① (a) $A(t) = 24(1.1)^t$

(b) $A(1776-1626) = 24(1.1)^{1776-1626} \approx \$38,825,228.06$

(c) $A(2005-1626) = 24(1.1)^{2005-1626}$

$$\approx 1.17 \times 10^{17} \text{ dollars.}$$

(d) Based on this calculation, Mr. Minuit would have been much better off putting the money in the stock market than buying Manhattan for \$24, since his worth would then be ~~thousands of~~ hundreds of thousands of times the total amount of all goods produced in the United States in a year.

(e) The reasoning is inappropriate over this long time period. Not only did the stock market not exist in 1626, but when it did, the rate of return was not a constant 10%. Finally, since so much wealth is physically impossible (according to our current understanding), it would probably not have been possible for ~~the~~ Mr. Minuit's stocks to return him a ~~so~~ rate of growth of 10%.

(2) I list in order of increasing rate of growth:

(i), (b), (a), (e), (f), (c), (h), (g), (d)

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(3) $2^{24} = 10^{t} \Leftrightarrow 24\ln(2) = t\ln(10)$

$\Rightarrow t = \dfrac{24\ln(2)}{\ln(10)} \approx 7.22$

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(4) (a) $\lim_{x\to\infty} \dfrac{x^2-1}{x^2+1} = 1$, (b) $\lim_{x\to 1} \dfrac{x^2-1}{x^2+1} = \dfrac{0}{2} = 0$

(c) $\lim_{x\to\infty} \sin(x)$ does not exist

(d) $\lim_{x\to\pi/2}$ ~~sin~~ tan(x) does not exist.

(e) $\lim_{x\to\infty} \dfrac{\ln(x)}{x} = 0$;

(f) $\lim_{x\to\infty} \dfrac{x}{\ln(x)} = \infty$ (that is, $\dfrac{x}{\ln x}$ increases without bound as $x\to\infty$.)