

Mathematics 2204
Chapter 1 - Part 1 - Review

1. What is the inverse of the matrix $\begin{bmatrix} -2 & 3 \\ -4 & 5 \end{bmatrix}$?

(A) $\begin{bmatrix} \frac{5}{2} & -\frac{3}{2} \\ 2 & -1 \end{bmatrix}$

(B) $\begin{bmatrix} -\frac{5}{22} & \frac{3}{22} \\ -\frac{2}{11} & \frac{1}{11} \end{bmatrix}$

(C) $\begin{bmatrix} 5 & -3 \\ 4 & -2 \end{bmatrix}$

(D) $\begin{bmatrix} 5 & 4 \\ 3 & 2 \end{bmatrix}$

2. What is the determinant of $\begin{bmatrix} 7 & -5 \\ 2 & 1 \end{bmatrix}$?

(A) -37

(B) -17

(C) -3

(D) 17

3. Which of the following matrices has an inverse?

(A) $\begin{bmatrix} 2 & 6 \\ 1 & 3 \end{bmatrix}$

(B) $\begin{bmatrix} 4 & 1 \\ 7 & 2 \end{bmatrix}$

(C) $\begin{bmatrix} -3 & 2 \\ 9 & -6 \end{bmatrix}$

(D) $\begin{bmatrix} -4 & 12 \\ -1 & 3 \end{bmatrix}$

4. Which system is equivalent to the following?

$$x + y = 7$$

$$3x - y = 4$$

(A) $2x - 2y = 14$
 $9x + 3y = 12$

(B) $-2x + 2y = 14$
 $-9x - 3y = 4$

(C) $2x + 2y = 14$
 $3x - 9y = 12$

(D) $2x + 2y = 14$
 $9x - 3y = 12$

5. Which of the following is the solution for the system of equations?

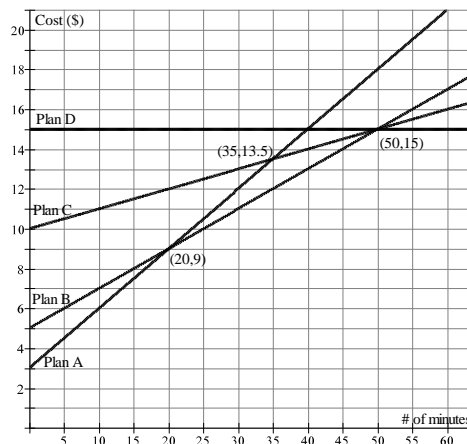
$$2x + 3y = 8$$

$$5x - 2y = 1$$

- (A) $-2, 4$
- (B) $1, 2$
- (C) $2, 1$
- (D) $2, -4$

6. The graph to the right shows the price structure for four different long distance phone plans offered by a local phone company. If you were to talk for 35 minutes, which phone plan should you use?

- (A) Plan A
- (B) Plan B
- (C) Plan C
- (D) Plan D



7. Which of the following matrix representations is equivalent to the following?

$$2x + 3y = 7$$

$$5x - 9y = 10$$

- (A) $\begin{bmatrix} 2 & 3 \\ 5 & -9 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7 \\ 10 \end{bmatrix}$
- (B) $\begin{bmatrix} 2 & 5 \\ 3 & -9 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7 \\ 10 \end{bmatrix}$
- (C) $\begin{bmatrix} x \\ y \end{bmatrix} \begin{bmatrix} 2 & 3 \\ 5 & -9 \end{bmatrix} = \begin{bmatrix} 7 \\ 10 \end{bmatrix}$
- (D) $\begin{bmatrix} 2 & 3 \\ 5 & -9 \end{bmatrix} \begin{bmatrix} 7 \\ 10 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$

8. Which of the following is an identity matrix?

- (A) $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$
- (B) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$
- (C) $\begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 0 \\ 1 & 0 & 0 \end{bmatrix}$
- (D) $\begin{bmatrix} 0 & 0 & 1 \\ 0 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$

