

# Matrices Review Guide

1.  $5 \times 4$

2. 
$$\begin{bmatrix} 6x & 9 \\ -4 & 5y \end{bmatrix} = \begin{bmatrix} 36 & a+7 \\ z-3 & 45 \end{bmatrix}$$

$a = 2$        $y = 9$   
 $x = 6$        $z = -1$

$6x = 36$        $9 = a + 7$        $-4 = z - 3$        $5y = 45$   
 $x = 6$        $2 = a$        $-1 = z$        $y = 9$

3.  $A_{9 \times 6} \cdot B_{6 \times 4}$       yes!       $9 \times 4$

4.  $C_{8 \times 2} \cdot D_{6 \times 8}$       NO!

5.  $A - B = \begin{bmatrix} 6 & -7 & 18 \\ 4 & 0.5 & 11 \end{bmatrix} + \begin{bmatrix} -1 & -15 & +3 \\ -14 & -5 & -23 \end{bmatrix} = \begin{bmatrix} 7 & -22 & 21 \\ -10 & -4.5 & -12 \end{bmatrix}$

6.  $2B + A = \begin{bmatrix} -2 & 30 & -6 \\ 28 & 10 & 40 \end{bmatrix} + \begin{bmatrix} 6 & -7 & 18 \\ 4 & 0.5 & 11 \end{bmatrix} = \begin{bmatrix} 4 & 23 & 12 \\ 32 & 10.5 & 51 \end{bmatrix}$

7.  $-8C = -8 \begin{bmatrix} 0 & 17 & 0 & 1 \\ -2 & 9 & 13 & 5 \\ -7 & 0 & 9 & 0 \end{bmatrix} = \begin{bmatrix} 0 & -136 & 0 & -8 \\ 16 & -72 & -104 & -40 \\ 56 & 0 & -72 & 0 \end{bmatrix}$

8.  $BA = \begin{bmatrix} -1 & 15 & -3 \\ 14 & 5 & 23 \end{bmatrix} \begin{bmatrix} 6 & -7 & 18 \\ 4 & 0.5 & 11 \end{bmatrix}$       Does NOT exist!

$2 \times 3$        $2 \times 3$



$$9. \text{AC} = \begin{bmatrix} 6 & -7 & 18 \\ 4 & 0.5 & 11 \end{bmatrix} \begin{bmatrix} 0 & 17 & 0 & 1 \\ -2 & 9 & 13 & 5 \\ -7 & 0 & 9 & 0 \end{bmatrix} = \begin{bmatrix} -112 & 39 & 71 & -29 \\ -78 & 72.5 & 105.5 & 6.5 \end{bmatrix}$$

$$= \begin{matrix} 0 + 14 + -126 & 102 - 63 + 0 & 0 - 91 + 162 & 6 - 35 + 0 \\ 0 + -1 - 77 & 68 + 4.5 + 0 & 0 + 6.5 + 99 & 4 + 2.5 + 0 \end{matrix}$$

$$= \begin{bmatrix} -112 & 39 & 71 & -29 \\ -78 & 72.5 & 105.5 & 6.5 \end{bmatrix}$$

$$10. \begin{bmatrix} 4 & 4 \\ 1 & 0 \\ -6 & -8 \end{bmatrix} \begin{bmatrix} -3 & 0 \\ -7 & 2 \end{bmatrix} = \begin{bmatrix} -40 & 8 \\ -3 & 0 \\ 74 & -16 \end{bmatrix}$$

$$-12 - 28 \quad 0 + 8$$

$$-3 + 0 \quad 0 + 0$$

$$18 + 56 \quad 0 - 16$$

$$11. \begin{vmatrix} 8 & 4 \\ 2 & 9 \end{vmatrix} \quad 72 - 8 = 64$$

$$12. \begin{vmatrix} 4 & 9 & 5 & 4 & 9 \\ 1 & 7 & -6 & 1 & 7 \\ -4 & 1 & 8 & -4 & 1 \end{vmatrix}$$

$$224 + 216 + 5 = 445$$

$$-140 - 24 + 72 = -92$$

$$445 - (-92) = 445 + 92$$

$$\text{Det} = 537$$



$$13. \frac{1}{2} \det \begin{bmatrix} -2 & 6 & 10 \\ 4 & -8 & 12 \\ 1 & 1 & 1 \end{bmatrix} = 104 \text{ units}^2$$

$$14. \frac{1}{2} \det \begin{bmatrix} -1 & -5 & 9 \\ 3 & -7 & 11 \\ 1 & 1 & 1 \end{bmatrix} = 34 \text{ units}^2$$

Identity!

$$15. \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 0 & 0.5 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \text{ yes!}$$

No + an identity

$$16. \begin{bmatrix} 7 & -3 & -3 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0.1 & 0.02 & 0.06 \\ -0.8 & 0.96 & -0.38 \\ 0.7 & 0.74 & 0.22 \end{bmatrix} = \begin{bmatrix} 1 & -4.96 & 0.9 \\ -0.9 & 0.94 & -0.44 \\ 0.6 & 0.72 & 0.16 \end{bmatrix} \text{ NO!}$$

$$17. A^{-1} = \begin{bmatrix} 2 & 0 & 3 \\ 7 & -1 & 11 \\ 3 & 0 & 4 \end{bmatrix}$$

$$18. \begin{bmatrix} 8 & -4 \\ 9 & 12 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 24 \\ -6 \end{bmatrix} \quad A^{-1}B = \begin{bmatrix} 2 \\ -2 \end{bmatrix}$$

$$19. \begin{cases} x + y = 43 \\ x - y = 7 \end{cases} \quad \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 43 \\ 7 \end{bmatrix} \quad A^{-1}B = \begin{bmatrix} 25 \\ 18 \end{bmatrix}$$



$$20. \quad 0.05n + 0.25q = 16.35$$

$$n + q = 123$$

$n = 72$  nickels

$q = 51$  quarters

$$21. \quad 3n + 4s + 8d = 10.89$$

$$2n + 0s + 3d = 4.72$$

$$12n + 7s + 2d = 17.73$$

nerds = \$1.19

smarties = \$0.27

Dum-Dums = \$0.78

$$22. \quad \begin{bmatrix} 12 & 8 & -2 & : & 114 \\ 0 & -4 & 12 & : & 92 \\ 9 & 0 & -14 & : & 10 \end{bmatrix}$$

$$a = 12$$

$$b = -2$$

$$c = 7$$

$$23. \quad x + 6y - 7z = -26$$

$$2x + 5y + 8z = -24$$

$$3x + 4y + 9z = -22$$

$$x = -2$$

$$y = -4$$

$$z = 0$$

24. G O O D L U C K O N E X A M S

$\begin{bmatrix} 7 & 15 \\ 15 & 4 \\ 0 & 12 \\ 21 & 3 \\ 11 & 0 \\ 15 & 14 \\ 0 & 5 \\ 24 & 1 \\ 13 & 19 \end{bmatrix}$

$$25. \quad [B][A] = \begin{bmatrix} -133 & 86 & -88 & 128 & -84 & 24 & -105 & 174 & -44 & 88 & -158 & 148 & -35 & 10 & -103 & 194 & -185 & 142 \end{bmatrix}$$

$$26. \quad \begin{bmatrix} -10 & -18 \\ 4 & 24 \\ 27 & 72 \\ -19 & -38 \\ 57 & 156 \\ -14 & -28 \end{bmatrix}$$

$$27. \quad [B][A]^{-1} = \begin{bmatrix} 13 & 1 & 20 & 8 & 0 & 9 & 19 & 0 & 6 & 21 & 14 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

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