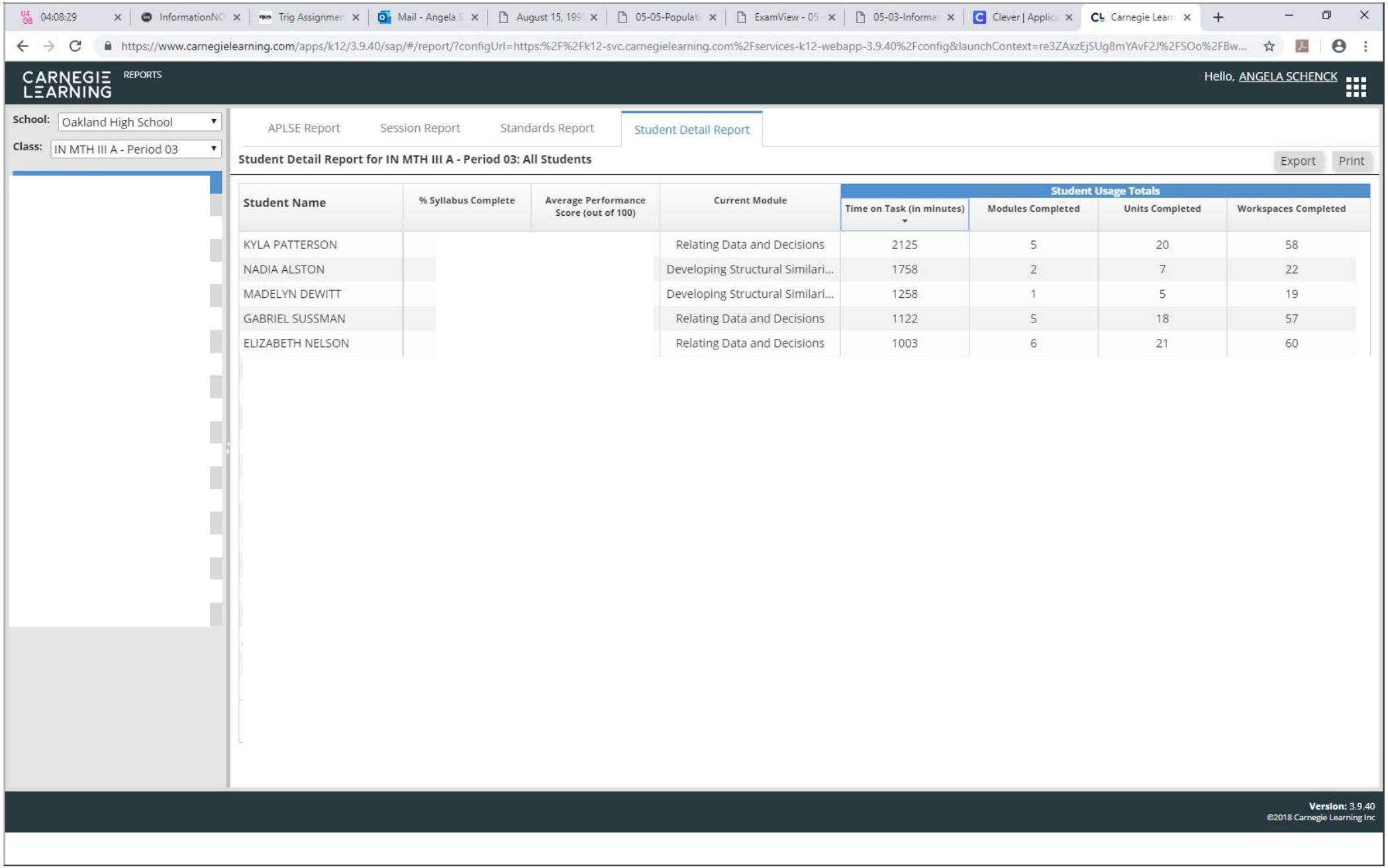
$4a - 2b - 3c = 8$

$-2a + 3b + c = -7$

8. Rewrite the following systems of equations as a matrix equation.
(Label which is the "Coefficient Matrix", the "Variable Matrix", and the "Constant Matrix")

a. $-2a + 8b = 6$
$4a - 9b = 2$

b. $4x - y + 3z = 5$
$-2x + y + 5z = -7$
$2x - 2y + 4z = 2$


04:08:29
InformationNC
Trig Assignmen
Mail - Angela S
August 15, 199
05-05-Populati
ExamView - 05
05-03-Informa
Clever | Applic
Carnegie Learn
https://www.carnegielearning.com/apps/k12/3.9.40/sap/#/report/?configUrl=https:%2F%2Fk12-svc.carnegielearning.com%2Fservices-k12-webapp-3.9.40%2Fconfig&launchContext=re3ZAxzEjSUg8mYAvF2J%2FSOo%2FBw...
CARNEGIE LEARNING
REPORTS
Hello, ANGELA SCHENCK
School: Oakland High School
Class: IN MTH III A - Period 03
APLSE Report
Session Report
Standards Report
Student Detail Report
Student Detail Report for IN MTH III A - Period 03: All Students
Export
Print
Student Name
% Syllabus Complete
Average Performance Score (out of 100)
Current Module
Student Usage Totals
Time on Task (in minutes)
Modules Completed
Units Completed
Workspaces Completed
KYLA PATTERSON Relating Data and Decisions 2125 5 20 58
NADIA ALSTON Developing Structural Similari... 1758 2 7 22
MADELYN DEWITT Developing Structural Similari... 1258 1 5 19
GABRIEL SUSSMAN Relating Data and Decisions 1122 5 18 57
ELIZABETH NELSON Relating Data and Decisions 1003 6 21 60
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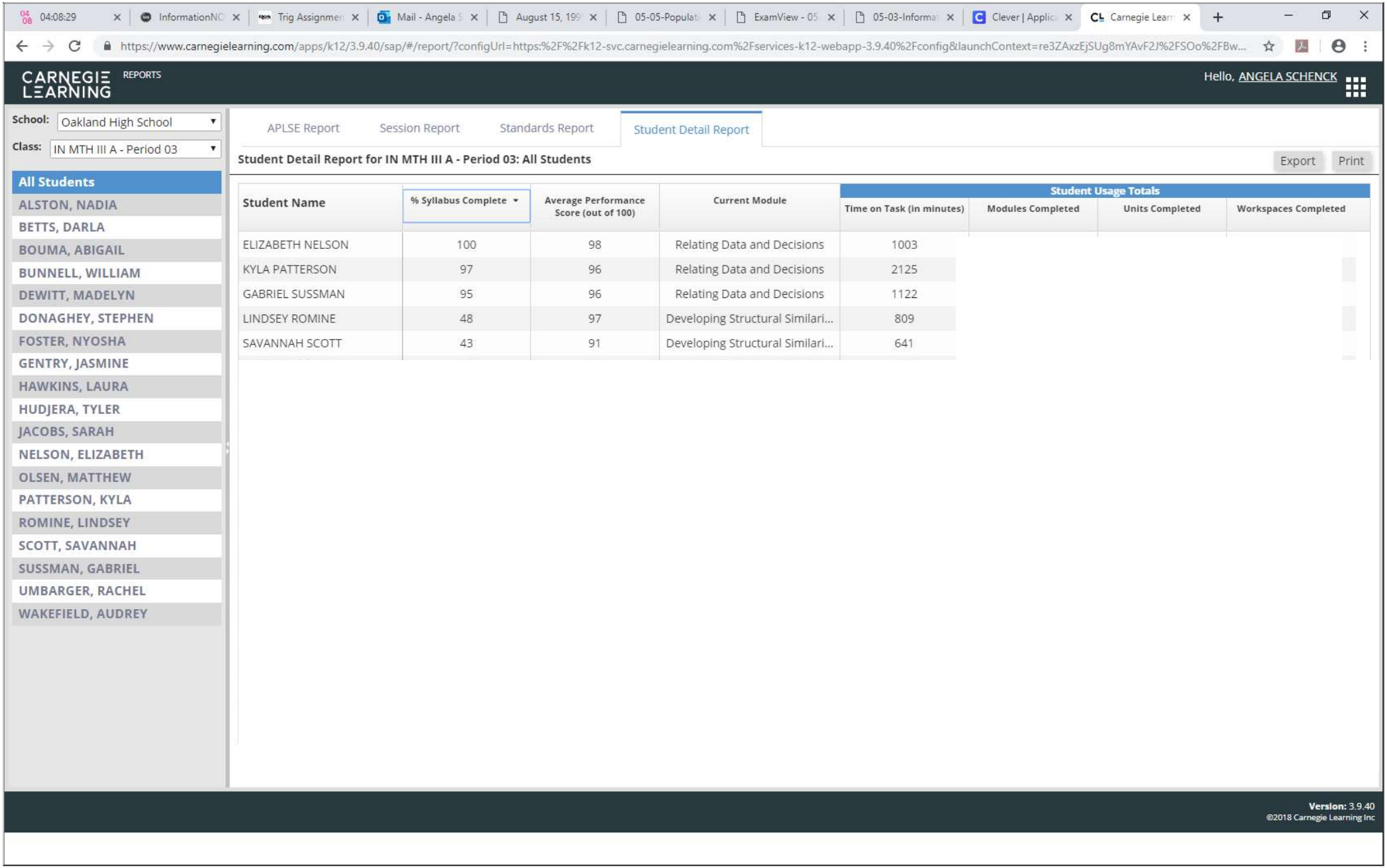
https://www.carnegielearning.com/apps/k12/3.9.40/sap/#/report/?configUrl=https:%2F%2Fk12-svc.carnegielearning.com%2Fservices-k12-webapp-3.9.40%2Fconfig&launchContext=re3ZAxzEjSUg8mYAvF2J%2FSOo%2FBw...
CARNEGIE LEARNING
REPORTS
Hello, ANGELA SCHENCK
School: Oakland High School
Class: IN MTH III A - Period 03
All Students
ALSTON, NADIA
BETTS, DARLA
BOUMA, ABIGAIL
BUNNELL, WILLIAM
DEWITT, MADELYN
DONAGHEY, STEPHEN
FOSTER, NYOSHA
GENTRY, JASMINE
HAWKINS, LAURA
HUDJERA, TYLER
JACOBS, SARAH
NELSON, ELIZABETH
OLSEN, MATTHEW
PATTERSON, KYLA
ROMINE, LINDSEY
SCOTT, SAVANNAH
SUSSMAN, GABRIEL
UMBARGER, RACHEL
WAKEFIELD, AUDREY
APLSE Report
Session Report
Standards Report
Student Detail Report
Student Detail Report for IN MTH III A - Period 03: All Students
Export
Print
Student Name
% Syllabus Complete
Average Performance Score (out of 100)
Current Module
Student Usage Totals
Time on Task (in minutes)
Modules Completed
Units Completed
Workspaces Completed
ELIZABETH NELSON 100 98 Relating Data and Decisions 1003
KYLA PATTERSON 97 96 Relating Data and Decisions 2125
GABRIEL SUSSMAN 95 96 Relating Data and Decisions 1122
LINDSEY ROMINE 48 97 Developing Structural Similari... 809
SAVANNAH SCOTT 43 91 Developing Structural Similari... 641
Version: 3.9.40
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8. Rewrite the following systems of equations as a matrix equation.
(Label which is the "Coefficient Matrix", the "Variable Matrix", and the "Constant Matrix")

a. $-2a+8b=6$
$4a-9b=2$

b. $4x-y+3z=5$
$-2x+y+5z=-7$
$3x-2y+4z=-3$

Var Ans.

