Math 165: 0901 Quiz

Name:_____

Section:_____

(10pt) Let $f(x) = 2x^2 + 3$. Find the average rate of change on the interval $[1, 3]$.

(10pt) Find the following limits:

$$\text{(a) } \lim_{x \to 2} \frac{x^2 - 4}{x^2 - 2x} \qquad\qquad \text{(b) } \lim_{x \to 5} \frac{\sqrt{x + 4} - 3}{x - 5}$$

Math 165: 0929 Quiz

Name:_____

Section:_____

(10pt) Find the derivatives of the following functions:

(a) $\dfrac{\sqrt{s}-1}{\sqrt{s}+1}$

(b) $(4x+3)^4(x+1)^{-3}$

(10pt) Find the tangent line of $f(x) = e^{x^2-x}$ at $x = 1$.

Math 165: 1020 Quiz

Name:_____

Section:_____

(10pt) Find the tangent line of $f(x) = \tan^{-1}(x^3) + 1$ at $x = 1$.

[Hint: Again, you need to find the slope, which is $f'(1)$; and the point is $(1, f(1))$.]

(10pt) You are taking smartphone video of a racecar from a position 100 ft from the track as shown in the diagram. The car is moving at a steady rate of 300 ft/sec. How fast is the angle θ changing as the car passes directly in front of you?

300 ft/sec

racecar
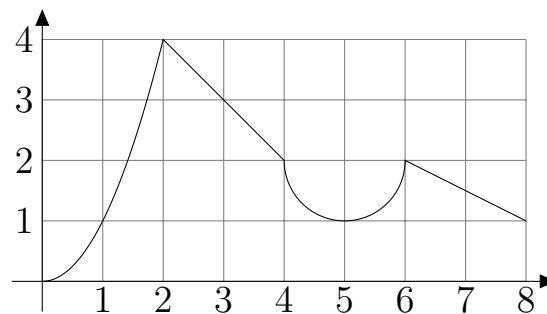
100 ft

θ

You
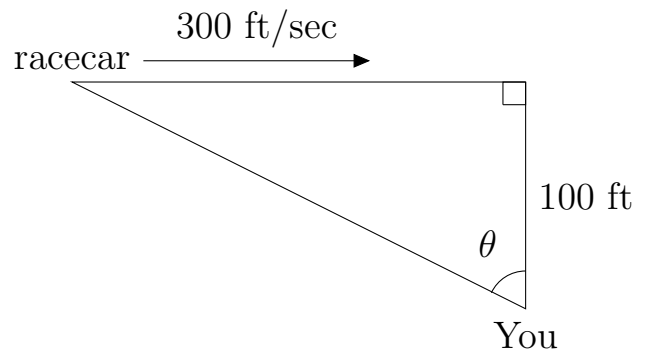
Math 165: 1201 Quiz

Name:_____

Section:_____

(10pt) Let $f(x)$ be the graph drawn below with $f(x) = x^2$ for $0 \leq x \leq 2$. Evaluate the following integrals.

(i) $\int_0^2 f(x)dx$ **(ii)** $\int_2^4 f(x)dx$ **(iii)** $\int_0^4 f(x)dx$

(10pt) Let

$$G(x) = \int_3^x \sin(t^2)dt, \, H(x) = \int_3^{x^2} \sin(t^2)dt, \text{ and } J(x) = \ln(x + H(x)).$$

Find the following.

(i) $\frac{dG(x)}{dx}$ **(ii)** $\frac{dH(x)}{dx}$ **(iii)** $\frac{dJ(x)}{dx}\big|_{x=\sqrt{3}}$

[Question **(iii)** just remind you there is some question type like this. You don't need to answer it during the quiz.]