

Math 116 Final Fall 17 Answers

1) a) infinitely many

b) $\frac{1 + \cos(2\theta)}{2}$

c) circle

d) $|x| < 1$

e) e^x

2) a) (i) $-10, -9$ are two such points

(ii) $0, 2$ are two such points

(iii) -5 and -17

b) False

c) True

3) a) $(-5\sqrt{2}, 5\sqrt{2})$

b) $(10, 2\pi/3)$ and $(10, 8\pi/3)$ are two possibilities

4) a) $\langle t, f(t) \rangle$

b) $\frac{24 \ln(4) + 36(\ln(4))^2}{(1 + (12 \ln(4))^2)^{3/2}}$

5) $y - 10000 = 50000(\ln(10) + 1)(x - 1)$

6) a) $2\pi \int_1^2 \left(\frac{4t^{3/2}}{3} + 1 \right) \sqrt{(2\sqrt{t})^2 + (t - 1)^2} dt$

b) $\frac{1}{105}(333 + 1088\sqrt{2})\pi$

7) a) 5

b) 2

8) a) $-\frac{1}{9x+54} + \frac{8}{27-9x}$

b) $-8 \ln(2)/9 - \ln(7)/9 + 8 \ln(3)/9 + \ln(6)/9$

9) a) $\lim_{x \rightarrow \infty} \int_0^x f(t) dt$

b) $\frac{4}{s} - \frac{4}{s^2} + \frac{2}{s^3}$

c) $s > 0$

10) Note $f(x) = \frac{\sin(4x)}{4}$, then check.

11) a) $\sum_{n=1}^{\infty} a_n = \lim_{k \rightarrow \infty} S_k$ where $S_k = \sum_{n=1}^k a_n$.

b) $-\pi/4$

12) a) $72 + 128e^{t \ln \sqrt{59/64}}$

b) approximately 22 minutes

13) a) $-8/135$

b) e^{-15}