

# HW13 Key

①  $\ln(x^2 + 3x) = \ln 10 = 0$

$\Rightarrow \ln(x^2 + 3x) = \ln 10$

$\Rightarrow x^2 + 3x = 10$

$\Rightarrow x^2 + 3x - 10 = 0$

$\Rightarrow (x+5)(x-2) = 0$   $\boxed{x=2}$   
 $\boxed{x=-5}$

②  $\log_2(x+7) + \log_2(x) = 3$

$\Rightarrow \log_2 x(x+7) = 3$

$\Rightarrow 2^3 = x(x+7) \Rightarrow 8 = x^2 + 7x$

$x^2 + 7x - 8 = 0 \Rightarrow (x+8)(x-1) = 0$

~~$x = -8$~~   $\boxed{x=1}$

one solution  $\boxed{x=1}$

③  $\left(\frac{1}{7}\right)^x = 7^{x+4}$

$7^{-x} = 7^{x+4}$

$\Rightarrow -x = x + 4 \Rightarrow -2x = 4$

$x = \frac{4}{-2} = \boxed{-2}$

④ a)  $y = 10,000(1-0.1)^8 = 4304.67$

b) rate = 10%

⑤ a)  $y = 5 \cdot (1.05)^{25} = 16.43$

b) rate = 5%

⑥

Equation:

$y = 100,000(1-0.01)^t$   
t = 75 years

population after 25 years

$= 100,000(0.99)^{100}$

$= 36,603.23$

⑦  $p(x) = 0.5(1.03)^t$

e) price = 0.5

f) rate = 3%

g)  $p(70) = 0.5(1.03)^{70}$

$= 3.96$

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