$\begin{bmatrix}-2 & 8\\ 4 & -9\end{bmatrix}\cdot\begin{bmatrix}a\\ b\end{bmatrix}=\begin{bmatrix}6\\ 2\end{bmatrix}$

Coe. Matrix

$\begin{bmatrix}4 & -1 & 3\\ -2 & 1 & 5\\ 3 & -2 & 4\end{bmatrix}\cdot\begin{bmatrix}x\\ y\\ z\end{bmatrix}=\begin{bmatrix}5\\ -7\\ -3\end{bmatrix}$

9. Rewrite the following systems of equations as a matrix equation and solve the matrix equation using an inverse.
(Find the inverse for (a) without the calculator)

a. $-p+2q=8$
$2p+3q=-2$

b. $2a-b-3c=10$
$4a+2b+2c=8$
$-4a+3b+c=5$

9. Rewrite the following systems of equations as a matrix equation and solve the matrix equation using an inverse.

(Find the inverse for (a) without the calculator)

a. $-p+2q=8$
$2p+3q=-2$

b. $2a-b-3c=10$
$4a+2b+2c=8$
$-4a+3b+c=5$

$\begin{bmatrix}-1 & 2\\ 2 & 3\end{bmatrix}\cdot\begin{bmatrix}p\\ q\end{bmatrix}=\begin{bmatrix}8\\ -2\end{bmatrix}$

$\begin{bmatrix}p\\ q\end{bmatrix}=\begin{bmatrix}-1 & 2\\ 2 & 3\end{bmatrix}^{-1}\cdot\begin{bmatrix}8\\ -2\end{bmatrix}$

$\begin{bmatrix}-4\\ 2\end{bmatrix}$

$\begin{bmatrix}-1 & 2\\ 2 & 3\end{bmatrix}^{-1}*\begin{bmatrix}8\\ -2\end{bmatrix}$

$\begin{bmatrix}-4\\ 2\end{bmatrix}$

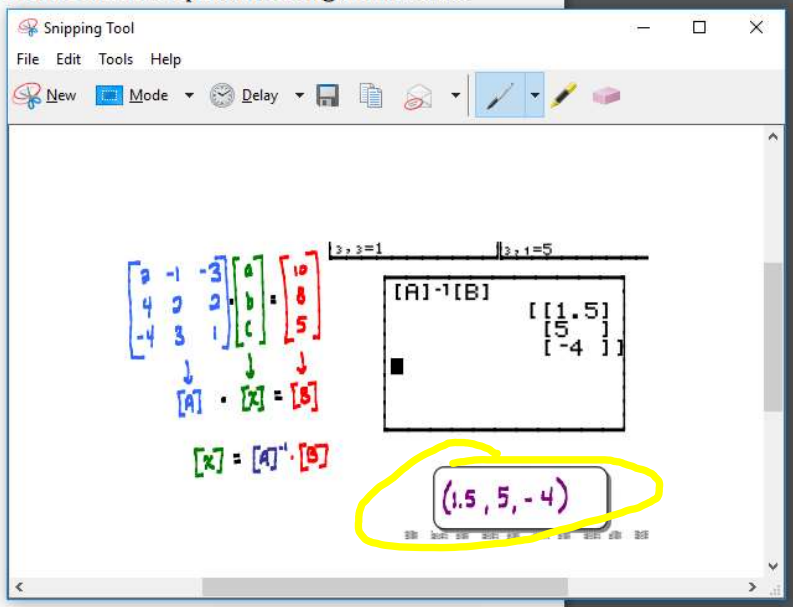
10. At a local movie theater, a person purchased 2 large popcorns and 4 large drinks for a total of $38.50 before taxes. A second person purchased 1 large popcorn and 3 large drinks for $25.10 before taxes at the same theater. How much is the theater charging for large popcorns and large drinks? *(Use a matrix equation to solve this problem)*

9. Rewrite the following systems of equations as a matrix equation and solve the matrix equation using an inverse.

(Find the inverse for (a) without the calculator)

a. $-p+2q=8$
$2p+3q=-2$

b. $2a-b-3c=10$
$4a+2b+2c=8$
$-4a+3b+c=5$



10. At a local movie theater, a person purchased 2 large popcorns and 4 large drinks for a total of $38.50 before taxes. A second person purchased 1 large popcorn and 3 large drinks for $25.10 before taxes at the same theater. How much is the theater charging for large popcorns and large drinks? *(Use a matrix equation to solve this problem)*

10. At a local movie theater, a person purchased 2 large popcorns and 4 large drinks for a total of $38.50 before taxes. A second person purchased 1 large popcorn and 3 large drinks for $25.10 before taxes at the same theater. How much is the theater charging for large popcorns and large drinks? *(Use a matrix equation to solve this problem)*

$2P + 4D = 38.50$

$P + 3D = 25.10$

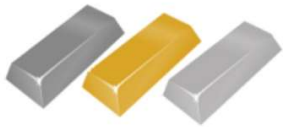
$\begin{bmatrix} 2 & 4 \\ 1 & 3 \end{bmatrix}^{-1} \begin{bmatrix} 38.5 \\ 25.1 \end{bmatrix}$

11. Tim has decided to invest some of his retirement money in precious metal commodities (platinum, gold, and silver). He purchased a combined total of 24 ounces of the three metals. Platinum costs $1000 per ounce. Gold costs $1300 per ounce. Silver costs only $20 per ounce. Tim spent a total of $14,640 on the investment. For this investment, Tim bought as many ounces of silver as he did gold and platinum combined. Determine how many ounces of each type of precious metal Tim purchased. *(Use a matrix equation to solve this problem)*

10. At a local movie theater, a person purchased 2 large popcorns and 4 large drinks for a total of $38.50 before taxes. A second person purchased 1 large popcorn and 3 large drinks for $25.10 before taxes at the same theater. How much is the theater charging for large popcorns and large drinks? *(Use a matrix equation to solve this problem)*

$$\begin{bmatrix} P \\ D \end{bmatrix} = \begin{bmatrix} 7.55 \\ 5.85 \end{bmatrix}$$

11. Tim has decided to invest some of his retirement money in precious metal commodities (platinum, gold, and silver). He purchased a combined total of 24 ounces of the three metals. Platinum costs $1000 per ounce. Gold costs $1300 per ounce. Silver costs only $20 per ounce. Tim spent a total of $14,640 on the investment. For this investment, Tim bought as many ounces of silver as he did gold and platinum combined. Determine how many ounces of each type of precious metal Tim purchased. *(Use a matrix equation to solve this problem)*



$$1000P + 1300G + 20S = 14640$$

$$P + G - S = 0$$

$$P + G + S = 24$$

$$\begin{bmatrix} 1000 & 1300 & 20 \\ 1 & 1 & -1 \\ 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} P \\ G \\ S \end{bmatrix} = \begin{bmatrix} 14640 \\ 0 \\ 24 \end{bmatrix}$$

4 oz P

8 oz G

12 oz S

May 7th Mathia
May 16 and 17 Mathia

Test Grades for Mathia
Module 2, 4 and 6

Assignment Grade for
Mathia Module 5

Georgia Standards Of Excellence

Sec 5.3 – Informational Matrices
Matrices

Name:

1. A flu epidemic occurs in Middletown schools and each student is either susceptible, sick, or infected.

The percentage of students in each category by grade level is given below.

$$[S] = \begin{array}{c} \\ \textit{Susceptible} \\ \textit{Sick} \\ \textit{Infected} \end{array} \begin{array}{c} \begin{array}{ccc} \text{Elementary School} & \text{Middle School} & \text{High School} \end{array} \\ \begin{bmatrix} 60\% & 25\% & 15\% \\ 65\% & 15\% & 20\% \\ 70\% & 10\% & 20\% \end{bmatrix} \end{array}$$

The population distribution of the Middletown school district is given below

$$[P] = \begin{array}{c} \\ \textit{Elementary} \\ \textit{MiddleSchool} \\ \textit{HighSchool} \end{array} \begin{array}{c} \begin{array}{cc} \text{Girls} & \text{Boys} \end{array} \\ \begin{bmatrix} 1610 & 1580 \\ 830 & 795 \\ 1115 & 1100 \end{bmatrix} \end{array}$$

```
[.6  .25  .15]   [1
[.65 .15  .2 ] * [1
[.7  .1   .2 ]   [1
[1340.75 1311.75
 1394    1366.2
 1433    1405.5
```

a. Describe the value of S_{32} and what it represents.

10% of the infected students are in middle school

b. Describe the value of P_{22} and what it represents.

795 boys are in middle school

c. Find $[S]\cdot[P]$. (You can use your calculator if you would like). INCLUDE LABELS

	Girls	Boys
Sus.	1341	1311
Sick	1394	1366
Inf.	1433	1405

d. Describe the value of $[[S]\cdot[P]]_{21}$ and what it represents.

1394 Girls are sick

INCLUDE LABELS

d. Describe the value of $[[S]\cdot[P]]_{21}$ and what it represents.

e. Based on the flu epidemic in Middletown schools, how many sick girls are there?

1394

f. Based on the flu epidemic in Middletown schools, how many boys are infected?

1405

2. A study is being conducted by Time Warner about the network spending of its Network HBO and 2 online competitors.

The percentage of spending categories by each network is shown below.

$$[S] = \begin{array}{c} \\ Movies \\ Mini\ Series \\ Current\ TV \end{array} \begin{array}{c} \begin{array}{ccc} NetFlix & HULU & HBO \end{array} \\ \begin{bmatrix} 60\% & 35\% & 70\% \\ 30\% & 30\% & 30\% \\ 10\% & 35\% & 0\% \end{bmatrix} \end{array}$$

The amount of spending per month by each company is shown below.

$$[P] = \begin{array}{c} \\ NetFlix \\ HULU \\ HBO \end{array} \begin{array}{c} \begin{array}{c} Monthly\ Spending \end{array} \\ \begin{bmatrix} \$85\ million \\ \$33\ million \\ \$912\ million \end{bmatrix} \end{array}$$

a. Describe the value of S_{23} and what it represents.

