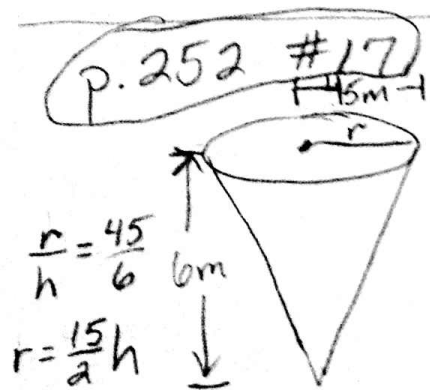


Multiple Choice Packet #3 - ANSWERS

- | | | | | | |
|------|------|------|-------|-------|-------|
| 1. E | 4. B | 7. A | 10. B | 13. D | 16. E |
| 2. A | 5. D | 8. D | 11. E | 14. D | |
| 3. C | 6. A | 9. D | 12. C | 15. D | |

Unit 4B TEST REVIEW Answers

- | | | | |
|------|------|-------|-------|
| 1. F | 5. D | 9. A | 14. B |
| 2. C | 6. C | 10. A | 15. E |
| 3. B | 7. B | 11. C | 16. E |
| 4. A | 8. B | 12. B | |
| | | 13. A | |



Given:

$$\frac{dV}{dt} = -50 \text{ m}^3/\text{min}$$

$$V = \frac{1}{3}\pi r^2 h$$

$$V = \frac{1}{3}\pi \left(\frac{15}{2}h\right)^2 h$$

$$V = \frac{1}{3}\pi \frac{225}{4} h^3$$

$$V = \frac{75}{4}\pi h^3$$

@ $\frac{dh}{dt} = ?$ when $h = 5 \text{ m}$

$$\frac{dV}{dt} = \frac{75.3}{4}\pi h^2 \frac{dh}{dt}$$

$$-50 = \frac{225}{4}\pi (5)^2 \frac{dh}{dt}$$

$$\frac{dh}{dt} = -\frac{50.4}{225\pi \cdot 25} = -0.11318 \text{ m/min}$$

$$\frac{dh}{dt} = -1.132 \text{ cm/min}$$

"Falling" at a rate of 1.132 cm/min

(b) $\frac{dr}{dt} = ?$ when $h = 5 \text{ m}$

$$r = \frac{15}{2}h$$

$$\frac{dr}{dt} = \frac{15}{2} \frac{dh}{dt} = \frac{15}{2} \left(-\frac{8}{225\pi} \right) = -\frac{4}{15\pi} = -0.08488 \text{ m/min}$$

$$\boxed{\frac{dr}{dt} = -8.488 \text{ cm/min}}$$

$$\textcircled{23} \quad y = f(x) = \frac{10}{1+x^2} = 10(1+x^2)^{-1} \quad \frac{dy}{dt} = -10(1+x^2)^{-2} (2x) \frac{dx}{dt}$$

$\frac{dx}{dt} = 3 \text{ cm/sec}$ find $\frac{dy}{dt}$ at point where:

(a) $x = -2$

$$\frac{dy}{dt} = -10(1+4)^{-2} (-4)(3)$$

$$= \frac{-10}{25} (-12) = \frac{2}{5} (12) = \boxed{\frac{24}{5} \text{ cm/sec}}$$

(b) $x = 0$

$$\frac{dy}{dt} = -10(1)^{-2} (0)(3) = \boxed{0 \text{ cm/sec}}$$

(c) $x = 20$

$$\frac{dy}{dt} = -10(1+400)^{-2} (40)(3)$$

$$= \frac{-10}{(401)^2} (120) = \boxed{-.00746 \text{ cm/sec}}$$