# Homework Qs

Note Title 1/28/2016

53) $\frac{1}{8} + \frac{1}{2}x = \frac{1}{4}$ Solve.

$\frac{1}{2}x = \frac{1}{4} - \frac{1}{8}$

$\frac{1}{2}x = \frac{1}{4}\left(\frac{2}{2}\right) - \frac{1}{8}$

$\frac{1}{2}x = \frac{2}{8} - \frac{1}{8}$

$\frac{1}{2}x = \frac{1}{8}$

$\left(\frac{2}{1}\right)\frac{1}{2}x = \frac{1}{8}\left(\frac{2}{1}\right)$

$x = \frac{2}{8} = \frac{1}{4}$

$\left\{\frac{1}{4}\right\}$

2.2 #71) $\frac{3}{2}y + \frac{1}{3} = y - \frac{2}{3}$

$\frac{3}{2}y - y = -\frac{2}{3} - \frac{1}{3}$

$\frac{3}{2}y - \frac{1}{1}y\left(\frac{2}{2}\right) = -\frac{3}{3}$

$\frac{3}{2}y - \frac{2}{2}y = -1$

$\frac{1}{2}y = -1$

$\left(\frac{2}{1}\right)\frac{1}{2}y = -1\left(\frac{2}{1}\right)$

$y = -\frac{2}{1}$

$y = -2$

$\{-2\}$

2.3 #13

$$1 = \frac{1}{2}(4x+2)$$

$$1 = \frac{1}{2}(4x) + \frac{1}{2}(2)$$

$$1 = \frac{4x}{2} + \frac{2}{2}$$

$$1 = 2x + 1$$

$$0 = 2x$$

$$\frac{0}{2} = \frac{2x}{2}$$

$$0 = x$$

Solution Set: $\{0\}$

**Reminder:**

$\frac{0}{2} = 0$

$\frac{0}{5} = 0$

$\frac{0}{-7} = 0$

$\frac{2}{0}$ is undefined

$\frac{5}{0}$ is undefined

$\frac{0}{0}$ is undefined.

Why is $\frac{10}{0}$ undefined?

$\frac{10}{2} = 5$ because $5(2) = 10$

$\frac{10}{2} = ?$ $(?)(2) = 10$ Answer 5.

$2+2+2+2+2$ How many 2's did I have to add together to get 10? 5.

$\frac{10}{0} = ?$

$0+0+0+0+0+0+\ldots \neq 10$ will never get to 10.

$\frac{10}{0}$ is undefined because $(?)(0) = 10$ is impossible.

$\frac{0}{2} = ?$ same as $(?)(2) = 0$

answer: 0

$\frac{0}{2} = 0$

2.3 #25 $\frac{3}{4}(8x-4)+3 = \frac{2}{5}(5x+10)-1$

$\frac{3}{4}(8x) + \frac{3}{4}(-4) + 3 = \frac{2}{5}(5x) + \frac{2}{5}(10) - 1$

$\frac{6x}{1} - \frac{3}{1} + 3 = \frac{2x}{1} + \frac{4}{1} - 1$

$6x - 3 + 3 = 2x + 4 - 1$

$6x = 2x + 3$

$-2x \quad -2x$

$4x = 3$

$\frac{4x}{4} = \frac{3}{4}$

$x = \frac{3}{4}$

$\left\{\frac{3}{4}\right\}$

Note: It would be correct to write 0.75 for the answer to this problem.

However, what if our answer was $\frac{1}{3}$?

$\frac{1}{3} \neq 0.33$

$0.333\ldots = 0.\overline{3} = \frac{1}{3}$

Example: $2(-2x+4) = -4x+8$

$-4x+8 = -4x+8$

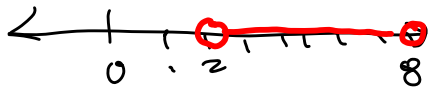
True for every $x$

Solution Set: **All real numbers**

To make xyz happy, enter two lower-case O's

Interval notation: covered in 0310.

$(2, 8)$ means $2 < x < 8$




In interval notation, All real numbers is represented as $(-\infty, \infty)$


Ex: $3x+5 = 3x-2$

$-3x \quad -3x$

$5 = -2$ False for every $x$

**No Solution**

To make xyz happy, enter DNE

## 2.5: Applications of Linear Equations

Represent the quantity by an algebraic expression.

a) 3 times a number

**$3x$**

b) 10 more than a number **$x+10$**

c) 6 less than a number

$\boxed{x-6}$

d) 4 less than twice a number

$\boxed{2x-4}$

e) Half a number $\boxed{\frac{1}{2}x}$

Example: One number is 4 more than twice another number. Their sum is 22. Find the numbers.

One number: $2x+4$

Another number: $x$

$$(2x+4)+x=22$$
$$3x+4=22$$
$$3x=18$$
$$\frac{3x}{3}=\frac{18}{3}$$
$$x=6$$

another number: $x=6$

one number: $2x+4$

$x=6 \Rightarrow 2(6)+4=12+4=16$

The two numbers are 6 and 16.

Check: twice 6: 12

4 more: 16 ✓ 1st sentence checks

Sum: $6+16=22$ ✓ 2nd sentence checks

Ex: One number is five more than twice another. If their sum is decreased by 10, the result is 22. Find the numbers.

One number: $2x+5$

Another number: $x$

$$(2x+5)+x \quad -10 = 22$$

(sum)

$$2x+5+x-10=22$$

$$3x-5=22$$

$$3x=27$$

$$x=\frac{27}{3}=9$$

another number: 9

One number: $2x+5$

$x=9 \Rightarrow 2(9)+5$

$=18+5=23$

The numbers are 9 and 23.

Check: twice 9: 18

5 more: 23 ✓

Sum: $9+23=32$

Decrease by 10: 22 ✓

**Example:** The perimeter of a rectangle is 100 ft. The length is 6 ft less than three times the width. Find the length and width.

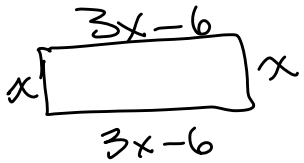
three times the width: $3x$ ($x$ = width)

width: $x$

length: $3x-6$

length compared to width: $x$

Perimeter = sum of all the side lengths




$x + (3x-6) + x + (3x-6) = 100$

$x+3x-6+x+3x-6=100$

$8x-12=100$

$8x=112$

$\frac{8x}{8} = \frac{112}{8}$

$x = \frac{112}{8}$

$x = 14$

OR (same!)

Perimeter $= 2(\text{length}) + 2(\text{width})$

$100 = 2(3x-6) + 2x$

$100 = 6x-12+2x$

$100 = 8x-12$

$8\overline{)112}$ → $14$; $8$; $32$; $32$; $0$

width: $x=14$

length: $3x-6$

Put in $x=14$: $3(14)-6$

$= 42-6$

$= 36$

The width is 14 ft and the length is 36 ft.

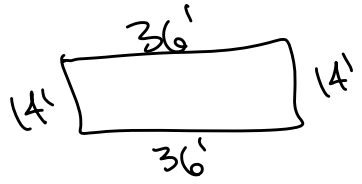
(could write as 14' and 36'.

Check 1:

1st sentence. Perimeter = 100 ft?

$P = 2L + 2W$

$2(14') + 2(36') = 28' + 72' = 100'$




$14' + 36' + 14' + 36'$

$= 50' + 50' = 100'$ ✓ 1st sentence checks.

3 times width: $3(14') = 42'$

6 ft less? $36'$ ✓

2nd sentence checks.