Name: _

Math 151-02, Calculus I – Crawford

Exam 2-A 12 October 2017

	Score	
	1	/10
	2	/12
	3	/12
s, and any unautho-	4	/24
	5	/16
en for written work.	6	/10
	7	/6
	8	/6
	9	/6
	Total	/100

- Calculators, books, notes (in any form), cell phones, and any unauthorized sources are <u>not</u> allowed.
- You may use the attached unit circle.
- Clearly indicate your answers.
- Show all your work partial credit may be given for written work.
- Good luck!

1. (10 pts). If $\cot \theta = -\frac{2}{5}$ and $\frac{3\pi}{2} \le \theta \le 2\pi$, use a right triangle to determine $\sin \theta$.

2. (12 pts). Find <u>all</u> solutions to the following equation.

 $2\sin^2 x = \sin x$

3. (12 pts). Find an equation of the tangent line to $y = \frac{3x^2 - 2x}{x^2 + 1}$ at x = 1.

4. (24 pts). Differentiate the following

(a).
$$s(t) = 3t^4 - 5t - \frac{2}{t^4}$$

(b). $y = x^2 \sec x$

(c). $f(x) = \cos(\sin(4x^2))$

[Do not simplify!]

5. (16 pts). Given the curve $x + x^2y = y^3$, use implicit differentiation to

(a). Find y'.

(b). Find y'' in terms of x and y only.

[You do not need to simplify.]

6. (10 pts). Given $f(x) = \sqrt{3 + x^2}$

(a). Find the differential dy.

(b). Evaluate dy for x = 1 and dx = -0.1.

[Simplify your answer.]

7. (6 pts). If the mass (in g) of a thin metal rod is given by $m(x) = 9 + x^2$,

find the linear density ρ when x = 3 m.

[Include units in your answer.]

8. (6 pts). Boyle's Law states that when a sample of gas is compressed at a constant temperature, the product of the pressure and the volume remains constant:

PV = C Find the rate of change of volume with respect to pressure.

9. (6 pts). The graph below shows the velocity v(t) and acceleration a(t) of a particle at time t.



- (a). Determine the time(s) when the particle is at rest.
- (b). Determine the time interval(s) when the particle is speeding up.