

1. (10 pts)

~~1. (10 pts)~~ $y = \sqrt{5x^2 - \sin x}$.

~~1. (10 pts)~~ $\frac{d}{dx} \frac{\arcsin(x)}{\sqrt{1-x^2}}$.

~~1. (10 pts)~~ $\int_0^{\ln 3} \frac{e^x}{1+e^{2x}} dx$.

~~1. (10 pts)~~ $\int_1^5 \ln \frac{x}{x+1} dx$ ~~1. (10 pts)~~ $n = 4$

~~1. (10 pts)~~ $\lim_{x \rightarrow 1} 2x \sinh \frac{3}{x}$.

Solution:

~~1. (10 pts)~~ $\frac{d}{dx} \frac{10x - \cos x}{2\sqrt{5x^2 - \sin x}}$:

~~1. (10 pts)~~ $u = \arcsin(x)$, $du = \frac{1}{\sqrt{1-x^2}}$

$$\begin{aligned} \int \frac{\arcsin(x)}{\sqrt{1-x^2}} dx &= \int u \, du \\ &= \frac{1}{2} u^2 + C \\ &= \frac{1}{2} (\arcsin(x))^2 + C \end{aligned}$$

~~1. (10 pts)~~ $u = e^x$, $du = e^x dx$, ~~1. (10 pts)~~ $u = e^{\ln 3}$

$$\begin{aligned}
 \lim_{x \rightarrow 1} 2x \sinh \frac{3}{x} &= \lim_{x \rightarrow 1} \frac{2 \sinh \frac{3}{x}}{\frac{1}{x}} \\
 &= \lim_{x \rightarrow 1} \frac{\cosh \frac{3}{x} \cdot \frac{-6}{x^2}}{-\frac{1}{x^2}} \\
 &= \lim_{x \rightarrow 1} 6 \cosh \frac{3}{x} \\
 &= 6:
 \end{aligned}$$

20

~~8/10/20~~

~~1/1/16~~

$$\begin{aligned}
 & f(x), \text{ at } x = a \\
 & f(x) \text{ on } [-1; 1] \\
 & f(x) = \begin{cases} \geq 2 \sin^{-1}(x) & \text{if } x < \frac{1}{2} \\ c & \text{if } x = \frac{1}{2} \\ > \cos^{-1}(x) & \text{if } x > \frac{1}{2} \end{cases} \\
 & \text{at } c \text{ in } f \text{ at } x = \frac{1}{2}
 \end{aligned}$$

~~16~~ $h^0(x) = \frac{1}{x} - \frac{1}{4}$ ~~16~~ $h^0(x) = \frac{1}{x} - \frac{1}{4}$

~~16~~ $x = 16$, ~~16~~ $x = 16$
~~16~~ $h^0(x) < 0$ ~~16~~ $x > 16$ ~~16~~ $h(x) = \frac{1}{x} - \frac{1}{4}$

~~16~~ $r^0(x) = 2^{\frac{1}{x}} \tan(x) - \frac{1}{4} \tan(x) \sec^2(x)$

~~16~~ $h(x)$ ~~16~~ $h^0(x) = 0$ ~~16~~

~~16~~ $h(x) = \frac{1}{x} - \frac{1}{4}$ ~~16~~ $h^0(x) > 0$ ~~16~~ $0 < x < 16$ ~~16~~
~~16~~ $x = 16$, ~~16~~

~~16~~ $s(x) = \frac{e^{2x}}{3 - e^{2x}}$

~~16~~ $s^0(1) = \frac{e^2}{3 - e^2}$

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~~16~~ $s(x) = \frac{e^{2x}}{3 - e^{2x}}$ ~~16~~

~~16~~ $s^{-1}(x) = \frac{1}{2} \ln \left(\frac{x}{3-x} \right)$

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Solution:

~~16~~

$$s(x) = \frac{e^{2x}}{3 - e^{2x}} \cdot e^{-2x}$$

China

$\frac{1}{1}$

Find $\frac{d}{dt}$

$$\begin{aligned}\frac{d}{dt} &= \frac{\cos^2(\theta)}{9} \frac{d\theta}{dt} \\ &= \frac{(9-15)^2}{9} \cdot 3 \\ &= \frac{3}{25} \text{ rad/s}\end{aligned}$$

At $\theta = 0$,
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