

Using Inverses and Identities

Name _____

1. Give the additive inverse of 78 in the real number system -78
2. Give the multiplicative inverse of 78 in the real number system $\frac{1}{78}$
3. Give the additive inverse of $-3/4$ in the real number system $\frac{3}{4}$
4. Give the multiplicative inverse of $-3/4$ in the real number system $-\frac{4}{3}$
5. What is the identity in addition in the real number system? 0
6. What is the identity in multiplication in the real number system? 1
7. Give the multiplicative identity for a 2 x 2 matrix. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
8. Give the inverse matrix for $\begin{bmatrix} -4 & 6 \\ 7 & 8 \end{bmatrix}$ $\begin{bmatrix} 8 & -6 \\ -74 & -74 \\ -7 & -4 \\ -74 & -74 \end{bmatrix}$
9. Prove your answer in number 8 correct.

Product = $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

10. Solve these systems using inverse matrices. **SHOW ALL THREE STEPS!!!!**

A. $45x - 89y = 143$

$-56y + 67x = -67$

B. $y - 5/6 = 1/12(x - 4.7)$

$y + 13.4 = -7/8(x + 12)$

$$\begin{bmatrix} 45 & -89 \\ 67 & -56 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 143 \\ -67 \end{bmatrix}$$

$$[A]^{-1} [A] \begin{bmatrix} x \\ y \end{bmatrix} = [A]^{-1} [B]$$

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} \frac{-13971}{3443} \\ \frac{-12596}{3443} \end{bmatrix}$$

$$y_1 = \frac{1}{12}(x - 4.7) + \frac{5}{6}$$

$$y_2 = -\frac{7}{8}(x + 12) - 13.4$$

calc. intersect

$(-25.4, -1.675)$

C. $2x + 7y - 8z = 56$

$-6y + 5z - 2x = -45$

$78 - 3x + 5z = 9y$

D. $-7y + 6x + 3z = 5$

$12z - 4 + 8x = 4y$

$6 - 7y + 3z = 5x$

$$\begin{bmatrix} 2 & 7 & -8 \\ -2 & -6 & 5 \\ -3 & -9 & 5 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 56 \\ -45 \\ -78 \end{bmatrix}$$

$$[A]^{-1} [A] \begin{bmatrix} x \\ y \\ z \end{bmatrix} = [A]^{-1} [B]$$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -37.8 \\ 23.6 \\ 4.2 \end{bmatrix}$$

$$\begin{bmatrix} 6 & -7 & 3 \\ 8 & -4 & 12 \\ -5 & -7 & 3 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 5 \\ 4 \\ -6 \end{bmatrix}$$

$$[A]^{-1} [A] \begin{bmatrix} x \\ y \\ z \end{bmatrix} = [A]^{-1} [B]$$

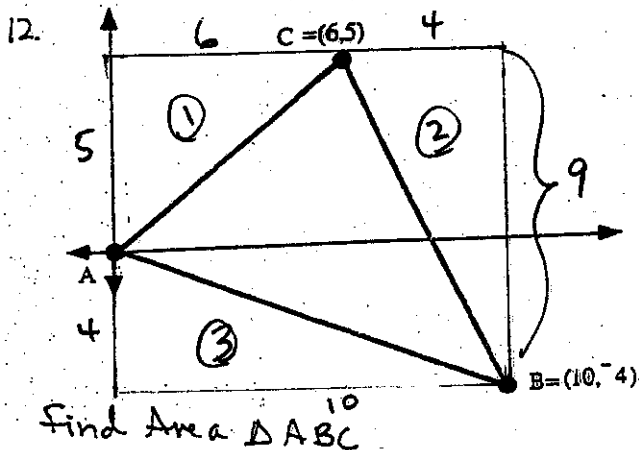
$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ -\frac{1}{3} \end{bmatrix} / 26$$

"Solve" the following open sentence by writing a sequence of four equivalent open sentences ending with one of the form " $x =$ 'the solution'."

*	a	b	c	d	e	f	g
a	f	a	e	g	b	d	c
b	a	b	c	d	e	f	g
c	e	c	d	a	g	b	f
d	g	d	a	e	f	c	b
e	b	e	g	f	c	a	d
f	d	f	b	c	a	g	e
g	c	g	f	b	d	e	a

a) $c * x = g$
 $f * (c * x) = f * g$
 $(f * c) * x = e$
 $b * x = e$
 $x = e$

b) $f * x = c$
 $c * (f * x) = c * c$
 $(c * f) * x = d$
 $b * x = d$
 $x = d$



$$A = A_{sq} - A_{\Delta_1} - A_{\Delta_2} - A_{\Delta_3}$$

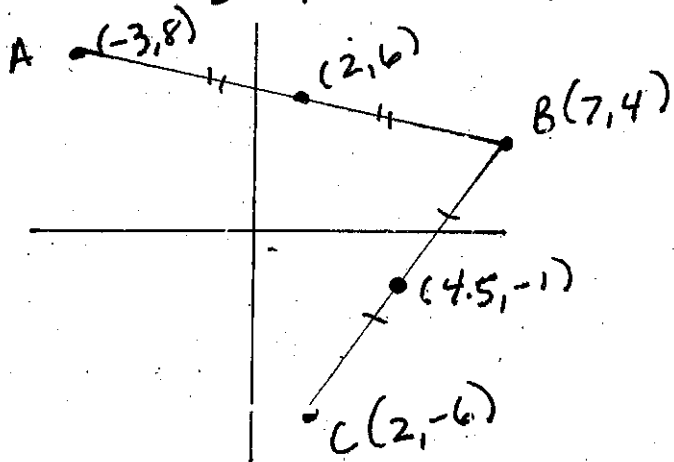
$$= 9(10) - \frac{1}{2} \cdot 6 \cdot 6 - \frac{1}{2} \cdot 4 \cdot 6 - \frac{1}{2} \cdot 4 \cdot 4$$

$$= 90 - 18 - 12 - 8$$

$$= 52 \text{ m}^2$$

Equation: $(x - \frac{1}{12})^2 + (y - \frac{29}{24})^2 = \frac{32045}{576}$

13. Find the equation of a circle containing $A(-3, 8)$, $B(7, 4)$, $C(2, -6)$



\perp Bisector \overline{AB}
 $y - 6 = \frac{5}{2}(x - 2)$
 \perp Bisector \overline{BC}
 $y + 1 = -\frac{1}{2}(x - 4.5)$
 Calc. intersect
 $(\frac{1}{12}, \frac{29}{24})$
 $r = \sqrt{\frac{32045}{576}}$