## 3 September 2014 Review of Exponentials

(1) Use the laws of exponents to rewrite and simplify the expression. (a)  $9^{\frac{3}{2}}$ 

(b) 
$$\frac{(x^n \cdot x^{2n-5})^2}{x^{4n+1} \cdot x^{-3}}$$
  
(c)  $x\sqrt{1+\frac{1}{x^2}}, \quad x > 0$ 

(2) Make a rough sketch of the graph of each function. (a)  $y = 2^{x+2}$ 

(b) 
$$y = 1 - 2^{-x}$$

(c) 
$$y = 2^{|x|}$$

(3) Find the domain of each function.  $1 \qquad 2x^2$ 

(a) 
$$f(x) = \frac{1 - 3^x}{1 - 5^{1 - x^2}}$$

(b) 
$$f(x) = \frac{1+x}{2^{\cos x}}$$

- (4) A bacterial culture is known to triple every two hours. Suppose there are initially 80 bacteria.
  - (a) How many bacteria are there after 8 hours?
  - (b) How many bacteria are there after t hours?

(5) Prove that the function

$$f(x) = \frac{1 - e^{1/x}}{1 + e^{1/x}}$$

is an odd function.