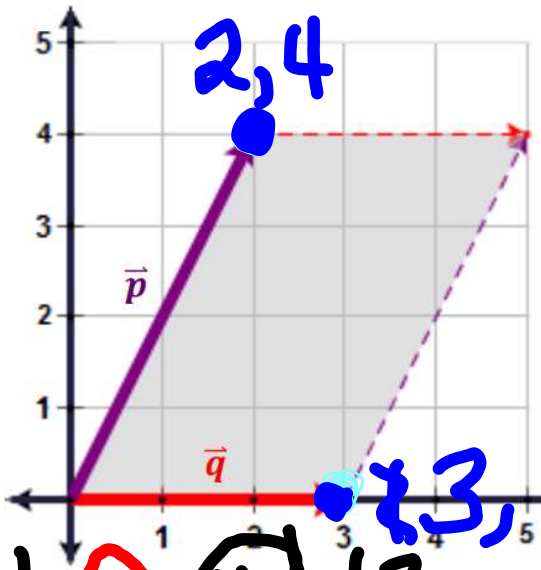
b. Describe the value of P_{31} and what it represents.

c. Find $[S]\cdot[P]$. (You can use your calculator if you would like).

The determinant can be used to find the area of a parallelogram defined by the sum of two vectors.

3. Find the **area** of the following parallelograms.

a. Vectors: $\vec{p}: \langle 2, 4 \rangle$ and $\vec{q}: \langle 3, 0 \rangle$



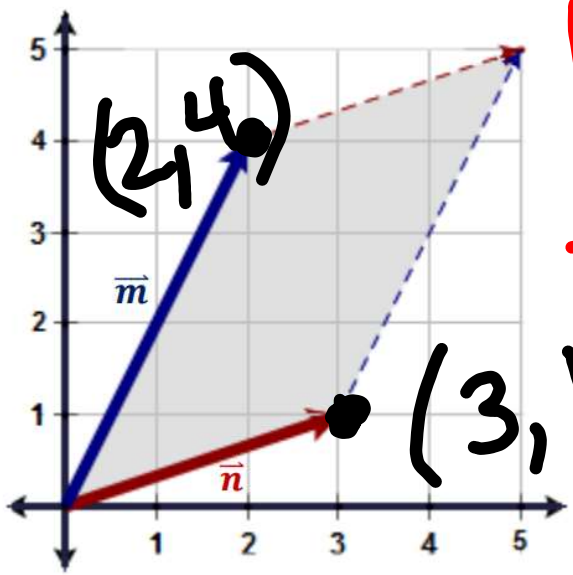
$\begin{vmatrix} 2 & 4 \\ 3 & 0 \end{vmatrix}$

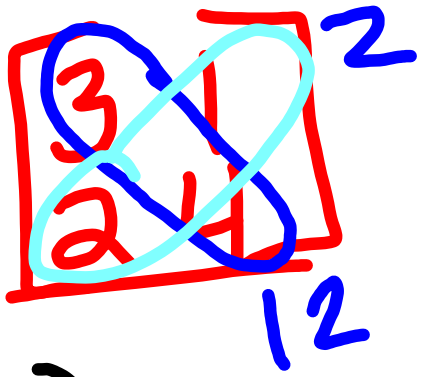
$2 \cdot 0 - 3 \cdot 4 = 0 - 12 = -12$

12

12 sq units

b. Vectors: $\vec{m}: \langle 2, 4 \rangle$ and $\vec{n}: \langle 3, 1 \rangle$





$12 - 2 = 10$

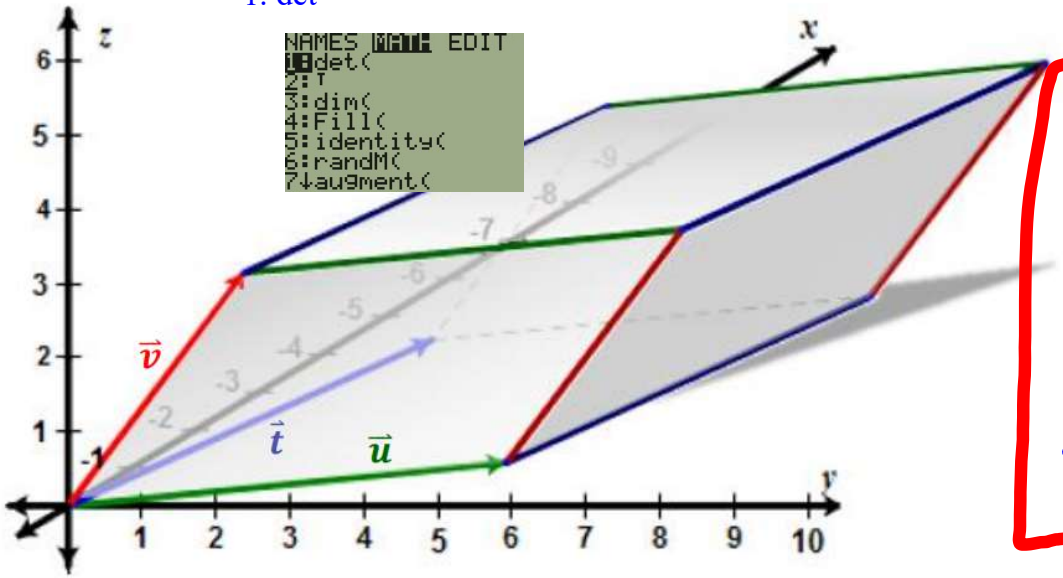
10 units^2

B − T

$0 - 12 = -12$

Determinant
2nd x^-1
MATH
1. det

4. Find the **volume** of the parallelepiped described by the vectors: $\vec{t}: \langle -4, 1, 0 \rangle$, $\vec{u}: \langle -1, 5, 0 \rangle$, and $\vec{v}: \langle -1, 2, 3 \rangle$



$$\begin{bmatrix} -1 & 5 & 0 \\ -4 & 1 & 0 \\ -1 & 2 & 3 \end{bmatrix}$$

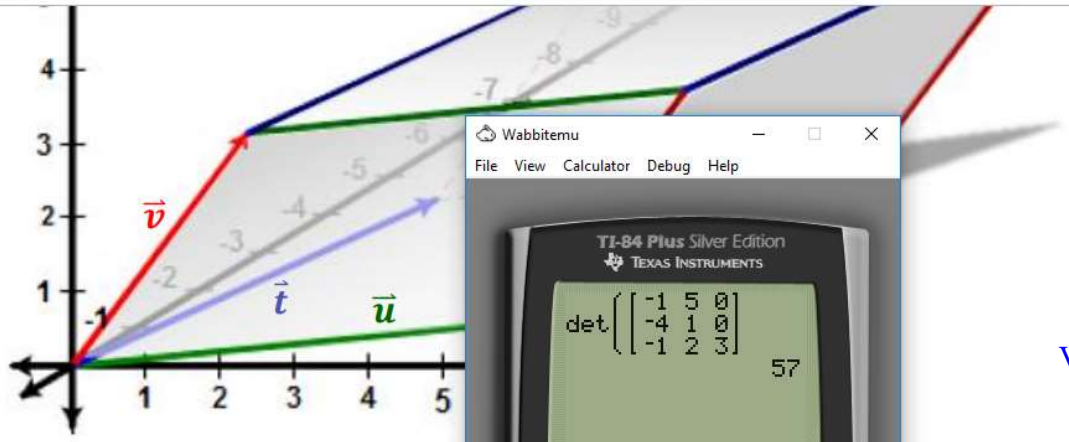
The determinant can be used to find the inverse of a 2×2 matrix.

5. Find the inverse of the following 2×2 matrices by hand using the formula.

a. $\begin{bmatrix} 2 & 5 \\ 2 & 6 \end{bmatrix}^{-1}$

b. $\begin{bmatrix} 4 & 8 \\ 3 & 6 \end{bmatrix}^{-1}$

Given the matrix $[A] = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, the inverse can be found using the following formula: $[A]^{-1} = \frac{1}{\det(A)} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$



Volume = 57 cube units

The determinant can be use **×2 matrix.**

5. Find the inverse of the foll using the formula.

a. $\begin{bmatrix} 2 & 5 \\ 2 & 6 \end{bmatrix}^{-1}$

Given the matrix $[A]=\begin{bmatrix} a & b \\ c & d \end{bmatrix}$, the inverse can be found using the following formula: $[A]^{-1}=\frac{1}{\det(A)}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

1 2 3 4 5 6 7 8 9 10

The determinant can be used to find the inverse of a 2×2 matrix.

Given the matrix $[A]=\begin{bmatrix} a & b \\ c & d \end{bmatrix}$, the inverse can be found using the following formula: $[A]^{-1}=\frac{1}{\det(A)}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

5. Find the inverse of the following 2×2 matrices by hand using the formula.

a. $\begin{bmatrix} 2 & 5 \\ 2 & 6 \end{bmatrix}^{-1}$

b. $\begin{bmatrix} 4 & 8 \\ 3 & 6 \end{bmatrix}^{-1}$

det $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$

12 − 10 = 2

24 − 24 = 0

$\frac{1}{\det}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$ // $\frac{1}{2}\begin{bmatrix} 6 & -5 \\ -2 & 2 \end{bmatrix}$

No Inverse

6. Using your calculator find the following inverses.

$\begin{bmatrix} 1 & 3 & 2 \end{bmatrix}^{-1}$

a. $\begin{bmatrix} 6 & 10 \\ 2 & 4 \end{bmatrix}^{-1}$

b. $\begin{bmatrix} 10 & 5 \\ -4 & -2 \end{bmatrix}^{-1}$

$\frac{1}{0}\begin{bmatrix} 2 & -5 \\ 4 & 10 \end{bmatrix}$

c. $\begin{bmatrix} 1 & 3 & 2 \\ 1 & 4 & 2 \\ 3 & 1 & 1 \end{bmatrix}^{-1}$

$\begin{bmatrix} 1 & -2.5 \\ -.5 & 1.5 \end{bmatrix}$

NP

$\frac{1}{5}\begin{bmatrix} -2 & 1 & 2 \\ -5 & 5 & 0 \\ 11 & -8 & -1 \end{bmatrix}$

Systems of equations can be written as a matrix equation and solved.

7. Rewrite the following matrix equations as a system of equations.

a. $\begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 6 \\ 8 \end{bmatrix}$

b. $\begin{bmatrix} 3 & 2 & -2 \\ 4 & -2 & -3 \\ -2 & 3 & 1 \end{bmatrix} \cdot \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 3 \\ 8 \\ -7 \end{bmatrix}$

Systems of equations can be written as a matrix equation and solved.

