Meet 5 Answers

1. Algebraic Fractions with Factoring

November 1988

1. $\dfrac{-2}{(x+1)(x-1)}$
2. $-\dfrac{1}{5}$
3. $\dfrac{5}{13}$

November 1989

1. $\dfrac{w}{w-2}$
2. **All Reals, x ≠ 0, 1, 3**
3. $c = 5 \ \ or \ \ -5-b-d$

November 1991

1. $\dfrac{x(x+3)}{(x-5)(x+1)}$
2. **2**
3. **1,** $\dfrac{3 \pm \sqrt{13}}{2}$

November 1992

1. $\dfrac{x^2-6x-18}{(x-3)(x+2)(x-1)}$
2. **30**
3. **A = 1/12, B = -7/4, C = 5/3**

November 1993

1. $-\dfrac{3}{2} \ \ or \ \ -\dfrac{1}{2}$
2. $1\dfrac{5}{8}$
3. $\dfrac{3}{7} \ \ or \ \ \pm\dfrac{\sqrt{10}}{2}$

March 1995

1. **A = 1, B = -4, C = 7**
2. **15**
3. $\dfrac{(1-2x)}{(x-1)}$

March 1996

1. $\dfrac{1}{(x-1)}$
2. $0 \ \ or \ \ -2\dfrac{4}{5}$
3. **A = 4, B = 3, C = 7**

March 1997

1. $-14\dfrac{2}{3} \ \ or \ \ -\dfrac{44}{3}$
2. **3 or -1**
3. $1\dfrac{1}{2}$ min

March 1998

1. $\dfrac{a-10b}{a+2b}$
2. $(x-2y)(x+2y)(a-3)(a+3)$
3. **12**

March 1999

1. $\dfrac{1}{4}$
2. $\dfrac{7}{13}$
3. $\dfrac{3}{2}$

March 2000

1. $\dfrac{4x+5}{4x^3-3x^2}$
2. $\dfrac{2x^2+x-11}{(x-1)(x-2)(x+2)(x-3)}$
3. $6, \dfrac{25}{7}$

March 2001

1. **–x – 3**
2. $(16x-9y)(8z-3x)$
3. **7 or -1**

March 2002

1. **2**
2. **6**
3. **0, -1, 4**

March 2003

1. $\frac{1}{x^2}$
2. **7**
3. **17, 44**

March 2004

1. $\frac{x^2+4x+12}{x(x+2)(x+3)}$ *or* $\frac{x^2+4x+12}{x^3+5x^2+6x}$
2. **15 hours**
3. $-\frac{2}{3}$

March 2005

1. **(2x + 5)(2x + 1)**
2. **1**
3. **4 or** $\frac{11}{7}$

March 2006

1. $\frac{7}{5}$
2. **9**
3. $\frac{2}{5}$

March 2007

1. **-1**
2. **C = 4, D = 2**
3. $\frac{-4x^2+xy-4x}{x-4}$

March 2008

1. **±2**
2. **-24 or 60**
3. **4**

March 2009

1. **-2 or -3**
2. **-1**
3. $2x^2-3x$

March 2010

1. $\frac{2x+5}{2x^2+6x+2}$
2. $\frac{x+10}{x-3}$
3. **1/5 or 8**

March 2011

1. **5**
2. $\frac{x^n-y^n}{x^n+4y^n}$
3. **-2 or ½**

March 2012

1. $\mathbf{24x^8y^7z^7}$
2. $\frac{3x+1}{x-3}$
3. **3**, **-3/2**

March 2013

1. $\frac{3x^2+3x}{4x+2}$
2. $\mathbf{x^3-3x^2}$
3. **4** or **x = 4**

March 2014

1. $\frac{1}{x+3}$
2. **14**
3. **15 or -4**

2. Trigonometric Equations and Identities

March 1989

1. $\dfrac{\sqrt{6}-\sqrt{2}}{4}$
2. **-4**
3. π

March 1990

1. $2\sin^2 x - 1$
2. **0**
3. $\left\{\dfrac{\pi}{2}, \dfrac{7\pi}{6}\right\}$

March 1992

1. $15\sqrt{3}$ **(feet)**
2. **-2/3 or 1**
3. $\dfrac{\pi}{4}$ **or** $\dfrac{3\pi}{4}$

