NOTES: Solving Equations with Variables on BOTH SIDES

$7x-1=3(x+8)+3$

$7x-1=3x+24+3$

$7x-1=3x+27$

$4x-1=27$

$4x=28$

$\boxed{x=7}$

Check:

$7(7)-1=48$ ✓

$3(7+8)+3=48$

- **Any grouping symbols?**
- **Combine Like terms on right**
- **Combine Like terms on left**
- **Move all variables to one side and constants to the other**
- **Isolate the variable**

1) $3x-6=22-x$

$+6 \quad +6$

$3x=28-x$

$4x=28$

$x=7$

2) $4x+1=17+6x$

$-2x=16$

$x=-8$

3) $-7+6x=13+x$

$5x=20$

$x=4$

4) $6x-10=-70-4x$

$60=-10x$

$x=-6$

5) $-5+7+2k-3k=k-8$

$2-k=k-8$

$10=2k$

$k=5$

6) $5(1-3x)=25+10x$

$5-15x=25+10x$

$-25x=20$

$x=\frac{20}{-25}$

$x=-\frac{4}{5}$

7) $\frac{2}{3}(3x+9)=-2(2x+6)$

$2(3x+9)=-6(2x+6)$

$6x+18=-12x-36$

$18x=-54$

$x=-3$

8) $\frac{1}{2}d+\frac{3}{8}=-2d$

$4d+3=-16d$

$3=-20d$

$d=-\frac{3}{20}$

9) $\frac{5}{2}t-t=3+\frac{3}{2}t$

$5t-2t=6+3t$

$0\neq 6$

$\emptyset$

10) Your parents are looking to install internet at your house. Company A charges an installation fee of $60 and a monthly fee of $42.95. Company B charges an installation fee of $25 and a monthly charge of $49.95. Write and solve an equation to find the month when you would pay the **same** total amount for each Internet Service.

A B

$60 + 42.95x = 25 + 49.95x$

$35 = 7x$

$x = 5$

Company A + Company B will charge the same amount during the 5th month

Which service should your parents use if they need 1.5 years of internet service?

$60 + 42.95(18) = 833.10$

$25 + 49.95(18) = 924.10$

11) A boat leaves New Orleans and travels upstream on the Mississippi River for 4 hours. The return trip takes only 2.8 hours because the boat travels 3 miles per hour faster downstream due to the current. How far does the boat travel upstream?

$4x = 2.8(x + 3)$

$4x = 2.8x + 8.4$

$1.2x = 8.4$

$x = 7$ miles up stream