7. Rewrite the following matrix equations as a system of equations.

a. $\begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 6 \\ 8 \end{bmatrix}$

$x - 2y = 6$

$3x + 4y = 8$

b. $\begin{bmatrix} 3 & 2 & -2 \\ 4 & -2 & -3 \\ -2 & 3 & 1 \end{bmatrix} \cdot \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 3 \\ 8 \\ -7 \end{bmatrix}$

$3a + 2b - 2c = 3$

$4a - 2b - 3c = 8$

$-2a + 3b + c = -7$

8. Rewrite the following systems of equations as a matrix equation.
(Label which is the "Coefficient Matrix", the "Variable Matrix", and the "Constant Matrix")

8. Rewrite the following systems of equations as a matrix equation.
(Label which is the "Coefficient Matrix", the "Variable Matrix", and the "Constant Matrix")

a. $\begin{aligned} -2a + 8b &= 6 \\ 4a - 9b &= 2 \end{aligned}$

b. $\begin{aligned} 4x - y + 3z &= 5 \\ -2x + y + 5z &= -7 \\ 3x - 2y + 4z &= -3 \end{aligned}$

Coefficient Matrix

Variable

Constant

$$\begin{bmatrix} -2 & 8 \\ 4 & -9 \end{bmatrix} \cdot \begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 6 \\ 2 \end{bmatrix}$$

$$\begin{bmatrix} 4 & -1 & 3 \\ -2 & 1 & 5 \\ 3 & -2 & 4 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 5 \\ -7 \\ 3 \end{bmatrix}$$

9. Rewrite the following systems of equations as a matrix equation and solve the matrix equation using an inverse.

9. Rewrite the following systems of equations as a matrix equation and solve the matrix equation using an inverse.

(Find the inverse for [illegible] on the calculator)

a. $-p + 2q = 8$
$2p + 3q = -2$

b. $2a - b - 3c = 10$
$4a + 2b + 2c = 8$
$-4a + 3b + c = 5$

$\begin{bmatrix} -1 & 2 \\ 2 & 3 \end{bmatrix} \begin{bmatrix} p \\ q \end{bmatrix} = \begin{bmatrix} 8 \\ -2 \end{bmatrix}$

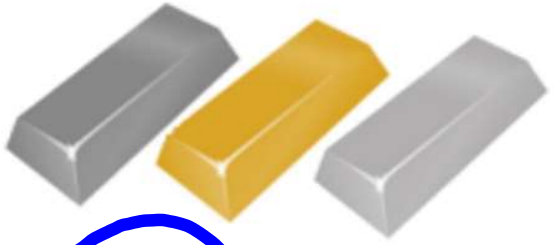
$p = -4$
$q = 2$

$\begin{bmatrix} p \\ q \end{bmatrix} = \begin{bmatrix} -1 & 2 \\ 2 & 3 \end{bmatrix}^{-1} \cdot \begin{bmatrix} 8 \\ -2 \end{bmatrix}$

$\begin{bmatrix} -4 \\ 2 \end{bmatrix}$

10. At a local movie theater, a person purchased 2 large popcorns and 4 large drinks for a total of $38.50 before taxes. A second person purchased 1 large popcorn and 3 large drinks for $25.10 before taxes at the same theater. How much is the theater charging for large popcorns and large drinks? *(Use a matrix equation to solve*

11. Tim has decided to invest some of his retirement money in precious metal commo[1 1 1 ; 1000 1300 20 ; 1 1 -1]nd silver). He purchased a combined total of 24 ounc Platinum costs $1000 per ounce. Gold costs $1300 p nly $20 per ounce. Tim spent a total of $14,640 this investment, Tim bought as many ounces of silver inum combined. Determine how many ounces of each type of precious metal Tim purchased. *(Use a matrix equation to solve this problem)*



$P + G + S = 24$

$1000P + 1300G + 20S = 14640$

$P + G - S = 0$

$S = P + G$

$0 = P + G - S$

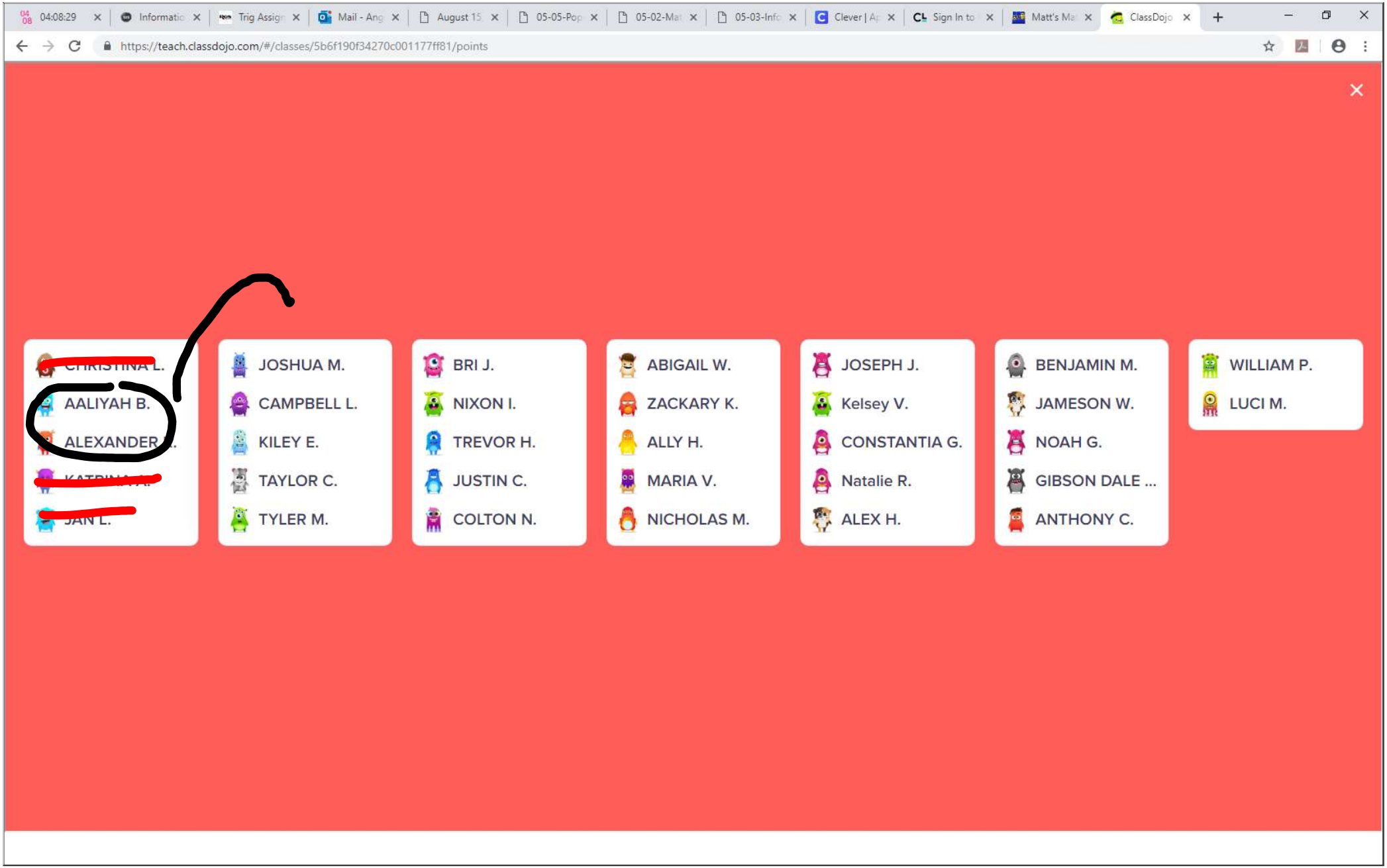
10. At a local movie theater, a person purchased 2 large popcorns and 4 large drinks for a total of $38.50 before taxes. A second person purchased 1 large popcorn and 3 large drinks for $25.10 before taxes at the same theater. How much is the theater charging for large popcorns and large drinks? *(Use a matrix equation to solve this problem)*

$P = 7.55$

$D = 5.85$

$\begin{bmatrix} 7.55 \\ 5.85 \end{bmatrix}$

11. Tim has decided to invest some of his retirement money in precious metal commodities (platinum, gold, and silver). He purchased a combined total of 24 ounces of the three metals. Platinum costs $1000 per ounce. Gold costs $1300 per ounce. Silver costs only $20 per ounce. Tim spent a total of $14,640 on the investment. For this investment, Tim bought as many ounces of silver as he did gold and platinum combined. Determine how many ounces of each type of precious metal Tim purchased. *(Use a matrix equation to solve this problem)*


https://teach.classdojo.com/#/classes/5b6f190f34270c001177ff81/points
AALIYAH B.
JOSHUA M.
CAMPBELL L.
KILEY E.
TAYLOR C.
TYLER M.
BRI J.
NIXON I.
TREVOR H.
JUSTIN C.
COLTON N.
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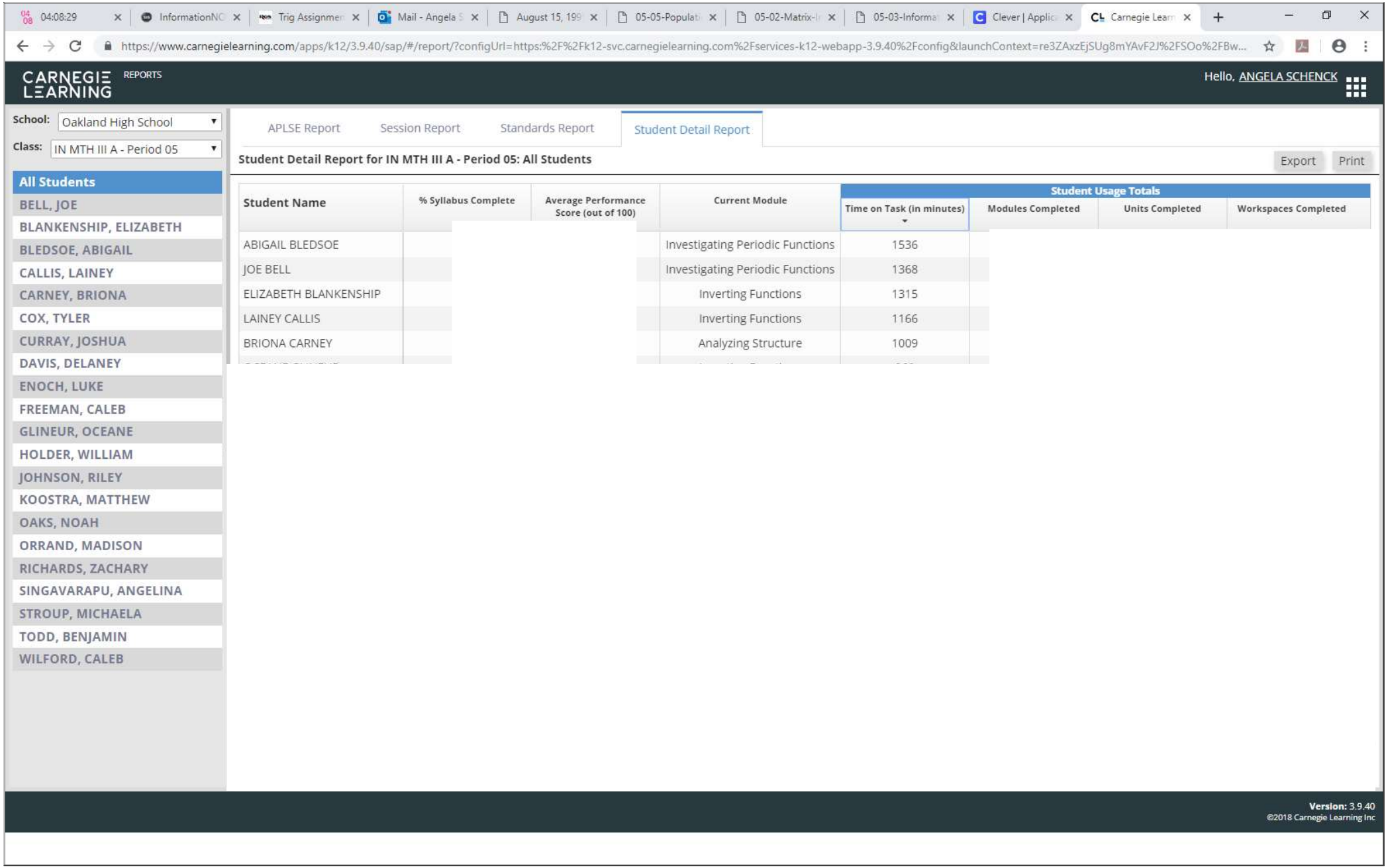
ZACKARY K.
ALLY H.
MARIA V.
NICHOLAS M.
JOSEPH J.
Kelsey V.
CONSTANTIA G.
Natalie R.
ALEX H.
BENJAMIN M.
JAMESON W.
NOAH G.
GIBSON DALE ...
ANTHONY C.
WILLIAM P.
LUCI M.