9. Scott's Scooters charge a rental fee of \$20 plus 30¢ per kilometre. If a person spends \$80 on a scooter rental, how many kilometres did she travel?
- (A) 44
(B) 100
(C) 150
(D) 200

10. Which of the following systems has no solution?

- (A) $2x + 8y = 3$
 $-x + 4y = 1.5$
- (B) $2x - 8y = 3$
 $x - 4y = -1.5$
- (C) $2x + 8y = 3$
 $x - 4y = 1.5$
- (D) $2x - 8y = 3$
 $x + 4y = -1.5$

11. What is the solution to the system of equations represented by the matrix multiplication

$$\begin{bmatrix} 2 & 3 \\ -4 & 7 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 5 \\ 29 \end{bmatrix} ?$$

- (A) $\begin{bmatrix} -23 \\ -2 \end{bmatrix}$
- (B) $\begin{bmatrix} -16 \\ -15 \end{bmatrix}$
- (C) $\begin{bmatrix} -2 \\ 3 \end{bmatrix}$
- (D) $\begin{bmatrix} 97 \\ 183 \end{bmatrix}$

12. What is the solution for the following system of equations?

$$2x - 3y = 13$$

$$2x + 7y = 3$$

- (A) $\left(\frac{7}{2}, 1\right)$
- (B) 5, -1
- (C) 5, 7
- (D) $\left(\frac{27}{2}, 4\right)$

13. What is the determinant of the matrix $\begin{bmatrix} 11 & 12 \\ 9 & 7 \end{bmatrix}$?

- (A) -69
(B) -31
(C) 31
(D) 69

14. Megan went to the store and picked up 3 bottles of juice and 2 bags of chips for \$5.95. Amanda went to the same store and bought a bottle of juice and 2 bags of chips for \$3.45. If j represents the cost of a bottle of juice and c represents the cost of a bag of chips, which system models this situation?

- (A) $2c + 3c = 5.95$
 $2j + j = 3.45$
- (B) $2j + 2c = 5.95$
 $3j + c = 3.45$
- (C) $2j + 3c = 5.95$
 $2c + j = 3.45$
- (D) $3j + 2c = 5.95$
 $j + 2c = 3.45$

15. Which matrix multiplication is equivalent to the following system?

$$\begin{aligned} 2x + 3y &= -9 \\ -4x + 5y &= 16 \end{aligned}$$

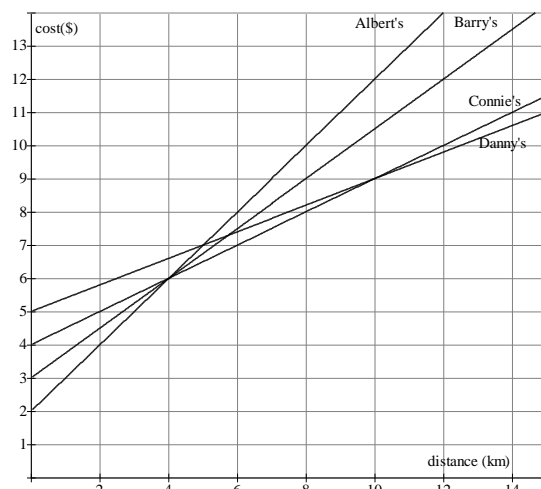
- (A) $\begin{bmatrix} 2 & 3 \\ -4 & 5 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -9 \\ 16 \end{bmatrix}$
- (B) $\begin{bmatrix} 2 & 3 \\ -4 & 5 \end{bmatrix} \begin{bmatrix} y \\ x \end{bmatrix} = \begin{bmatrix} -9 \\ 16 \end{bmatrix}$
- (C) $\begin{bmatrix} 5 & -3 \\ 4 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -9 \\ 16 \end{bmatrix}$
- (D) $\begin{bmatrix} 5 & -3 \\ 4 & 2 \end{bmatrix} \begin{bmatrix} y \\ x \end{bmatrix} = \begin{bmatrix} -9 \\ 16 \end{bmatrix}$

16. Given $A = \begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, which of the following statements is true?

- (A) $\frac{1}{A} \cdot A = I$
- (B) $A \cdot A = I$
- (C) $A^{-1} \cdot A = I$
- (D) $A^{-1} + A = I$

17. The following graph represents the cost structure for four taxi companies – Albert's Cabs, Barry's Ride, Connie's Shuttle Service, and Danny's Taxi. If you are taking a 12km trip, which company should you use?