March 1993

1. $\dfrac{2-\sqrt{3}}{10}$
2. **120º**
3. **38º21', 104º47', 218º21', 284º47'**

March 1994

1. $\dfrac{4\pi}{3}$ *or* $\dfrac{5\pi}{3}$
2. **0º, 45º, 180º**
3. $45^\circ \le x \le 90^\circ \quad 135^\circ \le x \le 180^\circ$
   $225^\circ \le x \le 270^\circ \quad 315^\circ \le x \le 360^\circ$

March 1995

1. $\dfrac{\pi}{4}, \dfrac{3\pi}{4}, \dfrac{5\pi}{4}, \dfrac{7\pi}{4}$
2. $\dfrac{x\sqrt{2}-\sqrt{2-2x^2}}{2}$
3. $\sin y + \cos y$

March 1996

1. **20º, 340º**
2. $2\csc x$
3. $135^\circ,\ 315^\circ,\ 21^\circ 48',\ 201^\circ 48'$

March 1997

1. $\sec x$
2. **900º**
3. $3i \pm \dfrac{3}{2},\ \sqrt{3} - \dfrac{3}{2}i$

March 1998

1. **30º, 90º, 150º, 270º**
2. $2\tan^2 \sigma$
3. **60º, 210º, 300º, 330º**

March 1999

1. $\csc x$
2. $\dfrac{3}{5}$
3. $90^\circ n$ *or* $\dfrac{\pi}{2}n$ $\left(n \text{ is an integer}\right)$

March 2000

1. $\dfrac{4}{15}$
2. $\dfrac{\sin(x+y)}{\sin(x-y)}$
3. $\dfrac{\pi}{8}, \dfrac{3\pi}{8}, \dfrac{5\pi}{8}, \dfrac{7\pi}{8}$

March 2001

1. **3**
2. $\cot x$
3. **-4**

March 2002

1. $2\sec^2 x$
2. **45º, 90º, 225º, 270º**
3. $\dfrac{\pi}{3}, \dfrac{2\pi}{3}, \dfrac{4\pi}{3}, \dfrac{5\pi}{3}, \dfrac{\pi}{4}, \dfrac{3\pi}{4}, \dfrac{5\pi}{4}, \dfrac{7\pi}{4}$

March 2003

1. **45º**
2. $\dfrac{1}{2}$
3. **105º and 345º**

March 2004

1. **60, -60, 300, -300**
2. $\frac{\sqrt{2}}{4}$
3. $40, 80, 160 \text{ or } \frac{2\pi}{9}, \frac{4\pi}{9}, \frac{8\pi}{9}$

March 2005

1. **45º 225º**
2. **6**
3. $4\sin\theta$

March 2006

1. **30º, -30º**
2. $\sin^2\phi$
3. **30º, 150º, 120º, -120º**

March 2007

1. $\sec x$ or $\frac{1}{\sin x}$
2. $90^\circ k,\ k \in I$ or $\frac{\pi k}{2},\ k \in I$
3. $-2-\sqrt{3}$ or $-\sqrt{7+4\sqrt{3}}$

March 2008

1. $\frac{7\pi}{6}, \frac{11\pi}{6}$
2. $\frac{31}{25}$ or $1\frac{6}{25}$ or 1.24
3. **60º or 300º**

March 2009

1. **-1**
2. $\tan\theta = \frac{\sqrt{1-a^2}}{a}$
3. $\csc\left(\frac{180^\circ}{n}\right)$ or $\csc\frac{\pi}{n}$

March 2010

1. $\tan\theta$
2. **30° or 150°**
3. **0°, 90°, 180°, 22 ½°, 67 ½°, 112 ½°, 157 ½°**

March 2011

1. $\frac{\sqrt{3}}{2}$
2. **13/84**
3. $\sin x$ or $\frac{1}{\csc x}$

March 2012

1. $\frac{\pi}{6}$
2. **44/125**
3. **0º, 60º, 180º, 300º**

March 2013

1. **240º or 300º** or **240 or 360**
2. $\pm\frac{\sqrt{5}}{2}$
3. **π/3 or 2π/3**

March 2014

1. **8/17**
2. **1 -** $\sqrt{2}$ or $-\sqrt{3-2\sqrt{2}}$
3. **30º, 45º, 210º, 225º** (mistake in problem, though)