CARNEGIE LEARNING
REPORTS
Hello, ANGELA SCHENCK
School: Oakland High School
Class: IN MTH III A - Period 05
All Students
BELL, JOE
BLANKENSHIP, ELIZABETH
BLEDSOE, ABIGAIL
CALLIS, LAINEY
CARNEY, BRIONA
COX, TYLER
CURRAY, JOSHUA
DAVIS, DELANEY
ENOCH, LUKE
FREEMAN, CALEB
GLINEUR, OCEANE
HOLDER, WILLIAM
JOHNSON, RILEY
KOOSTRA, MATTHEW
OAKS, NOAH
ORRAND, MADISON
RICHARDS, ZACHARY
SINGAVARAPU, ANGELINA
STROUP, MICHAELA
TODD, BENJAMIN
WILFORD, CALEB
APLSE Report
Session Report
Standards Report
Student Detail Report
Student Detail Report for IN MTH III A - Period 05: All Students
Export
Print
Student Name
% Syllabus Complete
Average Performance Score (out of 100)
Current Module
Student Usage Totals
Time on Task (in minutes)
Modules Completed
Units Completed
Workspaces Completed
ABIGAIL BLEDSOE
Investigating Periodic Functions
1536
JOE BELL
Investigating Periodic Functions
1368
ELIZABETH BLANKENSHIP
Inverting Functions
1315
LAINEY CALLIS
Inverting Functions
1166
BRIONA CARNEY
Analyzing Structure
1009
Version: 3.9.40
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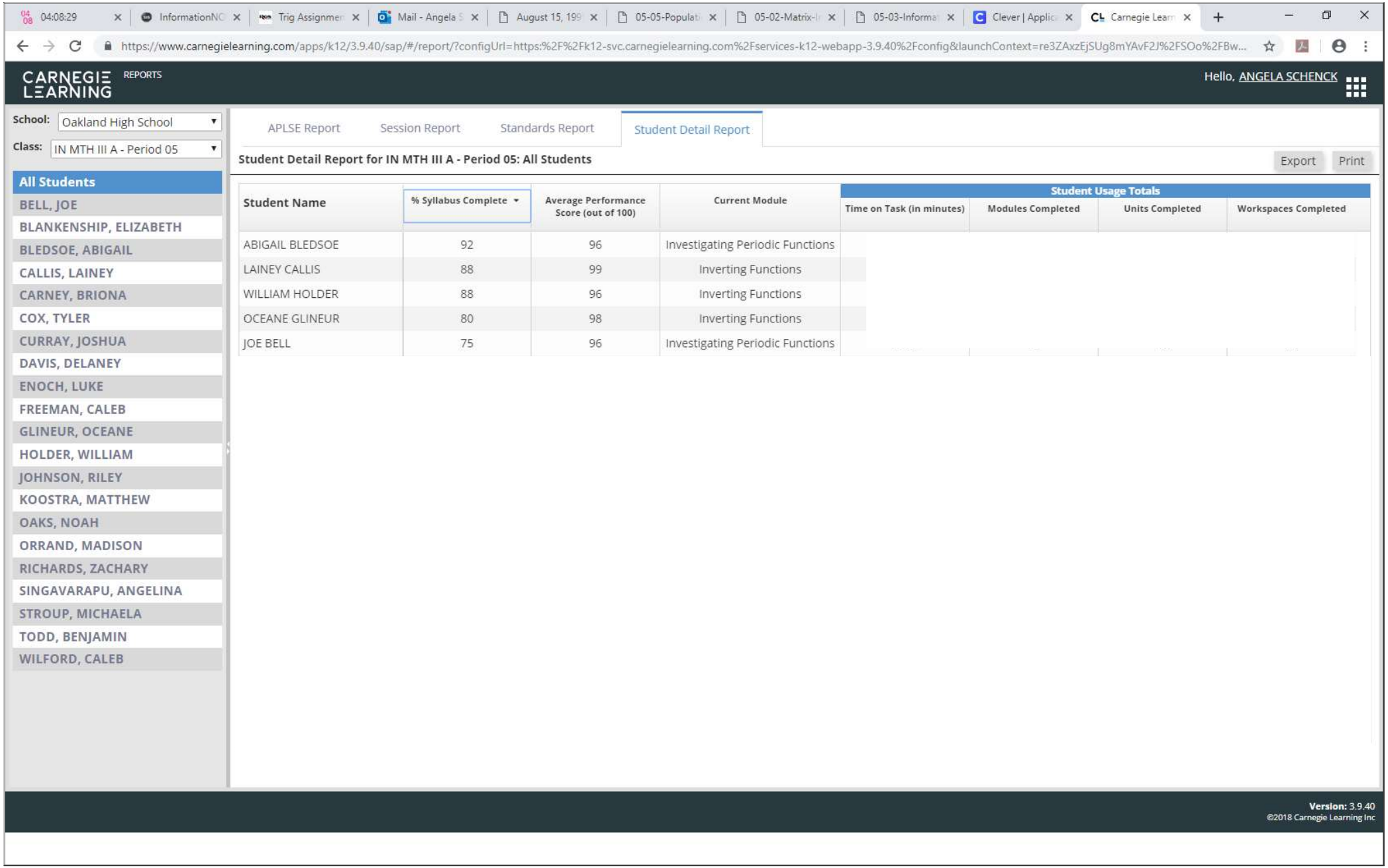
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CARNEGIE LEARNING
REPORTS
Hello, ANGELA SCHENCK
School: Oakland High School
Class: IN MTH III A - Period 05
All Students
BELL, JOE
BLANKENSHIP, ELIZABETH
BLEDSOE, ABIGAIL
CALLIS, LAINEY
CARNEY, BRIONA
COX, TYLER
CURRAY, JOSHUA
DAVIS, DELANEY
ENOCH, LUKE
FREEMAN, CALEB
GLINEUR, OCEANE
HOLDER, WILLIAM
JOHNSON, RILEY
KOOSTRA, MATTHEW
OAKS, NOAH
ORRAND, MADISON
RICHARDS, ZACHARY
SINGAVARAPU, ANGELINA
STROUP, MICHAELA
TODD, BENJAMIN
WILFORD, CALEB
APLSE Report
Session Report
Standards Report
Student Detail Report
Student Detail Report for IN MTH III A - Period 05: All Students
Export
Print
Student Name
% Syllabus Complete
Average Performance Score (out of 100)
Current Module
Student Usage Totals
Time on Task (in minutes)
Modules Completed
Units Completed
Workspaces Completed
ABIGAIL BLEDSOE 92 96 Investigating Periodic Functions
LAINEY CALLIS 88 99 Inverting Functions
WILLIAM HOLDER 88 96 Inverting Functions
OCEANE GLINEUR 80 98 Inverting Functions
JOE BELL 75 96 Investigating Periodic Functions
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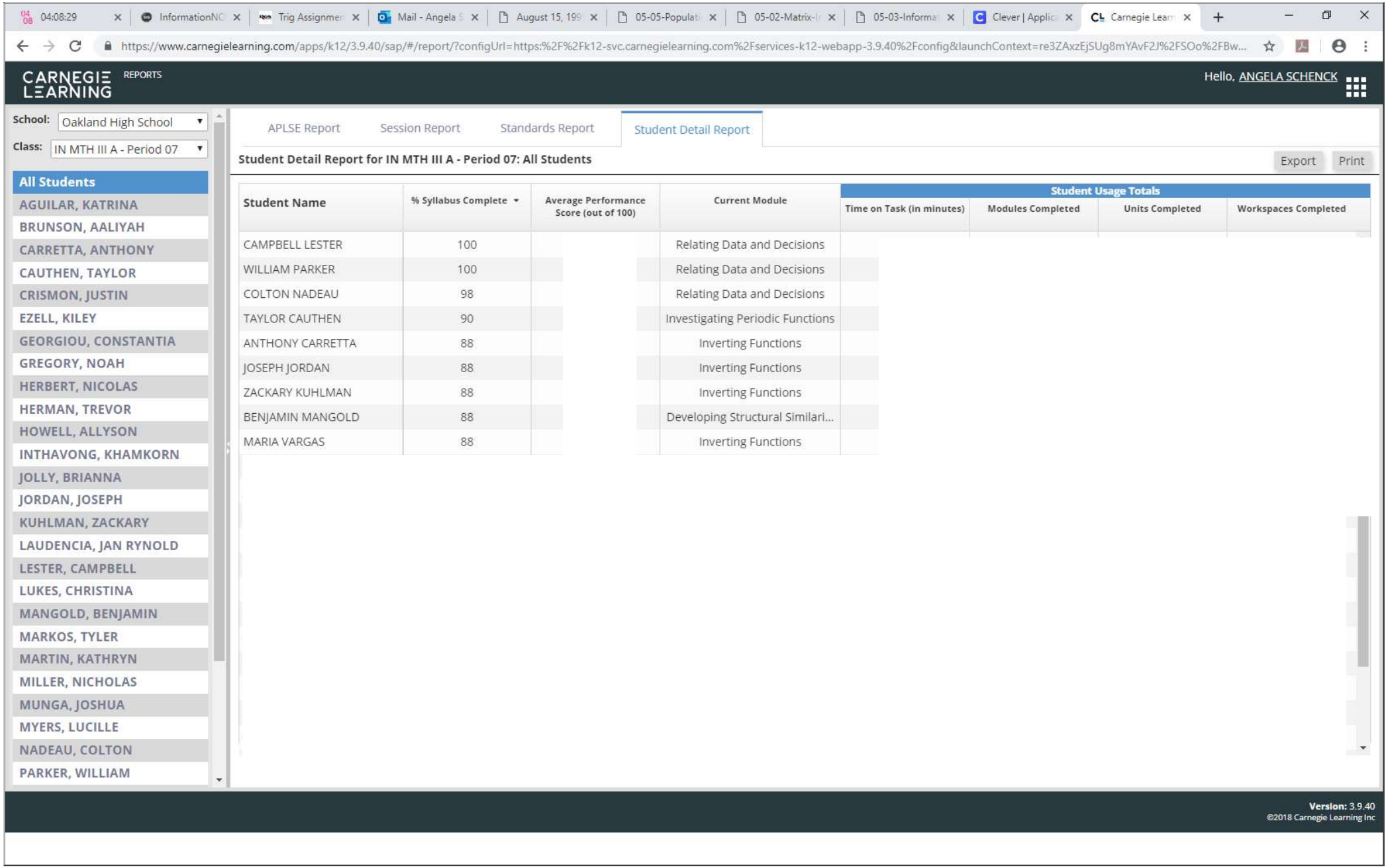
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CARNEGIE LEARNING
REPORTS
Hello, ANGELA SCHENCK
School: Oakland High School
Class: IN MTH III A - Period 07
All Students
AGUILAR, KATRINA
BRUNSON, AALIYAH
CARRETTA, ANTHONY
CAUTHEN, TAYLOR
CRISMON, JUSTIN
EZELL, KILEY
GEORGIOU, CONSTANTIA
GREGORY, NOAH
HERBERT, NICOLAS
HERMAN, TREVOR
HOWELL, ALLYSON
INTHAVONG, KHAMKORN
JOLLY, BRIANNA
JORDAN, JOSEPH
KUHLMAN, ZACKARY
LAUDENCIA, JAN RYNOLD
LESTER, CAMPBELL
LUKES, CHRISTINA
MANGOLD, BENJAMIN
MARKOS, TYLER
MARTIN, KATHRYN
MILLER, NICHOLAS
MUNGA, JOSHUA
MYERS, LUCILLE
NADEAU, COLTON
PARKER, WILLIAM
APLSE Report
Session Report
Standards Report
Student Detail Report
Student Detail Report for IN MTH III A - Period 07: All Students
Export
Print
Student Name
% Syllabus Complete
Average Performance Score (out of 100)
Current Module
Student Usage Totals
Time on Task (in minutes)
Modules Completed
Units Completed
Workspaces Completed
CAMPBELL LESTER 100 Relating Data and Decisions
WILLIAM PARKER 100 Relating Data and Decisions
COLTON NADEAU 98 Relating Data and Decisions
TAYLOR CAUTHEN 90 Investigating Periodic Functions
ANTHONY CARRETTA 88 Inverting Functions
JOSEPH JORDAN 88 Inverting Functions
ZACKARY KUHLMAN 88 Inverting Functions
BENJAMIN MANGOLD 88 Developing Structural Similari...
MARIA VARGAS 88 Inverting Functions
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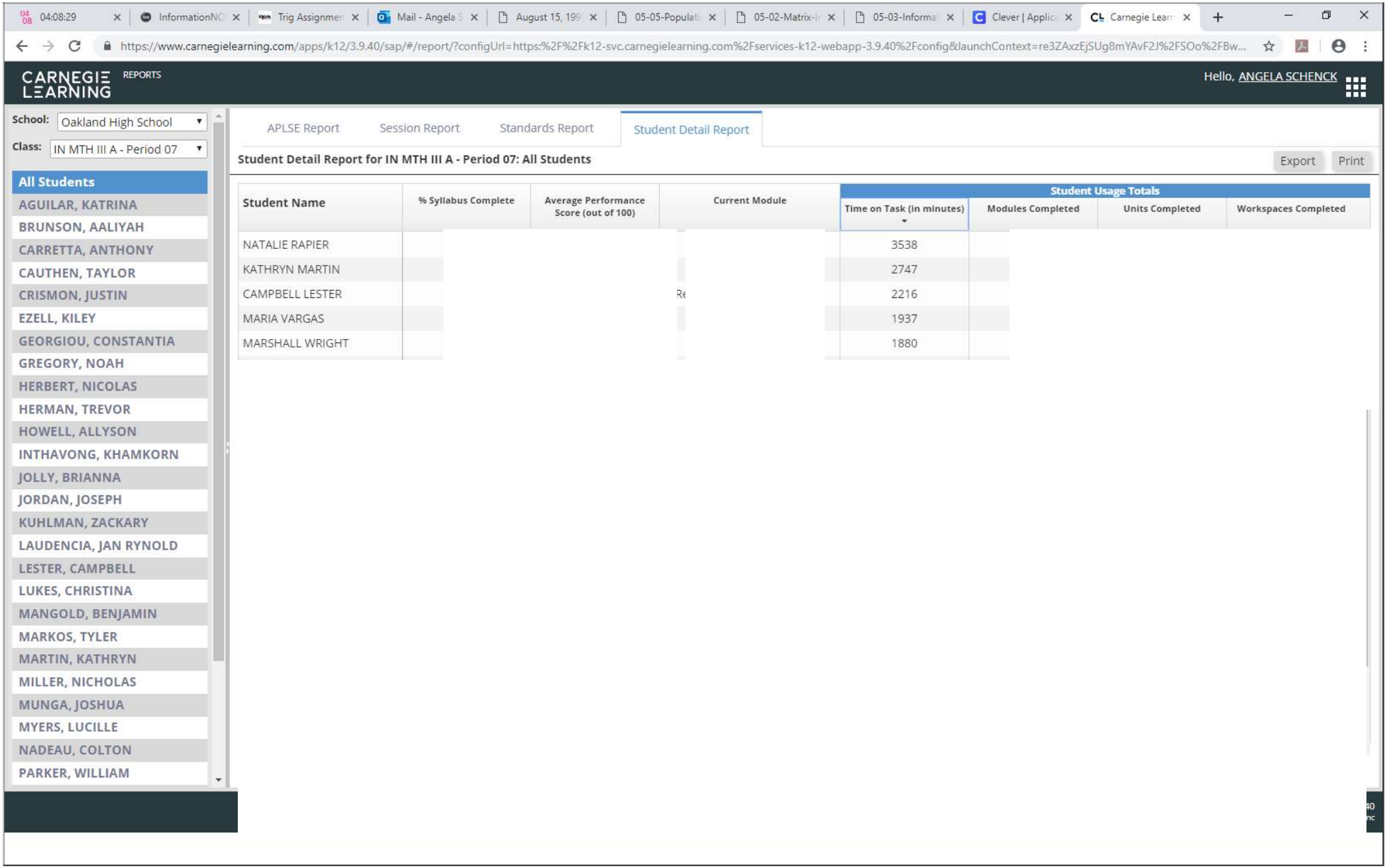
CARNEGIE LEARNING
REPORTS
Hello, ANGELA SCHENCK
School: Oakland High School
Class: IN MTH III A - Period 07
All Students
AGUILAR, KATRINA
BRUNSON, AALIYAH
CARRETTA, ANTHONY
CAUTHEN, TAYLOR
CRISMON, JUSTIN
EZELL, KILEY
GEORGIOU, CONSTANTIA
GREGORY, NOAH
HERBERT, NICOLAS
HERMAN, TREVOR
HOWELL, ALLYSON
INTHAVONG, KHAMKORN
JOLLY, BRIANNA
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KUHLMAN, ZACKARY
LAUDENCIA, JAN RYNOLD
LESTER, CAMPBELL
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MANGOLD, BENJAMIN
MARKOS, TYLER
MARTIN, KATHRYN
MILLER, NICHOLAS
MUNGA, JOSHUA
MYERS, LUCILLE
NADEAU, COLTON
PARKER, WILLIAM
APLSE Report
Session Report
Standards Report
Student Detail Report
Student Detail Report for IN MTH III A - Period 07: All Students
Export
Print
Student Name
% Syllabus Complete
Average Performance Score (out of 100)
Current Module
Student Usage Totals
Time on Task (in minutes)
Modules Completed
Units Completed
Workspaces Completed
NATALIE RAPIER 3538
KATHRYN MARTIN 2747
CAMPBELL LESTER 2216
MARIA VARGAS 1937
MARSHALL WRIGHT 1880

