Day Two

a) $9 + \frac{1}{2}x = 14$

$-9 \quad -9$

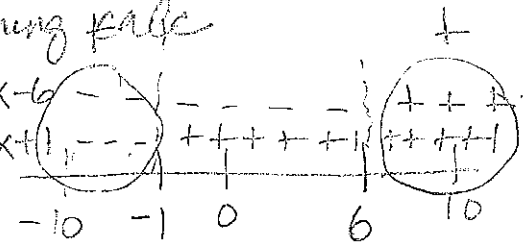
$2 \cdot \frac{1}{2}x = 5 \cdot 2$

$\boxed{x = 10}$

b) $(x-6)(x+1) \geq 0$ Also can use graphing calc

$x-6=0 \quad x+1=0$

$x=6 \quad x=-1$



when $x \leq -1$ or $x \geq 6$

$(-\infty, -1] \cup [6, +\infty)$

c) $(x+1)(x-6) = 4$

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

$x^2 - 5x - 10 = 0$

$a=1 \quad b=-5 \quad c=-10$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$= \frac{5 \pm \sqrt{25+40}}{2}$

$x = \frac{5 \pm \sqrt{65}}{2}$

$x = \frac{5+\sqrt{65}}{2}$ or $x = \frac{5-\sqrt{65}}{2}$

$x \approx 6.53 \quad x \approx -1.53$

d) $\frac{2(5^x)}{2} = \frac{250}{2}$

$5^x = 125 \rightarrow 5^x = 125$

$\log_5 125 = x \quad 5^x = 5^3$

$\frac{\log 125}{\log 5} = x \quad x = 3$

$\boxed{3 = x}$

e) $2x^2 - 2x + 5 = 0$

$a=2 \quad b=-2 \quad c=5$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$x = \frac{2 \pm \sqrt{4-40}}{4}$

$x = \frac{2 \pm \sqrt{-36}}{4}$

$x = \frac{2 \pm 6i}{4}$

$x = \frac{2+6i}{4}$ or $x = \frac{2-6i}{4}$

$\boxed{x = \frac{1+3i}{2} \text{ or } x = \frac{1-3i}{2}}$

f) $\log_3 (2x+6) = 5$

$3^5 = 2x+6$

$243 = 2x+6$

$-6 \quad -6$

$\frac{237}{2} = \frac{2x}{2}$

$\boxed{118.5 = x}$

g) $|x+10| - 7 > -5$

$+7 \quad +7$

$|x+10| > 2$

$x+10 < -2$ or $x+10 > 2$

$-10 \quad -10 \quad -10 \quad -10$

$\boxed{x < -12 \text{ or } x > -8}$

$\boxed{(-\infty, -12) \cup (-8, +\infty)}$

h) $2(4x-8) = 8x+14$

$8x-16 = 8x+14$

$-8x \quad -8x$

$-16 = 14$

false statement

No solution

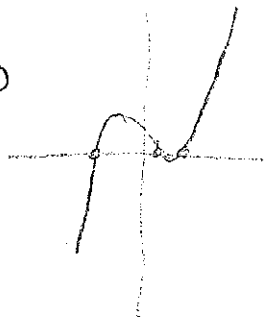
i) $x^3-2x+5 = 4$

$-4 \quad -4$

$x^3-2x+1 = 0$

$y_1 = x^3-2x+1$

$y_2 = 0$



$x = .618$ or

$x = -1.618$ or

$x = 1$

j) $16 = |-4+5x|$

$-4+5x = 16$ or $-4+5x = -16$

$+4 \quad +4 \quad +4 \quad +4$

$5x = 20$ $\quad 5x = -12$

$x = 4$ or $x = -1.4$

k) $125^{9x-2} = 150$

$\log_{125} 150 = 9x-2$

$\frac{\log 150}{\log 125} = 9x-2$

$1.0377609 = 9x-2$

$+2 \quad +2$

$\frac{3.0377609}{9} = \frac{9x}{9}$

$.337529 = x$

l) $0 = (x-5)(3x+5)(x^2-7x+15)$

$x-5=0$ or $3x+5=0$ or $x^2-7x+15=0$

$x=5$ $\quad 3x=-5$ $\quad a=1 \quad x = \frac{7 \pm \sqrt{49-60}}{2}$

$x = -\frac{5}{3}$ $\quad b=-7$

$c=15 \quad x = \frac{7 \pm \sqrt{-11}}{2}$

$x = \frac{7 \pm i\sqrt{11}}{2}$

m) $x \neq -5, -2$

$\frac{x-3}{x+5} = \frac{x}{x+2}$

$(x+5)(x+2) \cdot \frac{(x-3)}{(x+5)} = \frac{x}{(x+2)} \cdot (x+5)(x+2)$

$(x+2)(x-3) = x(x+5)$

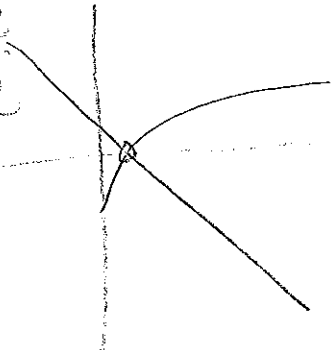
$x^2+2x-3x-6 = x^2+5x$

$-1x-6 = 5x$

$+1x \quad +1x$

$\frac{-6}{6} = \frac{6x}{6}$ $\quad x=-1$

n) $\ln(x) = 1-x$ $\quad y_1 = \ln x$ $\quad y_2 = 1-x$



$e^{1-x} = x$

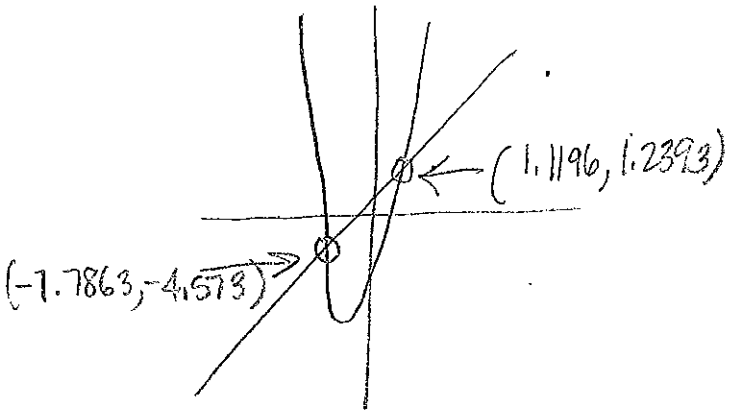
$x = 1$

$e^{1-1} = 1$

$e^0 = 1$ ✓

o) $\begin{cases} 3x^2+4x-y=7 \\ 2x-y=1 \end{cases}$ $\longrightarrow$ $y=3x^2+4x-7$ parabola

$\longrightarrow$ $y=2x-1$ line



$x=-1.7863$ $(-1.7863, -4.5726)$
$y=-4.5726$

$x=1.1196$ $(1.1196, 1.2393)$
$y=1.2393$

---

p) $f(3)+f(-7)+f(8)$

$f(3)=\frac{1}{2}(3)-6=1.5-6=-4.5$

$f(-7)=5$

$f(8)=-2(8)+10=-16+10=-6$

$f(3)+f(-7)+f(8)=-4.5+5+(-6)=\boxed{-5.5}$

---

2) The goal is to find the value(s) of the variable that will make the statement (equation) true.

3) Often you can use your graphing capabilities to solve equations. Works well with (1b) (1n) (1n)

4) On a multiple choice test you may be able to substitute answer choices in to see if they work in the equation.