3. Circles and Spheres

March 1989

1. **75**
2. $40 - 10\sqrt{7}$
3. **6**

March 1990

1. **40°**
2. **65π**
3. $3\sqrt{7}$

March 1992

1. **55**
2. **40**
3. $\frac{5\sqrt{3}}{2}$

March 1993

1. **56**
2. $5\sqrt{5} - 5$
3. **18**

March 1994

1. **6**
2. **61.22**
3. **10.2**

March 1995

1. **5**
2. **4**
3. $8\frac{2}{3}$

March 1996

1. **60°**
2. $2\frac{2}{3}$
3. $12\sqrt{5}$

March 1997

1. **122°**
2. $133\frac{1}{3}\pi \quad or \quad \frac{400\pi}{3}$
3. $24\sqrt{3} + 28\pi$

March 1998

1. **40**
2. $40\frac{6}{7}$
3. $4\sqrt{37}$

March 1999

1. $\frac{5\pi}{3}$
2. **4**
3. $\frac{2\sqrt{3} - 3}{3}$

March 2000

1. **4π**
2. **40**
3. $2\sqrt{286}$

March 2001

1. **25°**
2. **320**
3. $8\sqrt{3}$

March 2002

1. **12**
2. **24**
3. **5**

March 2003

1. **39°**
2. **12**
3. **9**

March 2004

1. **π**
2. **22.5**
3. $5\sqrt{6}$

March 2005

1. **2π**
2. **27**
3. **137.5**

March 2006

1. **11**
2. $5\sqrt{17}$
3. $6\sqrt{9-2\sqrt{15}}$

March 2007

1. $\frac{\sqrt{3}}{3}$
2. $\frac{\sqrt{3}}{2}e$
3. **13.5**

March 2008

1. **50°**
2. **25**
3. $\frac{\sqrt{3}}{1}$ or $\sqrt{3}:1$

March 2009

1. **140**
2. **148**
3. $20\sqrt{2}-20$

March 2010

1. **21°**
2. **15**
3. $\frac{120}{17}$

March 2011

1. **100**
2. **8π**
3. **17**

March 2012

1. **90º**
2. $6\frac{2}{3}$ or **20/3**
3. $16+\frac{16\sqrt{6}}{3}$

March 2013

1. **62** or **62º**
2. $\frac{1}{\pi}$
3. $\frac{3\sqrt{13}}{13}$

March 2014

1. **220º**
2. **2 or 5**
3. $13\frac{4}{17}$ or **225/17**

4. Conics

March 1989

1. **y = ±2(x + 3)**
2. $x^2 + y^2 = \frac{1}{2}$
3. **(4, 9), (8, 0)**

March 1990

1. $4\sqrt{10}$
2. $\frac{(y-2)^2}{25} - \frac{2(x-3)^2}{75} = 1$
3. $(x-2)^2 + (y+3)^2 = 16$

March 1992

1. **2**
2. **2x – 3y + 17 = 0, 2x + 3y – 13 = 0**
3. $\frac{(x-7)^2}{225} + \frac{(y+5)^2}{289} = 1$

March 1993

1. $2\sqrt{13}$
2. $\frac{(x+7)^2}{9} + \frac{(y-1)^2}{4} = 1$ **and** $\frac{(x+1)^2}{9} + \frac{(y-1)^2}{4} = 1$
3. $y = -\frac{1}{3}x - \frac{5}{3}$

March 1994

1. **-137**
2. $(y-3)^2 = 6(x+2)$
3. $x^2 + y^2 = 1.027$

March 1995

1. $6\sqrt{3}$
2. $\frac{\sqrt{73}}{2}$
3. $\frac{x^2}{8} - \frac{(y-8)^2}{64} = 1$

March 1996

1. **(5, -6), (1, -6)**
2. $(x-3)^2 = -12(y+1)$ *or* $y = -\frac{1}{12}x^2 + \frac{1}{2}x - \frac{7}{4}$
3. $\frac{(x-5)^2}{25} + \frac{(y+3)^2}{9} = 1$