MATH Georgia Standards Of Excellence

Sec 5.3 – Informational Matrices

Matrices Name:

1. A flu epidemic occurs in Middletown schools and each student is either susceptible, sick, or infected.

The percentage of students in each category by grade level is given below

$$[S] = \begin{array}{c} \\ \textit{Susceptible} \\ \textit{Sick} \\ \textit{Infected} \end{array} \begin{array}{c} \begin{array}{ccc} \text{Elementary School} & \text{Middle School} & \text{High School} \end{array} \\ \begin{bmatrix} 60\% & 25\% & 15\% \\ 65\% & 15\% & 20\% \\ 70\% & 10\% & 20\% \end{bmatrix} \end{array}$$

The population distribution of the Middletown school district is given below

$$[P] = \begin{array}{c} \\ \textit{Elementary} \\ \textit{MiddleSchool} \\ \textit{HighSchool} \end{array} \begin{array}{c} \begin{array}{cc} \text{Girls} & \text{Boys} \end{array} \\ \begin{bmatrix} 1610 & 1580 \\ 830 & 795 \\ 1115 & 1100 \end{bmatrix} \end{array}$$

S_{32}

a. Describe the value of S_{32} and what it represents.

10%

10% of the infected are middle school students

b. Describe the value of P_{22} and what it represents.

795 Number of boys in middle school

c. Find $[S]\cdot[P]$. (You can use your calculator if you INCLUDE LABELS

Ans▸Frac
[1340.75 1311.75]
[1394 1366.2]
[1433 1405.5]

Girls Boys

	Girls	Boys
Sus	1346	1311
Sick	1394	1366
Infec.	1433	1405

d. Describe the value of $[[S]\cdot[P]]_{21}$ and what it represents.

