

MATH 140A
Fall Semester 2001
Exam II
October 15, 2001

ANSWERS:

1. C; 2. D; 3. D; 4. A; 5. B; 6. A; 7. B; 8. D; 9. E; 10. A; 11. D; 12. D.

13. a. F; b. F; c. T; d. T; e. F.

14. a. i. $\frac{d}{dx} \sin x = \cos x$; ii. $\frac{d}{dx} \cos x = -\sin x$; iii. $\frac{d}{dx} \tan x = \sec^2 x$;

iv. $\frac{d}{dx} \cot x = -\csc^2 x$; v. $\frac{d}{dx} \sec x = \sec x \tan x$; vi. $\frac{d}{dx} \csc x = -\csc x \cot x$.

b.

$$\frac{d}{dx} \csc x = \frac{d}{dx} \frac{1}{\sin x} = \frac{(\sin x \cdot 0) - (1 \cdot \cos x)}{\sin^2 x} = \frac{-\cos x}{\sin^2 x} = -\frac{1}{\sin x} \frac{\cos x}{\sin x} = -\csc x \cot x.$$

15. a. $x = 0, \pi$; b. $x = \frac{3\pi}{2}$; c. $x = \frac{7\pi}{6}, \frac{11\pi}{6}$; d. $x = 0, \pi, \frac{3\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$.

16. $\frac{dy}{dt} = -\frac{3}{5}m/s$, that is, the height of the shadow is decreasing at a rate of $\frac{3}{5}m/s$.