21 S' 5.2 #s 7, 9, 11, 17, 31, 33, 41, 47

SETUPS: 60, 63, 64, 65, 71

#s 7-10 Is the point a solution?

(7) (1, 3, 2)

$x+y+z=6$ $\quad 1+3+2=6$ ✓

$x-y-z=-4$ $\quad 1-3-2=-4$ ✓

$2x+y-z=3$ $\quad 2(1)+3-2=3$ ✓ **Yes**

(9) (-1, 5, 2)

$2x+y-z=1$ $\quad 2(-1)+5-2=1$ ✓

$x-2y+z=-9$ $\quad -1-2(5)+2=-9$ ✓

$x-y-2z=-8$ $\quad -1-5-2(2)=-10$ **NO**

#s 11-16 Solve each system

(11) $x+y+z=6$ E1

$2x-2y-z=-5$ E2

$3x+y-z=2$ E3

NEW:

$x+y+z=6$ E1

$-4y-3z=-17$ E2

$-2y-4z=-16$ E3

NEW:

$x+y+z=6$

$-4y-3z=-17$

$z=3$

$-4y-3(3)=-17$

$-4y-9=-17$

$-4y=-8$

$y=2$

$x+2+3=6$

$x+5=6$

$x=1$

$-2E1+E2$:

$-2E1$ $-2x-2y-2z=-12$

E2 $2x-2y-z=-5$

$-4y-3z=-17$

$-3E1+E3$:

$-3E1$ $-3x-3y-3z=-18$

E3 $3x+y-z=2$

$-2y-4z=-16$

$E2+-2E3$:

E2 $-4y-3z=-17$

$-2E3$ $4y+8z=32$

$5z=15$

$z=3$

$\{(1, 2, 3)\}$

12.1 §5.2 #s 17, 31, 33, 41, 47,
SETUPS #s 60, 63-65, 71

(17) Find ordered triples (3) that belong to soln set

$\{(x, x+3, x-5) \mid x \in \mathbb{R}\}$

$x=0$: $(0, 3, -5)$
$x=1$: $(1, 4, -4)$
$x=2$: $(2, 5, -3)$

#s 27 - 48 Solve each system

(31) $2x - y + z = 7$ E1
$y + z = 5$ E2

Eliminate y in E1 to get x & y in terms of z

E2 + E1:
$2x + 2z = 7$

NEW SYSTEM

$2x + 2z = 7$ ⟹ $x = -2z + 7$
$y + z = 5$ $y = -z + 5$

WRITE SOLN:
$\{(-2z+7, -z+5, z) \mid z \in \mathbb{R}\}$

(33) $x + 2y - 3z = 5$ E1
$-x - 2y + 3z = -5$ E2
$2x + 4y - 6z = 10$ E3

E1 + E2:
$0 = 0$

-2E1 + E3:
$-2x - 4y + 3z = -10$
$2x + 4y - 6z = 10$
$0 = 0$

NEW SYSTEM:
$x + 2y - 3z = 5$!

All 3 same plane!

$\{(x, y, z) \mid x + 2y - 3z = 5\}$

121 5.2 #s 41, 47 SKIPS 60, 63, 64, 65, 71

(41)

$x - y + z = 7$

$2y - 3z = -13$

$3x \quad - 2z = -3$

NEW:

$x - y + z = 7$ E1

$2y - 3z = -13$ E2

$3y - 5z = -24$ E3

NEW:

$x - y + z = 7$

$2y - 3z = -13$

$\boxed{z = 9}$

So, $2y - 3(9) = -13$

$2y - 27 = -13$

$2y = 14$

$\boxed{y = 7}$

and, $x - 7 + 9 = 7$

$x + 2 = 7$

$\boxed{x = 5}$

$-3E1 + E3$

$-3E1 \quad -3x + 3y - 3z = -21$

$E3 \quad 3x \quad - 2z = -3$

$3y - 5z = -24$

$-3E2 \quad -6y + 9z = 39$

$2E3 \quad 6y - 10z = -48$

$-z = -9$

$z = 9$

$\boxed{\{(5, 7, 9)\}}$

Check:

$5 - 7 + 9 = 14 - 7 = 7$ ✓

$2(7) - 3(9) = 14 - 27 = -13$ ✓

$3(5) - 2(9) = 15 - 18 = -3$ ✓

121 §5.2 #5 47 SETUPS 60, 63-65, 71

(47)

$x = 2y - 1$

$y = 3z + 2$

$z = 2x - 3$

NEW:

$x - 2y = -1$ E1

$y - 3z = 2$ E2

$-4y + z = -5$ E3

NEW:

$x - 2y = -1$

$y - 3z = 2$

$\boxed{z = -\frac{3}{11}}$

So, $y - 3(-\frac{3}{11}) = 2$

$y + \frac{9}{11} = 2$

$y = \frac{22}{11} - \frac{9}{11} = \boxed{\frac{13}{11} = y}$

and, $x - 2(\frac{13}{11}) = -1$

$x - \frac{26}{11} = -1$

$x = \frac{-11}{11} + \frac{26}{11} = \boxed{\frac{15}{11} = x}$

$x - 2y = -1$ E1

$y - 3z = 2$ E2

$-2x + z = -3$ E3

2E1 + E3:

2E1 $2x - 4y = -2$

E3 $-2x + z = -3$

$-4y + z = -5$

4E2 + E3:

4E2 $4y - 12z = 8$

E3 $-4y + z = -5$

$-11z = 3$

$z = -\frac{3}{11}$

$\boxed{\{(\frac{15}{11}, \frac{13}{11}, -\frac{3}{11})\}}$

121 §5.2 SETUPS #s 60, 63-65, 74

(60) Perimeter of triangle is 40 m.
Sum of two shorter sides is 2 m more than long side. Longest side is 11 m more than shortest side.

Let x = length of shortest side (in m)
y = " " middle " " "
z = " " long " " "

Then $x + y + z = 40$

$x + y = z + 2$

$z = x + 11$

write in stdd form:

$x + y + z = 40$

$x + y - z = 2$

$-x + z = 11$

(63) Total of $25000 invested
Earned 9% on stocks,
" 10% " bonds
" 6% " mutual fund
Total return was $1860
Invested twice as much in mutual fund as she invested in bonds.

Let x = amt invested in stocks
y = " " " bonds
z = " " " mutual fund

Then $x + y + z = 25000$

$.08x + .1y + .06z = 1860$

$z = 2y$

stdd form

$x + y + z = 25000$

$.08x + .1y + .06z = 1860$

$-2y + z = 0$

121 § 5.2 #s 64, 65, 74

(64) In 1980, there were 1911 folks. In 1990 the # of folks under 20 increased by 10%, the # " " from 20–60 yrs decreased by 8%, & the # of folks over 60 increased by $\frac{1}{3}$. If 1990 pop was 2136, and the # of folks over 60 was equal to the number under 60, how many folks in each age group in 1980?

Let x = # of folks under 20 in 1980
y = " " " from 20–60 " "
z = " " " over 60 " "

Then $x + y + z = 1911$ Pop in 1980
" " 1990

$(x + .1x) + (y - .08y) + (z + \frac{1}{3}z) = 2136$

$1.1x + .92y + \frac{4}{3}z = 2136$

$\frac{4}{3}z = 1.1x + .92y$

Young-vs-Old

stdd form:

$$x + y + z = 1911$$
$$1.1x + .92y + \tfrac{4}{3}z = 2136$$
$$-1.1x - .92y + \tfrac{4}{3}z = 0$$