- (A) Albert's
 (B) Barry's
 (C) Connie's
 (D) Danny's



18. What is the inverse of $\begin{bmatrix} -2 & 4 \\ -3 & 5 \end{bmatrix}$?

(A) $\begin{bmatrix} -1 & 2 \\ \frac{-3}{2} & \frac{5}{2} \end{bmatrix}$

(B) $\begin{bmatrix} 2 & -3 \\ 4 & -5 \end{bmatrix}$

(C) $\begin{bmatrix} \frac{5}{2} & -2 \\ \frac{3}{2} & -1 \end{bmatrix}$

(D) $\begin{bmatrix} 5 & -4 \\ 3 & -2 \end{bmatrix}$

19. Which system of equations is equivalent to $\begin{matrix} x+2y=7 \\ -x-y=4 \end{matrix}$?

(A) $\begin{matrix} x+2y=7 \\ 2x+2y=8 \end{matrix}$

(B) $\begin{matrix} 2x+4y=14 \\ x+y=-4 \end{matrix}$

(C) $\begin{matrix} 2x+2y=14 \\ x+y=4 \end{matrix}$

(D) $\begin{matrix} 2x+4y=-14 \\ 2x+2y=-8 \end{matrix}$

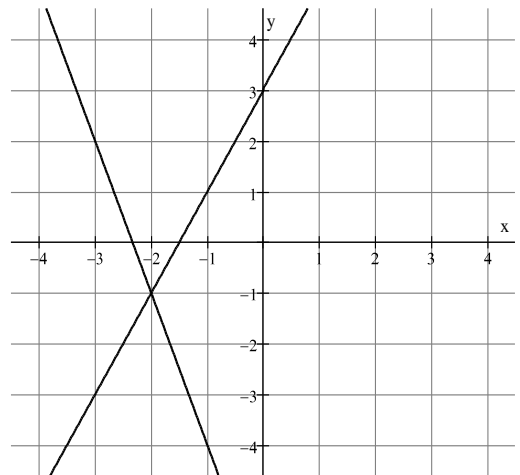
20. What is the solution to the system of equations graphed below?

(A) $-2, -1$

(B) $-2, 1$

(C) $-1, -2$

(D) $-1, 2$



21. The cost of being a member in Slim Down Health Club and Feeling Great Health Club is defined by the following equations where C is the cost of being a member in the club and m is the number of months you hold a membership.

Slim Down Health Club: $C = 200 + 15m$

Feeling Great Health Club: $C = 100 + 20m$

After how many months will the cost of both memberships be the same?

A) 5

B) 20

C) 100

D) 500

22. Which of the following system of equations has $(-1, 1)$ as a solution?

A) $\begin{cases} 5x + 6y = 1 \\ 6x + 2y = -3 \end{cases}$

B) $\begin{cases} 3x + 4y = 1 \\ 5x - 3y = -8 \end{cases}$

C) $\begin{cases} 3x - 4y = -6 \\ 3x + 3y = 1 \end{cases}$

D) $\begin{cases} 7x - 3y = 10 \\ 6x + 5y = -1 \end{cases}$

23. Which system of equations is represented by the matrix multiplication

$$\begin{bmatrix} 2 & -5 \\ 6 & -3 \end{bmatrix} \times \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 4 \end{bmatrix} ?$$

