

Answer Key for 41st MMPC Part I exam

1. d) $\frac{\pi(1.1r)^2}{\pi r^2} = 1.21$ 2. d) New area = $(0.7)^2$ old area 3. e) $(-1)^{11} = -1, (-1)^{n1} = 1, n > 1$

4. c) $\binom{12}{2}$ 5. a) 6. b) $\frac{1/3\pi r^2 h - 1/3(1/2r)^2(1/2h)}{1/3\pi r^2 h}$ 7. e) Definition of hyperbola

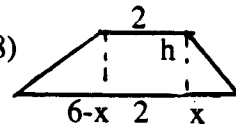
8. a) $1997 = 3 \cdot 665 + 2 = 3[3 \cdot 221 + 2] + 2$ etc. 9. e) $9x^2 + 1 = (9x + 1)^2$

10. a) $a^{1/2} = 6$ 11. d) Straight line in each quadrant

12. b) $275 = 11 \cdot 5 \cdot 5, 546 = 2 \cdot 3 \cdot 7 \cdot 13, 819 = 3 \cdot 3 \cdot 7 \cdot 13, 875 = 5 \cdot 5 \cdot 5 \cdot 7, 988 = 2 \cdot 2 \cdot 13 \cdot 19$

13. c) look at first 2 coins $\frac{4+6+6+4}{2^6}$ 14. b) square both sides twice and check

15. b) polynomial = $2(x-2)(x-3)(x-5)$ 16. a) Area = $1/2 h (2+8)$



17. d) $1 - 2\cos^2 A = \cos A$ 18. c) $\frac{14}{\pi 6^2} = \frac{A}{\pi 8^2}$ 19. e) $4 = 8^{2/3}, 3 = 9^{1/2}$

20. c) $b^2 = c(a+1) = a(c+2)$ so $c = 2a$ and $2b = 3a$ and $b^2 = 2/3b(4/3b+2)$

21. b) $2\pi \cdot 1.5N = 4 \cdot 5280$ 22. c) $D/d + D/4 = 1.5$

23. a) $x = \frac{-b + \sqrt{b^2 - 4ac}}{2a} = \frac{-b + c - a}{2a}$ 24. c) $\frac{x}{y^3} = 10^6$

25. a) $kx^2 + mx - k$ has no solution if $m^2 - 4k^2 < 0$

26. e) $\frac{5+5}{6^2}$ 27. c) Let $r = 1 \frac{14(1/2)\sin\frac{360^\circ}{14}\cos\frac{360^\circ}{14}}{\pi}$

28. b) $D = rt. 200 \cdot 1000 (1/3600) t = 400$ 29. d) If $x > 0$ then $x < 2.5$ and if $x < 0$ then $x > -5$

30. b) $t/6 + (t-1)/4 + (t-1.5)/3 = 1$ 31. d) $x-4 = 2(y-4)$ and $x+7+y+7 = 79$

32. b) Area = $1/2 FG (3+1)$ and $FG = \sqrt{16-4}$ 33. c) $\theta = \frac{s}{r} = \frac{1318}{3975} \frac{180}{\pi}$

34. e) Take tangent of both sides to get $\frac{M+N}{1-MN} = \sqrt{3}$

$$35. c) \frac{n(n+1)(2n+1)}{6} / \frac{n(n+1)}{2} \quad 36. e) \frac{1}{\cos A} = \tan^2 A$$

37. a) Mary doesn't play golf so Jim doesn't play tennis. Jim plays tennis and Bob doesn't play tennis is false. So Bob plays tennis and Ed doesn't play tennis is true.

$$38. e) \text{Area} = \frac{4\pi}{8} - \frac{\pi}{4} - \frac{1}{2} \quad 39. b) x^2 = 2 + x$$

$$40. b) \frac{1/2 \cdot 2\sqrt{3} - 3\pi/6}{\sqrt{3}}$$