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GPS # 5 1.5 ALGEBRAIC AND GRAPHICAL SOLUTIONS OF LINEAR EQUATIONS Class Time: T|R 11:00 Date: 1-15-08

Useful Guidelines: Y=mx+b or b+mx 2w/ 10

To solve a Linear Equation in One Variable:
* Eliminate the fractions: Multiply both sides by the least common denominator as needed.
* Clear parentheses and combine like terms as needed.
* Get all terms with the variable on one side of the equation and all numbers on the other side.
* Get an equation with just the variable on one side of the equation.

Zero of a Function: Any number a, for which $f(a)=0$, is called a zero of the function $f(x)$. If a is real, a is an x-intercept of the graph of the function. [Zeros of the function: solutions to the equation $f(x)=0$.]

Solve the following linear equations in one variable:

1. a) $\frac{4x+3}{4}-\frac{x-1}{2}=5$ LCD: 4

$4\left[\frac{4x+3}{4}-\frac{x-1}{2}\right]=[5]\cdot 4$

$(4x+3)-2(x-1)=20$

$4x+3-2x+2=20$

$2x+5=20$

$2x+5=20$

$-5\quad -5$

$\frac{2x}{2}=\frac{15}{2}$

$x=\frac{15}{2}$

b) $\left(\frac{3}{4}x-\frac{2}{7}\right)=\left(\frac{5}{7}x+\frac{1}{2}\right)$ LCD: 28

$21x-8=20x+14$

$+8\quad +8$

$21x=20+22$

$-20\quad -20$

$\frac{1x}{1}=\frac{22}{1}$

$x=22$

2. a) $0.04z+0.02(z-5)=0.01z+0.25$ LCM: 100

$\left(\frac{4}{100}z+\frac{2}{100}(z-5)\right)=\left(\frac{1}{100}z+\frac{25}{100}\right)100$

$4z+2(z-5)=1z+25$

$4z+2z-10=1z+25$

$6z-10=1z+25$

$+10\quad +10$

$6z=1z+35$

$-1\quad -1$

$\frac{5z}{5}=\frac{35}{5}$

$z=7$

b) $1.39-0.15x=2.41x+0.11$ LCM: 100

$100\left(\frac{139}{100}-\frac{15}{100}x\right)=\left(\frac{241}{100}x+\frac{11}{100}\right)100$

$139-15x=241x+11$

$-241\quad -241$

$139-256x=11$

$-139\quad -139$

$\frac{-256x}{-256}=\frac{-128}{-256}$

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

3. For the function $f(x)=45+15x$, find:

a) $f(-3)$

$f(x)=45+15x$

$f(-3)=45+15(-3)$

$f(-3)=0$

b) The solution to the equation $f(x)=0$

$45+15x=0$

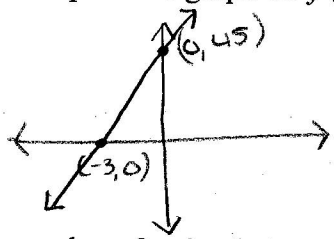
$-45\quad -45$

$\frac{15x}{15}=\frac{-45}{15}$

$x=-3$

$x=-3$

c) The x-intercept of the graph of $f(x)=45+15x$



$x=-3$

d) The zero of $f(x)=45+15x$.

Because $f(x)=0$ when $x=-3$

$x=-3$

we say that -3 is the zero of the function.

4. The future value of a simple interest investment is given by $S=P(1+rt)$. What principal P must be invested for twenty years at the simple interest rate of 5% so that the future value grows to $300,000?

$S=300,000$

$t=20$

$r=0.05$ or $\frac{5}{100}$

$P=?$

$S=P(1+rt)$

$300,000=P(1+\frac{5}{100}\cdot 20)$

$300,00=P(1+1)$

$300,00=P(2)$

$P=150,000$