A) $\begin{cases} 2x + 6y = 3 \\ -5x - 3y = 4 \end{cases}$

B) $\begin{cases} 2x - 3y = 3 \\ 6x - 5y = 4 \end{cases}$

C) $\begin{cases} -5x + 2y = 3 \\ -3x + 6y = 4 \end{cases}$

D) $\begin{cases} 2x - 5y = 3 \\ 6x - 3y = 4 \end{cases}$

24. What is the solution for $\begin{cases} 2x + 5y = -4 \\ 3x + 2y = 5 \end{cases}$?

A) $-\frac{9}{2}, 1$

B) $-2, 3$

C) $1, 1$

D) $3, -2$

25. The Physical Education Committee held a car wash to raise money. They washed cars for \$5 each and trucks for \$7 each. They washed 105 vehicles and earned \$595. If c represents the number of cars washed and t represents the number of trucks washed, which system of equation models this situation?

A) $\begin{cases} c + t = 105 \\ c + t = 595 \end{cases}$

B) $\begin{cases} 5c + 7t = 105 \\ c + t = 595 \end{cases}$

C) $\begin{cases} c + t = 105 \\ 5c + 7t = 595 \end{cases}$

D) $\begin{cases} c + t = 105 \\ 7c + 5t = 595 \end{cases}$

26. Which of the following matrices has a determinant equal to 6 ?

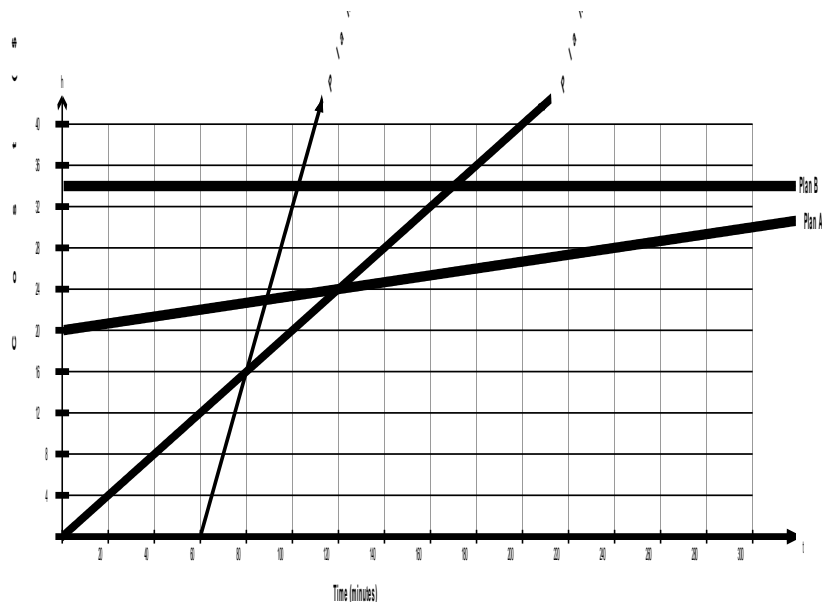
A) $\begin{bmatrix} -3 & -5 \\ -3 & -3 \end{bmatrix}$

B) $\begin{bmatrix} 2 & 4 \\ 1 & 1 \end{bmatrix}$

C) $\begin{bmatrix} -2 & -4 \\ 3 & 3 \end{bmatrix}$

D) $\begin{bmatrix} -2 & -4 \\ -3 & 3 \end{bmatrix}$

27. Four phone plans are graphed below. Which plan would you use if you called between 80 -120 minutes ?



- A) Plan A
B) Plan B
C) Plan C
D) Plan D

28. Given the system of equations below, which of the following is equivalent to $3A + (-2B)$?

Equation A: $2x - 3y = 4$

Equation B: $x + 2y = -2$

- A) $3x - y = 16$
B) $4x - y = 2$
C) $4x - 13y = 2$
D) $4x - 13y = 16$

29. George is on top of a building and throws a ball which takes a parabolic path defined by the equation $h = -2.5t^2 + 8.5t + c$ where t is time, in seconds, and h is the height, in metres, of the ball above the ground. If the ball lands after 4 seconds, what is the value of c ?