Estimated 1394 number of sick girls

c. Find $[S]\cdot[P]$. (You can use your calculator if you would like).
INCLUDE LABELS

d. Describe the value of $[[S]\cdot[P]]_{21}$ and what it represents.

e. Based on the flu epidemic in Middletown schools, how many sick girls are there? 1394 girls

f. Based on the flu epidemic in Middletown schools, how many boys are infected? 1405 Boys

2. A study is being conducted by Time Warner about the network spending of its Network HBO and 2 online competitors.

The percentage of spending categories by each network is shown below.

$$[S] = \begin{matrix} \\ Movies \\ Mini\ Series \\ Current\ TV \end{matrix} \begin{matrix} \begin{matrix} NetFlix & HULU & HBO \end{matrix} \\ \begin{bmatrix} 60\% & 35\% & 70\% \\ 30\% & 30\% & 30\% \\ 10\% & 35\% & 0\% \end{bmatrix} \end{matrix}$$

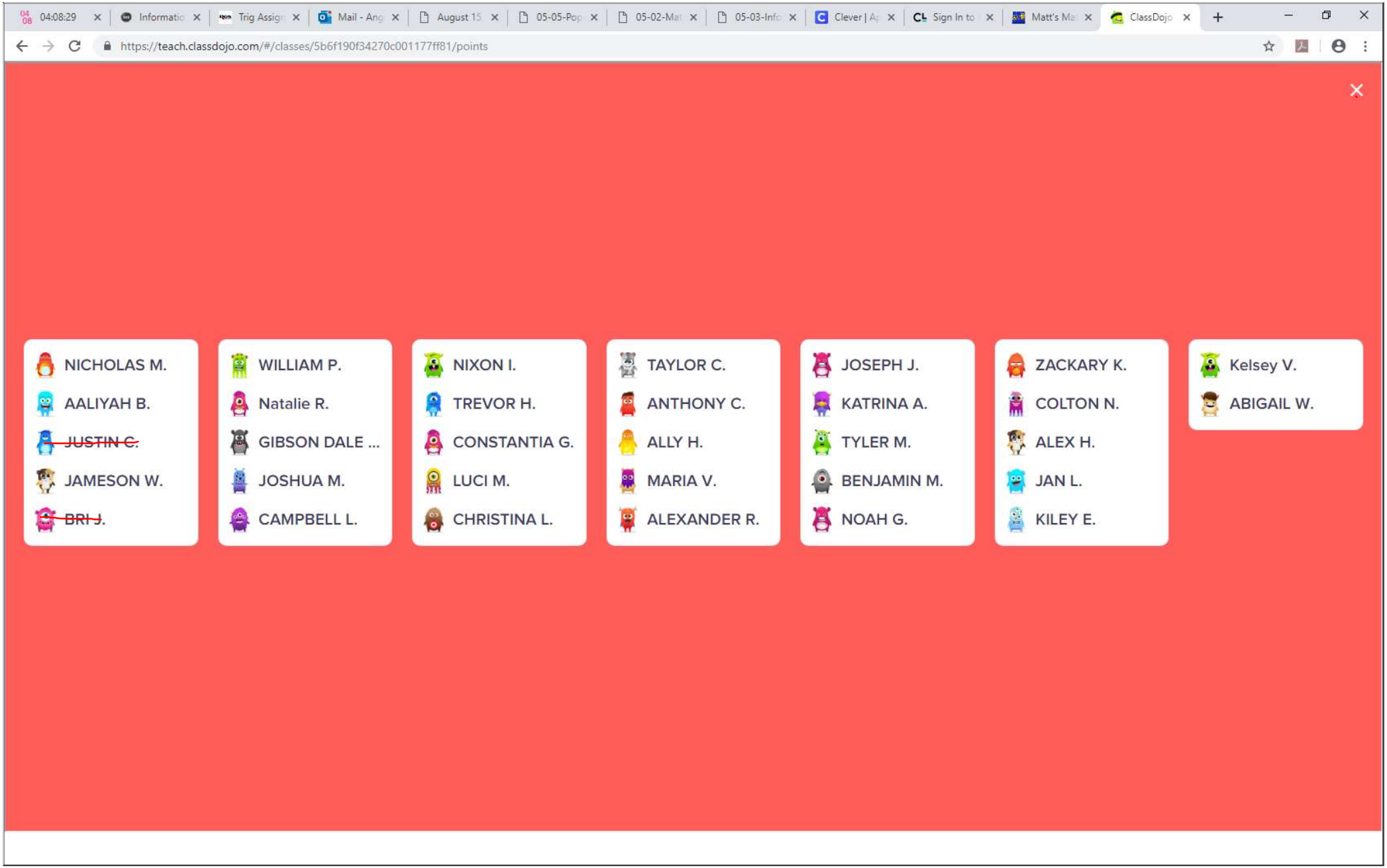
The amount of spending per month by each company is shown below.

$$[P] = \begin{matrix} \\ NetFlix \\ HULU \\ HBO \end{matrix} \begin{matrix} \begin{matrix} Monthly\ Spending \end{matrix} \\ \begin{bmatrix} \$85\ million \\ \$33\ million \\ \$912\ million \end{bmatrix} \end{matrix}$$

a. Describe the value of S_{23} and what it represents.

b. Describe the value of P_{31} and what it represents.

c. Find $[S]\cdot[P]$. (You can use your calculator if you would like).
INCLUDE LABELS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NICHOLAS M.
AALIYAH B.
JUSTIN C.
JAMESON W.
BRI J.
WILLIAM P.
Natalie R.
GIBSON DALE ...
JOSHUA M.
CAMPBELL L.
NIXON I.
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LUCI M.
CHRISTINA L.
TAYLOR C.
ANTHONY C.
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ALEXANDER R.
JOSEPH J.
KATRINA A.
TYLER M.
BENJAMIN M.
NOAH G.
ZACKARY K.
COLTON N.
ALEX H.
JAN L.
KILEY E.
Kelsey V.
ABIGAIL W.

$$[S] = \begin{matrix} \\ \textit{Mini Series} \\ \textit{Current TV} \end{matrix} \begin{bmatrix} 30\% & 30\% & 30\% \\ 10\% & 35\% & 0\% \end{bmatrix}$$

$$\begin{matrix} \\ \textit{HBO} \end{matrix} \begin{bmatrix} \\ \$912\,\textit{million} \end{bmatrix}$$

a. Describe the value of S_{23} and what it represents.

b. Describe the value of P_{31} and what it represents.

c. Find $[S]\cdot[P]$. (You can use your calculator if you would like).
INCLUDE LABELS

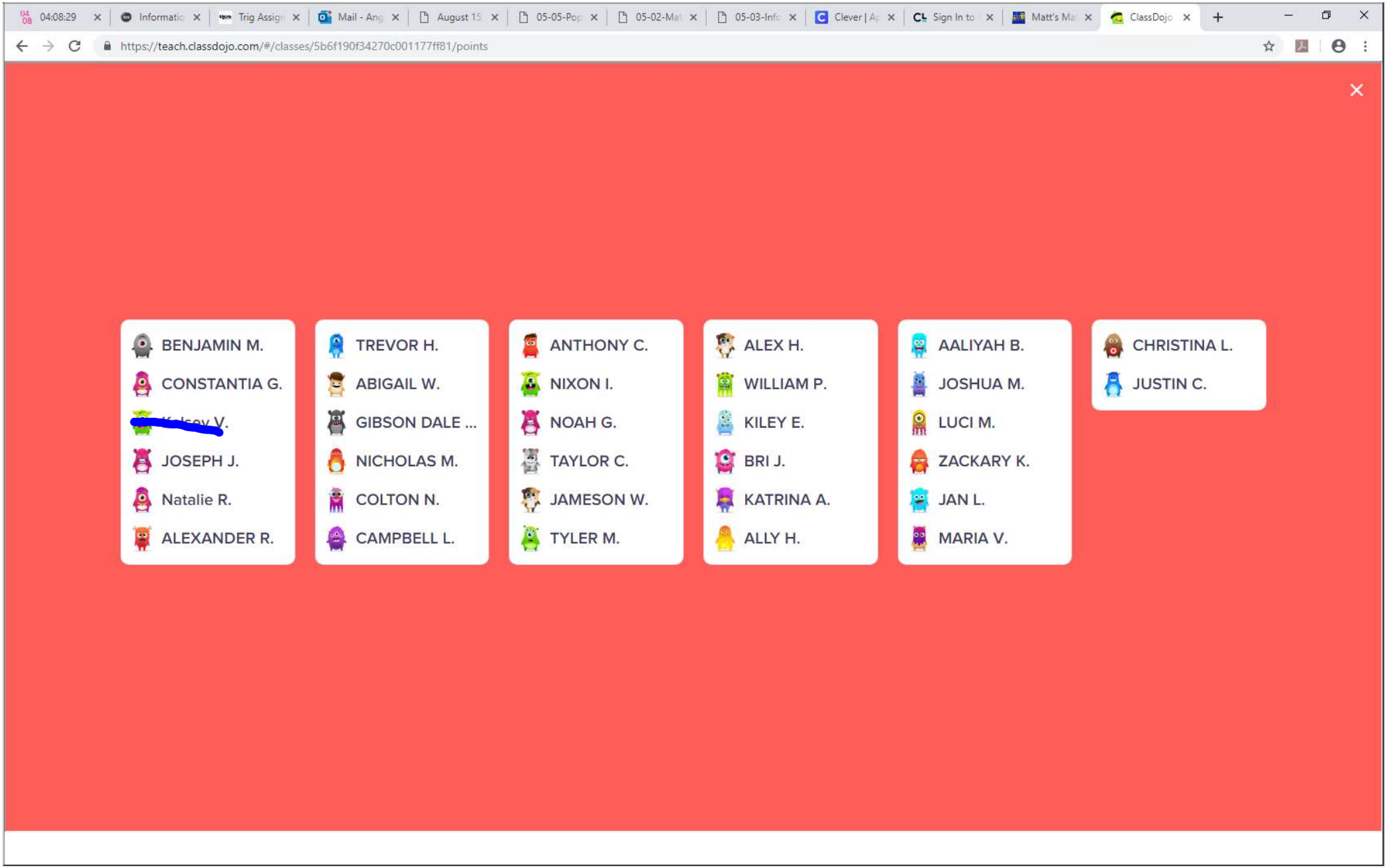
Monthly spend: millions

$$\begin{matrix} M \\ \text{Series} \\ \text{Curr} \end{matrix} \begin{bmatrix} 700.95 \\ 309 \\ 20.05 \end{bmatrix}$$

d. Describe the value of $[[S]\cdot[P]]_{11}$ and what it represents.

e. Based on the study, how much do the 3 companies spend on Mini Series?

f. Based on the study how much does HBO spend on Movies and their licensing?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https://teach.classdojo.com/#/classes/5b6f190f34270c001177ff81/points
BENJAMIN M.
CONSTANTIA G.
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Natalie R.
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ABIGAIL W.
GIBSON DALE ...
NICHOLAS M.
COLTON N.
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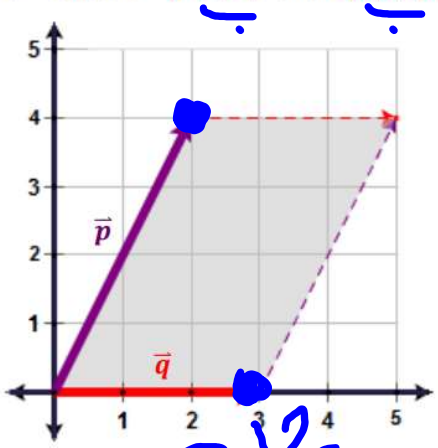
NIXON I.
NOAH G.
TAYLOR C.
JAMESON W.
TYLER M.
ALEX H.
WILLIAM P.
KILEY E.
BRI J.
KATRINA A.
ALLY H.
AALIYAH B.
JOSHUA M.
LUCI M.
ZACKARY K.
JAN L.
MARIA V.
CHRISTINA L.
JUSTIN C.

