

Final Exam Practice

ANSWERS

- 5
 - $\left\langle -\frac{2}{\sqrt{13}}, \frac{3}{\sqrt{13}} \right\rangle$
 - $\arccos\left(-\frac{9}{\sqrt{481}}\right)$
- $\mathbf{r}(t) = \langle -1 + 3t, 1 + 4t \rangle$ (note that this parametrization is not unique)
- $\left\langle \frac{3}{\sqrt{13}}, \frac{2}{\sqrt{13}} \right\rangle$
- 90J
- neither.
- $-\frac{\sqrt{3}}{2}$
 - 192
 - $\frac{1}{\sqrt{2}}$
- DNE ($-\infty$ as infinite limit)
 - $-\frac{1}{8}$
 - 1
 - 0.5
 - 1
 - 0.5
 - $5/3$
 - 0
 - 0
 - 1
 - 1
 - $\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x} + \frac{1}{x^2}\right)^x$
- $x = 4$
- no vertical asymptotes; $y = 1$ and $y = -1$ are horizontal asymptotes
- $6/25$
 - $y - 1 = \frac{6}{25}(x - 2)$
- $(\ln 2)^5$
 - 32
- $x < \ln 2$
- $\frac{1 - 2xy^3}{3x^2y^2 + 6y + 4}$
 - $\frac{8x + \sin(x + 2y)}{3y^2 - 2\sin(x + 2y)}$
- $\frac{20(x + 5)^3(125 - x^3)}{(x^4 + 625)^2}$
 - $\frac{(\cos x - 1)\cos(x - \sin x)}{\sin^2(x - \sin x)}$
 - $-\frac{5x}{\sqrt{1-x^2}} \tan^4(\sqrt{1-x^2}) \sec^2 \sqrt{1-x^2}$
 - $-\tan x$
 - $-\frac{1}{2\sqrt{t-t^2}} + \frac{5}{1+25t^2}$
- 2; 44
- 56
- $y = 1.5x + \ln 2$
- $(-3, 0)$
- $L(x) = 4 - \frac{3}{4}(x - 3)$
- $\frac{1}{2} \text{cm}^2/\text{min}$
- $\frac{8}{9\pi} \text{cm/s}$
- 13
- $\ln(\ln 2)$
 - $\frac{1}{e - 1}$
 - $2/3$
- $x = t, y = e^2 + 3e^2t.$
- 0.94 h
- 30.2 min
- increasing on $(-1, 0) \cup (2, \infty)$;
decreasing on $(-\infty, -1) \cup (0, 2)$;
local min at $x = -1, 2$; local max at $x = 0$.
- $(0, \infty)$
- $\max_{[-5,1]} f(x) = f(-2) = 21$; $\min_{[-5,1]} f(x) = f(-5) = -60$
- $2\sqrt{x} + \frac{8}{3}x\sqrt{x}$
- $x - 2\cos x - \sin x + 5$
- $24/25$

(b) $-\pi/4$

33. $4\sqrt{\frac{2}{3}} \times \frac{16}{3}$

34. (a) $\frac{1}{2}$

(b) $-\frac{\sin x}{2}$

35. (a) $1209/28$

(b) $b^4/4 + 2b^2 - b$

(c) $146/15$

(d) -3.5

36. 24