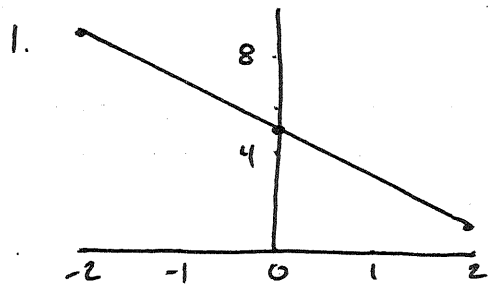


# AP PHYSICS C

## CALCULUS PRACTICE ANSWERS



2. 7.5 m

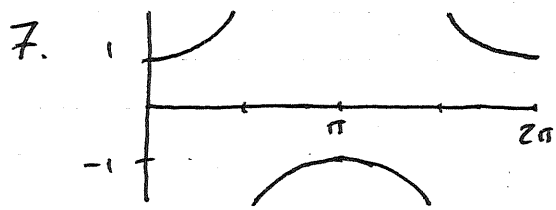
3.  $\langle 19.15, 16.07 \rangle$  m  
 $(18.4 \text{ m/s}, 319^\circ)$

4.  $\cot \theta = \frac{x}{y}$

5.  $\sin^2 \theta + \cos^2 \theta = 1$   
 DIVIDE BY  $\sin^2 \theta$

$$1 + \cot^2 \theta = \csc^2 \theta$$

6. 0.75, 0.6



8.  $+\infty, \frac{1}{\sqrt{2}}, 2$

9.  $x^{ab}$

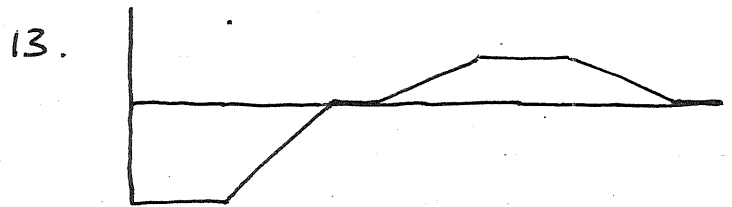
$$\log \frac{x}{y}$$

$$x^{a+b-c}$$

10. FOUR

11.  $-2 \text{ m/s}, 0 \text{ m/s}, -1 \text{ m/s}$

12.  $\frac{dy}{dx} = \lim_{\Delta x \rightarrow 0} \left[ \frac{10(x + \Delta x)^2 - 10x^2}{\Delta x} \right]$   
 $= 10x^2 + 20x \cdot \Delta x + 10\Delta x^2 - 10x^2$   
 $= 20x + 10\Delta x = 20x$



14.  $\frac{dy}{dx} = -15x^2 + 12$

$$\frac{dy}{dx} = 4x^{-2/3}$$

$$\frac{dy}{dx} = -24x^{-3}$$

15.  $(5x^2 + 12x - 20)(-12x^2) + (10x + 12)(-4x^3 + 10)$

16.  $\frac{(x^3)(4x) - (2x^2 - 10)(3x^2)}{x^6}$

17.  $\frac{1}{2}(-5x^2 + 4x)^{-1/2} \cdot (-10x + 4)$

18.  $-5 \sin(x) + 10 \cos(x)$

19.  $-32 \cos(4x)$

20.  $\frac{1}{x} + \frac{3}{x^2}, 10^x \cdot \ln 10 - 2e^{-2x}$

21.  $y' = -36x^2 - \sin(x) + 3e^{3x}$   
 $y'' = -72x - \cos(x) + 9e^{3x}$

22.  $-8x + 16 = 0$   
 $x = 2, \text{ MAXIMUM}$

23. 0 m

$$24. \quad 4 \ln x + 5e^x + \cos(x) + 4x^3 + C$$

$$25. \quad -\frac{1}{3} \cos(6x) + C$$

$$26. \quad \theta \cdot \sin(\theta) + \cos(\theta) + C$$

$$27. \quad \left. -\frac{4}{3}x^3 + 5x^2 + 20x \right|_0^5 = 58.3$$

$$28. \quad \left. 4e^x + \frac{x^2}{2} \right|_0^x = 4e^x + \frac{x^2}{2} - 4$$

$$29. \quad v = \frac{4}{3}t^3 + 10$$

$$s = \frac{1}{3}t^4 + 10t + 50$$

$$30. \quad dV = 4\pi \cdot R^2 \cdot dR$$

$$V = \frac{1}{2} \int_0^R 4\pi \cdot R^2 \cdot dR$$

$$= 2\pi \int_0^R R^2 \cdot dR$$

$$= 2\pi \left[ \frac{1}{3} R^3 \right]_0^R$$

$$= \frac{2}{3} \pi R^3$$