

2. Solving simultaneous equations with three variables

Example 3

Solve the simultaneous equations:  
 (A)  $x + y + z = 6$   
 (B)  $2x + y - z = 1$   
 C:  $4x - 3y + 2z = 4$

no z

(A)	$x + y + z = 6$	
+ (B)	$+2x + y - z = 1$	
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	$3x + 2y = 7$ (1)	
(C)	$4x - 3y + 2z = 4$	
+ 2(B)	$4x + 2y - 2z = 2$	
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	$8x - y = 6$ (2)	
(1)	$3x + 2y = 7$	
2(2)	$16x - 2y = 12$	
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	$19x = 19$	
	$x = 1$	

  

(2)	$8(1) - y = 6$
	$8 - y = 6$
	$y = 2$

  

(A)	$1 + 2 + z = 6$
	$3 + z = 6$
	$z = 3$

pt (1, 2, 3)

5. Solve the following equations with three unknowns. (i)  $2x + y + z = 8$  (1)  
 $5x - 3y + 2z = 3$  (2)  
 $7x + y + 3z = 20$  (3)

eliminate the Z's

(2)	$5x - 3y + 2z = 3$	
-2(1)	$-4x - 2y - 2z = -16$	
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	$x - 5y = -13$ (4)	
(3)	$7x + y + 3z = 20$	
-3(1)	$-6x - 3y - 3z = -24$	
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	$x - 2y = -4$ (5)	

Solve for x and y

(4)	$x - 5y = -13$	
-(5)	$-x + 2y = 4$	
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	$-3y = -9$	$\Rightarrow y = 3$

Sub into (5)

$$x - 2(3) = -4 \Rightarrow x - 6 = -4 \Rightarrow x = 2$$

Sub into (1)

$$2(2) + 3 + z = 8$$

$$4 + 3 + z = 8$$

$$7 + z = 8 \Rightarrow z = 1$$

Answer pt (2, 3, 1)