

Quiz 10

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. §4.2 #45 (5 marks) Find the inflection point(s), if any of

$$f(x) = 6x^3 - 18x^2 + 12x - 15$$



$$f'(x) = 18x^2 - 36x + 12$$

$$f''(x) = 36x - 36$$

Possible inflection point
at $f''(x) = 0$

$$0 = 36x - 36$$

$$1 = x$$

	$(-\infty, 1)$	$(1, \infty)$
test point, p	0	2
$f''(p)$	$f''(0) = -36$ -	$f''(2) = 36$ +
concavity		

∴ concavity changes at $x=1$

∴ inflection point at $x=1$

Question 2. §4.2 #61 (5 marks) Find the relative extrema, if any. Use the second derivative test, if applicable.

$$g(t) = t + \frac{9}{t}$$

$$g'(t) = 1 - \frac{9}{t^2}$$

$$g'(t) = \frac{t^2 - 9}{t^2}$$

$$g''(t) = \frac{2t(t^2) - (t^2 - 9)2t}{t^4}$$

$$g''(t) = \frac{18t}{t^4}$$

∴ critical point at
 $t=0$ since derivative
not defined and

$$0 = g'(t)$$

$$0 = \frac{t^2 - 9}{t^2}$$

$$0 = (t-3)(t+3)$$

$$\text{at } t=3, t=-3.$$

Since $g(t)$ is not defined at
 $t=0$, not a relative extrema

$$g''(3) = \frac{18(3)}{3^4} > 0 \quad \therefore \text{a rel. min.}$$

$$g''(-3) = \frac{18(-3)}{(-3)^4} < 0 \quad \therefore \text{a rel. max.}$$

Question 3. (5 marks) Find the equation of the tangent to the function $f(x) = \tan 2x$ at $x = \frac{\pi}{8}$

see test #2