Equations with Fractions

The one other thing that might throw you off is when you see a bunch of fractions in the problem. Not to worry, remember that you have power to do anything you want to the equation. For example:

$\frac{3}{8}x - \frac{5}{8} = \frac{7x}{8}$ might be easier to look at if there weren't so many fractions in the way. Well, get rid of them. Multiply by 8 on both sides.

$(8)\frac{3}{8}x - (8)\frac{5}{8} = (8)\frac{7x}{8}$ which makes it become:

$3x - 5 = 7x$ (not bad at all)

$-5 = 4x$

$-\frac{5}{4} = x$ Ta Da.

Worse example:

$\frac{2}{7} - \frac{x-3}{4} = 5$ looks scary.

You have the ability to wipe out all of the fractions. Fractions are simply statements of division. The opposite of division is multiplication – and you have the power to multiply both sides of the equation by anything you want to. The question is, what will undo a division by 7 and by 4; the answer is multiplication by 28. Here is what it looks like:

1. Simplify

$\frac{2}{7} - \frac{x-3}{4} = 5$

$(28)\frac{2}{7} - (28)\frac{x-3}{4} = 5(28)$ (multiplying everything by 28)

$(4)2 - (7)(x-3) = 140$ (28/7 = 4 and 28/4 = 7)

$8 - 7x + 21 = 140$ (Distribute the -7)

$-7x + 29 = 140$ (Combine numbers)

2. Subtract → $-7x = 111$ (Subtract 29 from both sides)

3. Divide → $x = -\frac{111}{7}$ (Not a nice looking answer, but it is right!)

Every problem can be boiled down to three steps:

Linear Equations

1. Simplify
   1. Parentheses
   2. Fractions
   3. Combine like terms
2. Add/Subtract
3. Multiply/Divide

Section 3.2 Exercises Part B

4.2

1. 35 less than 7 times a number is 98. What is the number?

2. Two numbers add to 351 and the second is 71 bigger than the first. What are the two numbers?

Solve.

3. $7p + 12 = 33 – 4p$

4. $3n + 48 = 7 – 2(n – 2)$

5. $5x – 10 = 5(x – 2)$

6. $3x – 7 = 15x$

7. $5x – 7(x+3) = -2x +12$

8. $.09x = 13 - .18x$

9. $.8(3x – 2) = 9.5x + 1$

10. $.2x – 7 + 2x = 3x - 5$

11. $12m = 70 + .4m$

12. $5(x – 5) – x = 4x – 20$

13. $9x – 4(x – 3) = 15x +7$

14. $8x – 12x + x = 9x +8x$

15. 85 is what percent of 39?

16. 85 is 54% of what?

17. What is 19% of 2,340?

18. What is 23% of 79?

19. 119 is 18% of what?

20. 43 is what percent of 174?

21. Original Price:$72.56
Tax: 7.3%
Final Price:

22. Original Price:
Discount: 30%
Final Price: $49.70

23. Original Price:
Tax: 5%
Final Price: $339.50

24. Original Price: $55.50
Discount: 40%
Final Price:

25. If the population of a town grew 31% up to 17,049, what was the population last year?

26. If the price of an object dropped 35% down to $101.25, what was the original price?

Solve.

Example:

$\frac{1}{3}(x+4) - \frac{5}{2} = \frac{1}{4}x + \frac{5}{6}$	
$^{(12)}\frac{1}{3}(x+4) - \frac{5}{2}{}^{(12)} = {}^{(12)}\frac{1}{4}x + {}^{(12)}\frac{5}{6}$	Clear fractions by multiplying by 12
$4(x+4) - 30 = 3x + 10$	
$4x + 16 - 30 = 3x + 10$	Distribute through parentheses
$x - 14 = 10$	Combine, getting x to one side
$x = 24$	Add 14 to both sides

27. $\frac{7}{3}t - 5 = 19$

28. $-\frac{3}{8}(x - 7) = 5 + 3x$

29. $\frac{2}{3}x - 6 = 3 + \frac{1}{2}x$

30. $\frac{4}{5}x = 2x - \frac{5}{3}$

31. $\frac{3}{5}x - \frac{2}{5}(x-3) = \frac{1}{5}x + 3$

32. $\frac{3x+2}{7} = \frac{4x-1}{5}$

33. $.9(-4x - 5) = 2.5x + 6$

34. $.0005x + .0045 = .004x$

35. $\frac{x+7}{4} = 8 - \frac{5}{6}x$

Preparation.

36. Describe the best way to get rid of fractions in an equation.

Answers:

1. 19
2. 140, 211
3. p = $\frac{21}{11}$
4. n = $-\frac{37}{5}$ or -7.4
5. All numbers
6. x = $-\frac{7}{12}$
7. no solution
8. x = 48.15
9. x = -.366
10. x = -2.5
11. m = 6.03
12. no solution
13. x = $\frac{1}{2}$
14. x = 0
15. 218%
16. 157.4
17. 444.6
18. 18.17
19. 661.1
20. 24.7%
21. $77.86
22. $71.00
23. $323.33
24. $33.30
25. 13,015
26. $155.77
27. t = $\frac{72}{7}$
28. x = $-\frac{19}{27}$
29. x = 54
30. x = $\frac{25}{18}$
31. no solution
32. x = $\frac{17}{13}$
33. x = $-\frac{105}{61}$
34. x = $\frac{9}{7}$
35. x = $\frac{75}{13}$
36. In class