Warm up: Solve

① $x + y + z = -11$

② $2x + 5y + 2z = -40$

③ $-x + 8y - 3z = -31$

① $x + y + z = -11$

③ $-x + 8y - 3z = -31$

④ $9y - 2z = -42$

$2 \cdot$ ①: $2x + 2y + 2z = -22$

$-1 \cdot$ ②: $-2x - 5y - 2z = 40$

⑤ $-3y = 18$

So $\boxed{y = -6}$

Use ④: $9(-6) - 2z = -42$

$-54 - 2z = -42$

$-2z = 12$

$\boxed{z = -6}$

Use ①: $x + (-6) + (-6) = -11$

$x - 12 = -11$

$\boxed{x = 1}$

$(x, y, z) = (1, -6, -6)$

8.5 Word Problems using Three Variables

10) In a triangle, measure of $\angle B$ is twice the measure of $\angle A$. measure of $\angle C$ 80° more than $\angle A$.

$a = m\angle A \quad b = m\angle B \quad c = m\angle C$

(1) $a + b + c = 180$

(2) $2a - b = 0$

(3) $-a + c = 80$

scratch

$b = 2a$ or $2a - b = 0$

$c = 80 + a$ or $-a + c = 80$

(1) $a + b + c = 180$

(2) $2a - b = 0$

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(4) $3a + c = 180$

(3) $-a + c = 80 \rightarrow -1 \cdot (3): \; a - c = -80$

(4) $3a + c = 180$

(4): $3a + c = 180$

(5) $4a = 100$

$\boxed{a = 25°}$

Use (3): $-a + c = 80$

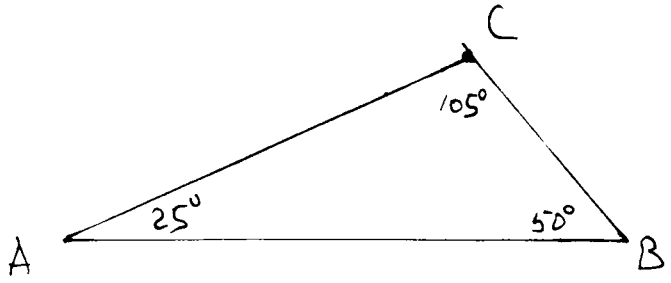
$-25 + c = 80$

$\boxed{c = 105°}$

use (2): $2(25) - b = 0$

$\boxed{50° = b}$

Check:



$$25^\circ + 50^\circ + 105^\circ = 180^\circ$$

$$\begin{cases} 2(25^\circ) - 50^\circ = 0^\circ \\ -25^\circ + 105^\circ = 80^\circ \end{cases}$$

Statement of answer: The three angles of the triangle have measures, 25 degrees, 50 degrees, and 105 degrees.

8.5 #23) A wants a patient to have a meal with 800 calories, 55 g of protein, 220 mg of vitamin C.

Available foods:

	calories	protein (g)	vit. C (mg)
beef	300	20	0
potato	100	5	20
broccoli	50	5	100

How many servings of each type of food should the meal contain?

#23 cont'd) Let x = number of servings of beef
" y = " " potato
" z = " " broccoli

nutritional conditions to be satisfied:

(1) calories: $300x + 100y + 50z = 800$
(2) protein: $20x + 5y + 5z = 55$
(3) vitamin C: $20y + 100z = 220$

(1)÷50: (1) $6x + 2y + z = 16$
(2)÷5: (2) $4x + y + z = 11$
(3)÷20: (3) $y + 5z = 11$

$-2\cdot$(1): $-12x - 4y - 2z = -32$
$3\cdot$(2): $12x + 3y + 3z = 33$
(4) $-y + z = 1$
(3) $y + 5z = 11$
(5) $6z = 12 \Rightarrow \boxed{z = 2}$

#23 cont'd) Back-substitute:

Use (3): $y + 5(2) = 11$

$y + 10 = 11$

$\boxed{y = 1}$

Use (2): $4x + 1 + 2 = 11$

$4x + 3 = 11$

$4x = 8$

$\boxed{x = 2}$

Answer: The meal should contain

2 servings of beef, 1 potato, and 2 servings of broccoli.