Question 2

(a) $f(x) = \dfrac{1 - e^{x^2}}{1 - e^{1-x^2}}$

For $f(x)$ to be defined, the expression

$$\dfrac{1 - e^{x^2}}{1 - e^{1-x^2}} \geq 0$$

$1 - e^{x^2} \geq 0 \quad (1 - e^{1-x^2}) \geq 0.$

$1 - e^{x^2} \geq 0$

$e^{x^2} \geq 1$

$\log e^{x^2} \geq \log 1.$

$\log(e)x^2 \geq 0.$

$x^2 \geq \dfrac{0}{\log e}$

$x^2 \geq 0$

$x \geq 0$

Domain of $f(x)$ is $(0, \infty)$.

(b) $f(x) = \dfrac{1+x}{e^{\cos x}}.$

$\dfrac{1+x}{e^{\cos x}} \geq 0$

$1 + x \geq 0$

$x \geq -1.$

Domain is $(-1, \infty)$.

(5) $g(t) = \sqrt{10^t - 100}$

$$10^t - 100 \geq 0.$$

$$10^t \geq 100$$

$$\log 10^t \geq \log 100$$

$$t \log 10 \geq \log 100$$

$$t \geq \frac{\log 100}{\log 10}$$

$$t \geq 2$$

Domain is $(2, \infty)$.

Q3

(a) $\lim\limits_{x \to -\infty} (x^2 + 2x^7)$.

$\lim\limits_{x \to -\infty} (x^2 + 2x^7) = \lim\limits_{x \to -\infty} \left[x^2 \left[1 + 2x^5 \right.\right.$