- A) -6
B) 0
C) 4
D) 6

30. Which of the following matrices has an inverse?

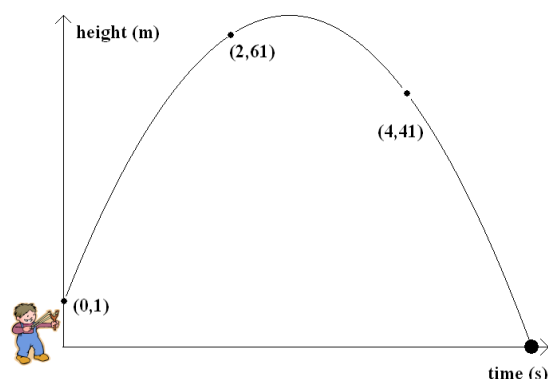
A) $\begin{bmatrix} 2 \\ 4 \\ 6 \end{bmatrix}$

B) $\begin{bmatrix} 4 & -4 \\ -3 & 3 \end{bmatrix}$

C) $\begin{bmatrix} 2 & -1 \\ 4 & 3 \end{bmatrix}$

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

31. A marble is shot from a slingshot. Initially, the marble is 1m high. After 2 seconds, the marble is 61m high. After 4 seconds, the marble is 41m high. Set up and solve a system of equations to determine the quadratic relation that models this situation, and use this relation to determine the height at 3 seconds.

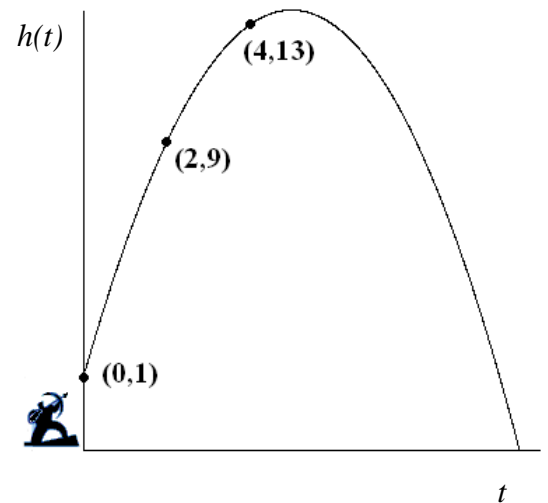


32. Paul and Jane are ordering hats and shirts from J & S Clothing. The following table shows how many of each item they ordered and the total price that was paid:

	# of hats	# of shirts	total price
Paul	10	4	110
Jane	7	3	80

Using matrices, calculate the unit price for each item.

33. The student council is having a dance as a fundraiser. They are selling two kinds of tickets: singles and couples. On the first day, 39 singles tickets and 24 couples tickets are sold for a total of \$268.50. On the second day, 13 singles tickets and 18 couples tickets are sold for a total of \$144.50. Create a system of equations to represent this information and, using matrices, find the cost for each type of ticket.
34. An arrow is fired into the air from a height of 1 metre. After 2 seconds, the arrow is 9 metres in the air. After 4 seconds, the arrow is 13 metres in the air. Set up and solve a system of equations to determine the quadratic relation, of the form $h(t) = at^2 + bt + c$, that models this situation. Use this relation to determine the height, $h(t)$, of the arrow at $t=10$ seconds.



35. Lorraine buys 6 cheap golf balls and 4 expensive ones for \$12.50. Bob buys 4 cheap and 3 expensive balls for \$9.00. Create a system of equations to represent this information and, using matrices, find the price of the two kinds of balls.
36. A toy rocket is launched from a platform 5 metres above the ground and reaches a height of 9 m in 4 seconds. The rocket touches down on the ground after 10 seconds. Write an equation in the form $h(t) = at^2 + bt + c$ that describes the path of the rocket where t represents time in seconds and $h(t)$ represent the height of the rocket in metres.

