

221 Matrix on ACT A15 – Scalar and Addition

26. What value of x satisfies the matrix equation below?

$$2 \begin{bmatrix} 4 & -1 \\ x & 3 \end{bmatrix} + \begin{bmatrix} 3 & 3 \\ 1 & 0 \end{bmatrix} = \begin{bmatrix} 11 & 1 \\ 9 & 6 \end{bmatrix}$$

- F. 3.5
G. 4
H. 4.5
J. 5.5
K. 8

J14 - Scalar

43. Given that $a \begin{bmatrix} 2 & 6 \\ 1 & 4 \end{bmatrix} = \begin{bmatrix} x & 27 \\ y & z \end{bmatrix}$ for some real number a , what is $x + z$?

- A. $\frac{4}{3}$
B. $\frac{27}{2}$
C. 26
D. 27
E. 48

J11

55. Given the matrix equation shown below, what is $\frac{b}{a}$?

$$\begin{bmatrix} 3! \\ 2! \end{bmatrix} + \begin{bmatrix} 2! \\ 4! \end{bmatrix} = \begin{bmatrix} a \\ b \end{bmatrix}$$

(Note: Whenever n is a positive integer, the notation $n!$ represents the product of the integers from n to 1. For example, $3! = 3 \cdot 2 \cdot 1$.)

- A. $\frac{13}{4}$
B. $\frac{6}{5}$
C. $\frac{4}{7}$
D. 4
E. 6

J10

44. For what (x, y) pair is the matrix equation below true?

$$\begin{bmatrix} 3 & \frac{x}{2} \\ 0 & 1 \end{bmatrix} + \begin{bmatrix} x & 5 \\ 1 & 0 \end{bmatrix} = \begin{bmatrix} y & y \\ 1 & 1 \end{bmatrix}$$

- F. (6, 0)
G. (5, 5)
H. (5, -2)
J. (4, 7)
K. (1, 4)

J15

48. Four matrices are given below.

$$W = \begin{bmatrix} 1 & 2 \\ 5 & 8 \end{bmatrix} \quad X = \begin{bmatrix} 3 & 9 \\ 7 & 4 \end{bmatrix} \quad Y = \begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 6 \end{bmatrix} \quad Z = \begin{bmatrix} 5 & 8 \\ 2 & 9 \\ 3 & 7 \end{bmatrix}$$

Which of the following matrix products is undefined?

- F. WX
G. WY
H. YZ
J. YW
K. XZ

WZ

J16

57. Which of the following matrices is equal to the matrix product $\begin{bmatrix} 2 & -5 \\ -3 & 4 \end{bmatrix} \cdot \begin{bmatrix} 2 \\ -1 \end{bmatrix}$?

- A. $\begin{bmatrix} 4 & 5 \\ -6 & -4 \end{bmatrix}$
B. $\begin{bmatrix} 4 & -3 \\ -4 & 3 \end{bmatrix}$
C. $\begin{bmatrix} 4 & -10 \\ 3 & -4 \end{bmatrix}$
D. $\begin{bmatrix} -1 \\ -2 \end{bmatrix}$
E. $\begin{bmatrix} 9 \\ -10 \end{bmatrix}$

D14

55. The determinant of any 2×2 matrix $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ is $ad - bc$.

The determinant of $\begin{bmatrix} x+3 & 7 \\ 2 & x-2 \end{bmatrix}$ is equal to 0. What are all possible values of x ?

- A. -5 and 4

- B. -4 and 5

- C. -3 and 2

- D. -1 and 9

- E. $-\sqrt{20}$ and $\sqrt{20}$

$$(x+3)(x-2) - 14 = 0$$

$$x^2 + x - 6 - 14 = 0$$

$$x^2 + x - 20 = 0$$

$$(x+5)(x-4) = 0$$

'14

53. The determinant of a matrix $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ equals $ad - cb$.

What must be the value of x for the matrix $\begin{bmatrix} x & 8 \\ x & x \end{bmatrix}$ to have a determinant of -16?

- A. -4
B. -2
C. $-\frac{8}{5}$
D. $\frac{8}{3}$
E. 4

D16

55. What is the determinant of the matrix shown below?

$$\begin{vmatrix} 8 & 3 \\ -5 & -2 \end{vmatrix}$$

- A. 34
B. 4
C. -1
D. -25
E. -31

A15 #26	G	J16 #57	E
J14 #43	D	D14 #55	B
J11 #55	A	'14 #53	E
J10 #44	J	D16 #55	C
J15 #48	K		