

Calculus — Problem Set 13

2. $d = 15a$ miles

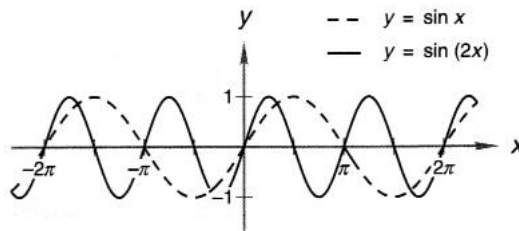
4. $\frac{\pi}{6}$

6. $x = 0, \pi$

10.

$$\begin{aligned} & \frac{\sin(x + \Delta x) - \sin x}{\Delta x} \\ &= \frac{\sin x \cos \Delta x + \cos x \sin \Delta x - \sin x}{\Delta x} \\ &= \frac{\sin x \cos \Delta x - \sin x}{\Delta x} + \frac{\cos x \sin \Delta x}{\Delta x} \\ &= \frac{\sin x (\cos \Delta x - 1)}{\Delta x} + \frac{\cos x \sin \Delta x}{\Delta x} \\ &= \sin x \left(\frac{\cos \Delta x - 1}{\Delta x} \right) + \cos x \left(\frac{\sin \Delta x}{\Delta x} \right) \end{aligned}$$

8.



12. a)

$$\begin{aligned} \tan(A + B) &= \frac{\sin(A + B)}{\cos(A + B)} \\ &= \frac{\sin A \cos B + \cos A \sin B}{\cos A \cos B - \sin A \sin B} \\ &= \frac{\sin A \cos B}{\cos A \cos B} + \frac{\cos A \sin B}{\cos A \cos B} \\ &= \frac{\sin A \cos B}{\cos A \cos B} + \frac{\sin A \sin B}{\cos A \cos B} \\ &= \frac{\tan A + \tan B}{1 - \tan A \tan B} \end{aligned}$$

b) $\frac{4}{3}$

14. a) 1

b) 1

c) 3

16. $x = -2$

18. $\frac{-2}{x(x + \Delta x)}$

20. a) (1.609, 5)

b) (ln 5, 5)

22.

$$DE = \frac{2\sqrt{3}h}{3} \approx 1.1547$$

24. A

Calculus — Problem Set 14

2. $r = \frac{mh}{h-2}$ miles per hour

4. 3

6. $2a$

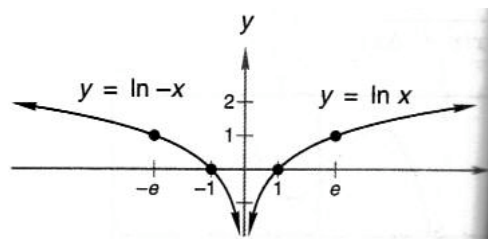
8. $-\frac{1}{4}$

10. Amplitude: 2

Period: $\frac{2\pi}{3}$

Centerline: $y = 4$

12.



14. $\cos x$

16. $x = e^{y-1}$

18. A

20. 1

22. B

24. $\frac{25}{12}$

