Name: _____ Date: _____

# Calculus Chapter 3 Test

1) State the Derivative of each of the following functions

a) $y = x^n$

b) $y = e^x$

c) $y = b^x$

d) $y = \sin x$

e) $y = \cos x$

f) $y = \tan x$

#2 – 18 Calculate the derivative of each

1) $f(x) = \frac{x^2 - x + 2}{\sqrt{x}}$

2) $f(x) = (x^2 + 3)^2$

3) $f(x) = x^4 + 3x^{3/2} - 5 - 2x^{-2}$

4) $f(x) = (3x^2 - 5x)e^x$

5) $f(x) = \left(\frac{1}{x^2} - \frac{3}{x^4}\right)(x + 5x^3)$

6) $f(x) = \frac{x^3+3x}{x^2-4x+3}$

7) $f(\theta) = \theta \cos\theta \sin\theta$

8) $f(x) = \frac{\cot x}{e^x}$

9) $f(x) = \sec x$

10) $f(x) = (5x^6 + 2x^3)^4$

11) $f(\theta) = e^{\tan\theta}$

12) $f(x) = \sqrt{1 + xe^{-2x}}$

13) $x^2 - 4xy + y^2 = 4$

14) $e^{\frac{x}{y}} = x - y$

15) $\sin(xy) = \cos(x + y)$

16) $f(x) = \ln(1 + x - x^3)$

17) $f(x) = 2^x \log_2 x$

18) $f(x) = \sqrt{\frac{x-1}{x^4+1}}$

19) If a snowball melts so that its surface area decreases at a rate of $1\ \frac{cm^2}{min}$ find the rate at which the diameter decreases when the diameter is 10 cm.

20) Find the linear approximation of the function $f(x) = \sqrt{1-x}$ at a=0 and use it to approximate the numbers $\sqrt{0.9}\ and\ \sqrt{0.99}$. sketch a graph of the function and its tangent line to illustrate this approximation.