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Systems of 3 Equations Substitution Method

A: $4x + y + 5z = -40$
B: $-3x + 2y + 4z = 10$
C: $x - y - 2z = -2$

Solve for one of the variables in one of the equations.

Substitute the expression for that variable into the other two equations.

$+y \quad +2z \qquad +y \quad +2z$

$x = -2 + y + 2z$

A: $4(-2+y+2z) + y + 5z = -40$

$-8 + 4y + 8z + y + 5z = -40$
$+8 \qquad\qquad\qquad\qquad\qquad +8$

B: $-3(-2+y+2z) + 2y + 4z = 10$

$6 - 3y - 6z + 2y + 4z = 10$
$-6 \qquad\qquad\qquad\qquad\qquad -6$

$5y + 13z = -32 \longrightarrow 5y + 13z = -32$

M5 $-y - 2z = 4 \longrightarrow -5y - 10z = 20$

$3z = -12$

$z = -4$

$-y - 2z = 4$
$-y - 2(-4) = 4$
$-y + 8 = 4$
$-y = -4$
$y = 4$

$x = -2 + y + 2z$
$x = -2 + 4 + 2(-4)$
$x = -6$ $(-6, 4, -4)$