The determinant can be used to find the area of a parallelogram defined by the sum of two vectors.

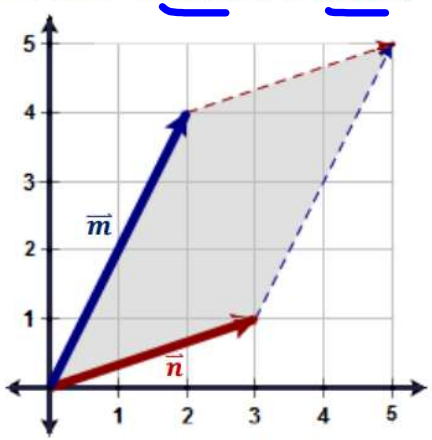
3. Find the **area** of the following parallelograms.

a. Vectors: $\vec{p}: \langle 2, 4 \rangle$ and $\vec{q}: \langle 3, 0 \rangle$



12

b. Vectors: $\vec{m}: \langle 2, 4 \rangle$ and $\vec{n}: \langle 3, 1 \rangle$

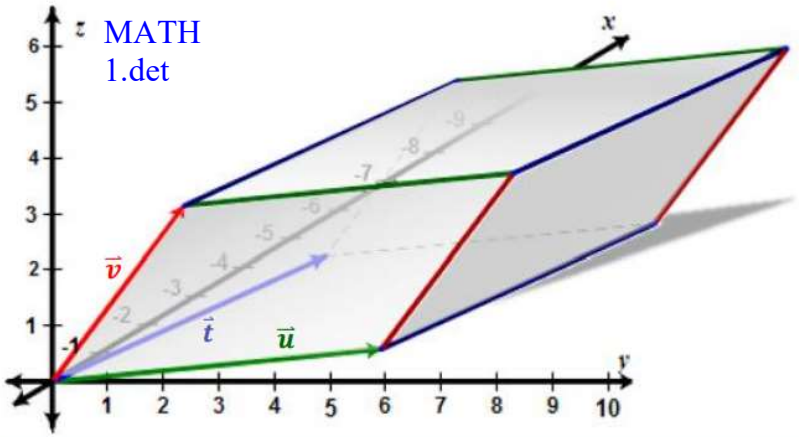


10

4. Find the **volume** of the parallelepiped described by the vectors: $\vec{t}: \langle -4, 1, 0 \rangle$, $\vec{u}: \langle -1, 5, 0 \rangle$, and $\vec{v}: \langle -1, 2, 3 \rangle$

2nd x^-1

4. Find the **volume** of the parallelepiped described by the vectors: $\vec{t}: \langle -4, 1, 0 \rangle$, $\vec{u}: \langle -1, 5, 0 \rangle$, and $\vec{v}: \langle -1, 2, 3 \rangle$



MATH
1.det

$$\begin{vmatrix} -4 & 1 & 0 \\ -1 & 2 & 3 \\ -1 & 5 & 0 \end{vmatrix}$$

det([[-4 1 0] [-1 2 3] [-1 5 0]])
57

57

The determinant can be used to find the inverse of a 2×2 matrix.

5. Find the inverse of the following 2×2 matrices by hand using the formula.

a. $\begin{bmatrix} 2 & 5 \\ 2 & 6 \end{bmatrix}^{-1}$

b. $\begin{bmatrix} 4 & 8 \\ 3 & 6 \end{bmatrix}^{-1}$

Given the matrix $[A] = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, the inverse can be found using the following formula: $[A]^{-1} = \frac{1}{\det(A)} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

1 2 3 4 5 6 7 8 9 10

The determinant can be used to find the inverse of a 2×2 matrix.

5. Find the inverse of the following 2×2 matrices by hand using the formula.

a. $\begin{bmatrix} 2 & 5 \\ 2 & 6 \end{bmatrix}^{-1}$ 10 12

12 − 10 = 2

$\frac{1}{\det}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

$\frac{1}{2}\begin{bmatrix} 6 & -5 \\ -2 & 2 \end{bmatrix}$.

b. $\begin{bmatrix} 4 & 8 \\ 3 & 6 \end{bmatrix}^{-1}$ 24 24

24 − 24 = 0

THERE IS NO INVERSE

Given the matrix $[A]=\begin{bmatrix} a & b \\ c & d \end{bmatrix}$, the inverse can be found using the following formula: $[A]^{-1}=\frac{1}{\det(A)}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

6. Using your calculator find the following inverses.

6. Using your calculator find the following inverses. On your own

a. $\begin{bmatrix} 6 & 10 \\ 2 & 4 \end{bmatrix}^{-1}$

b. $\begin{bmatrix} 10 & 5 \\ -4 & -2 \end{bmatrix}^{-1}$

c. $\begin{bmatrix} 1 & 3 & 2 \\ 1 & 4 & 2 \\ 3 & 1 & 1 \end{bmatrix}^{-1}$

Systems of equations can be written as a matrix equation and solved.

7. Rewrite the following matrix equations as a system of equations.

a. $\begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 6 \\ 8 \end{bmatrix}$

b. $\begin{bmatrix} 3 & 2 & -2 \\ 4 & -2 & -3 \\ -2 & 3 & 1 \end{bmatrix} \cdot \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 3 \\ 8 \\ -7 \end{bmatrix}$

Systems of equations can be written as a matrix equation and solved.

7. Rewrite the following matrix equations as a system of equations.

a. $\begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 6 \\ 8 \end{bmatrix}$

$1x - 2y = 6$

$3x + 4y = 8$

b. $\begin{bmatrix} 3 & 2 & -2 \\ 4 & -2 & -3 \\ -2 & 3 & 1 \end{bmatrix} \cdot \begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 3 \\ 8 \\ -7 \end{bmatrix}$

$3a + 2b - 2c = 3$

$4a - 2b - 3c = 8$

$-2a + 3b + c = -7$

8. Rewrite the following systems of equations as a matrix equation.
(Label which is the "Coefficient Matrix", the "Variable Matrix", and the "Constant Matrix")

8. Rewrite the following systems of equations as a matrix equation.
(Label which is the "Coefficient Matrix", the "Variable Matrix", and the "Constant Matrix")

a. $\begin{aligned} -2a + 8b &= 6 \\ 4a - 9b &= 2 \end{aligned}$

b. $\begin{aligned} 4x - y + 3z &= 5 \\ -2x + y + 5z &= -7 \\ 3x - 2y + 4z &= -3 \end{aligned}$

C · V = Constant

$\begin{bmatrix} -2 & 8 \\ 4 & -9 \end{bmatrix} \cdot \begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 6 \\ 2 \end{bmatrix}$

Coefficient

$\begin{bmatrix} 4 & -1 & 3 \\ -2 & 1 & 5 \\ 3 & -2 & 4 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 5 \\ -7 \\ -3 \end{bmatrix}$

9 Rewrite the following systems of equations as a matrix equation and solve the matrix equation using an inverse

9. Rewrite the following systems of equations as a matrix equation and solve the matrix equation using an inverse.

(Find the inverse for (a) without the calculator)

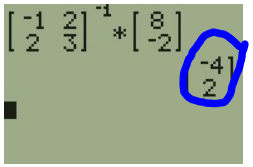
a. $-p+2q=8$
$2p+3q=-2$

$\begin{bmatrix}-1 & 2\\ 2 & 3\end{bmatrix}^{-1}\cdot\begin{bmatrix}8\\ -2\end{bmatrix}$

b. $2a-b-3c=10$
$4a+2b+2c=8$
$-4a+3b+c=5$

$\begin{bmatrix}2 & -1 & -3\\ 4 & 2 & 2\\ -4 & 3 & 1\end{bmatrix}^{-1}\cdot\begin{bmatrix}10\\ 8\\ 5\end{bmatrix}$

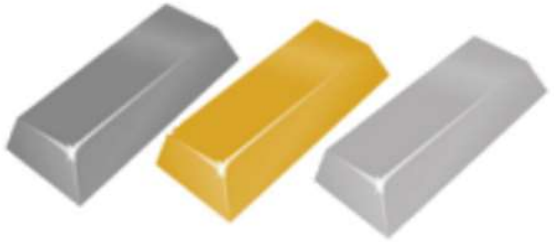
$a=1.5$
$b=5$
$c=-4$



10. At a local movie theater, a person purchased 2 large popcorns and 4 large drinks for a total of $38.50 before taxes. A second person purchased 1 large popcorn and 3 large drinks for $25.10 before taxes at the same theater. How much is the

commodities (platinum, gold, and silver). He purchased a combined total of 24 ounces of the three metals. Platinum costs $1000 per ounce. Gold costs $1300 per ounce. Silver costs only $20 per ounce. Tim spent a total of $14,640 on the investment. For this investment, Tim bought as many ounces of silver as he did gold and platinum combined. Determine how many ounces of each type of precious metal Tim purchased. *(Use a matrix equation to solve this problem)*

11. Tim has decided to invest some of his retirement money in precious metal commodities (platinum, gold, and silver). He purchased a combined total of 24 ounces of the three metals. Platinum costs $1000 per ounce. Gold costs $1300 per ounce. Silver costs only $20 per ounce. Tim spent a total of $14,640 on the investment. For this investment, Tim bought as many ounces of silver as he did gold and platinum combined. Determine how many ounces of each type of precious metal Tim purchased. *(Use a matrix equation to solve this problem)*



$P + S + G = 24$

$1000P + 20S + 1300G = 14640$

$P - S + G = 0$

$$\begin{bmatrix} 1 & 1 & 1 \\ 1000 & 20 & 1300 \\ 1 & -1 & 1 \end{bmatrix}^{-1} \cdot \begin{bmatrix} 24 \\ 14640 \\ 0 \end{bmatrix}$$

P S G

$P = 4$ oz

$S = 12$ oz

$G = 8$ oz