Algebra 2 3.4

Solve systems of linear equations in 3 variables

Use systems to solve problems

ordered triple

no solution ← $7 = 0$

infinitely many solutions ← $0 = 0$

substitution

elimination

whiteboards

(a, b, c)

Solve each system of equations

1. $-3a - 4b + 2c = 28$
   $a + 3b - 4c = -31$

3
4

$2a + 3c = 11$ × 5

$-9a - 12b + 6c = 84$
$4a + 12b - 16c = -124$

$-5a - 10c = -40$ ×2

How is this problem different?

$10a + 15c = 55$
$-10a - 20c = -80$

$-5c = -25$
$\frac{-5c}{-5} = \frac{-25}{-5}$
$c = 5$

12. $-2x + 15y + z = 44$
$4x + 3y + 3z = 18$
$-3x + 6y - z = 8$

(x, y, z)
$(\ ,\ , -4)$

$x - 4y + 3z = -27$ (−12)
$2x + 2y - 3z = 22$ (+12)

$4z = -16$
$\frac{4z}{4} = \frac{-16}{4}$
$z = -4$

$x - 4y - 12 = -27$
$+12 \quad +12$
$x - 4y = -15$

$2x + 2y + 12 = 22$
$-12 \quad -12$
$2x + 2y = 10$

b. $-6a + 9b - 12c = 21$
$-2a + 3b - 4c = 7$
$10a - 15b + 20c = -30$

GuidedPractice

2A. $-4x - 2y - z = 15$
$12x + 6y + 3z = 45$
$2x + 5y + 7z = -29$

2B. $3x + 5y - 2z = 13$
$-5x - 2y - 4z = 20$
$-14x - 17y + 2z = -19$

Writing equations

$30a + 25b + 20c = 456{,}000$

$a + b + c = 19{,}200$

$2a = b$

- Seats closest to an amphitheater stage cost \$30. The seats in the next section cost \$25, and lawn seats are \$20. There are twice as many seats in section B as in section A. When all 19,200 seats are sold, the amphitheater makes \$456,000.

  A system of equations in three variables can be used to determine the number of seats in each section.

$10b + 3g + 2h = 99$

$4b + 8g + 2h = 78$

$2b + 3g + 1h = 33.60$

$t = 1$ $\quad -3 + -2 + t = -4$

$f + s + t = -4$

$-f + s - t = 0$

$s - t = f$

$f + -2 = -5$

$+2 \quad +2$

$f + s = -5$

$f = -3$

$-b$

$\frac{2s}{2} = \frac{-4}{2}$

$s = -2$