March 1997

1. **6**
2. **(0, -2)**
3. $(x-3)^2 = -8(y-1)$ and $(x-3)^2 = 8(y+3)$

March 1998

1. $(0 \pm 4\sqrt{5})$
2. **(2, -2)**
3. $x^2 + y^2 - 18x - 20y + 81 = 0$

March 1999

1. **(3, -1)**
2. $9x^2 + 25y^2 - 72x - 100y + 19 = 0$
3. $3x^2 - y^2 - 12 = 0$

March 2000

1. $\left(2, \frac{1}{2}\right)$
2. $\frac{(x-4)^2}{144} + \frac{(y-6)^2}{36} = 1$
3. $\frac{(x-5)^2}{16} - \frac{(y+3)^2}{4} = 1$

March 2001

1. $(0 \pm 2\sqrt{3})$
2. $\frac{(x+3)^2}{64} - \frac{(y-5)^2}{225} = 1$
3. $\left(-1\frac{1}{13}, 11\frac{8}{13}\right)$ and $\left(-1\frac{1}{13}, 2\frac{5}{13}\right)$

March 2002

1. **(12, 3), (4, 3)**
2. $\frac{y^2}{16} - \frac{x^2}{36} = 1$
3. $(x-12)^2 + (y-5)^2 = 25$

March 2003

1. **40**
2. $\frac{\sqrt{89}}{8}$
3. $x^2 + 3y^2 - 4x - 18y - 5 = 0$

March 2004

1. **(2, 3)**
2. $x^2 + 6x + 20y + 49 = 0$
3. $(x+3)^2 + (y-2)^2 = 16$ or $x^2 + y^2 + 6x - 4y - 3 = 0$

March 2005

1. **-39**
2. $x^2 = -\frac{8}{3}y$
3. **4.5**

March 2006

1. **(4, 0), (-4, 0)**
2. $25x^2 + 4y^2 + 100x - 40y + 100 = 0$
3. $y^2 - 20x - 10y + 105 = 0$ or $(y-5)^2 = 20(x-4)$

March 2007

1. **Center: (2, -5), Radius: 6**
2. **66**
3. $\frac{(x-5)^2}{36} + \frac{(y-2)^2}{32} = 1$

March 2008

1. $x^2 + y^2 = 25$
2. $\frac{(x+8)^2}{1} - \frac{(y+4)^2}{3} = 1$
3. $(x-3)^2 + (y-4)^2 = 25$

March 2009

1. $x^2 + y^2 = 85$
2. **(5, -6), (5, 0)**
3. $\frac{(y-6)^2}{400} - \frac{(x+7)^2}{256} = 1$

March 2010

1. **(±25, 0)**
2. $\frac{(y-5)^2}{16} - \frac{(x+3)^2}{4} = 1$ or $4x^2 - y^2 + 24x + 10y + 27 = 0$
3. $(x+1)^2 + (y-3)^2 = 16$ or $x^2 + y^2 + 2x - 6y - 6 = 0$

March 2011

1. $\frac{x^2}{100} + \frac{y^2}{36} = 1$
2. $9x^2 + 25y^2 = 900$
3. $y = x^2 - x$ or $\left(x - \frac{1}{2}\right)^2 = y + \frac{1}{4}$

March 2012

1. **(-3, 6), (-3, -6)**
2. $\frac{(x-1)^2}{16} + \frac{(y-3)^2}{25} = 1$ or $25x^2 + 16y^2 - 50x - 96y - 231 = 0$
3. $\frac{(y+8)^2}{36} - \frac{(x-4)^2}{9} = 1$ or $y^2 - 4x^2 + 16y + 32x - 36 = 0$

March 2013

1. **5**
2. **-4096**
3. $\frac{(x+3)^2}{16} - \frac{(y-5)^2}{4} = 1$ or **$x^2 - 4y^2 + 6x + 40y - 107 = 0$**

March 2014

1. **$x^2 + y^2 = 61$**
2. $\sqrt{15}/4$
3. **(14, -5), (-6, -5)**

5. Arithmetic with Statistics

March 1997

1. **27**
2. **a = 157, b = 3 (smallest)** but **a=71, b=89 (smallest positive)**
3. **1024/5** or **204.8 (seconds)**

March 1999

1. **Peg** $\frac{1}{48}$
2. **19**
3. **68**

March 2000

1. **24321_5**
2. **5**
3. **4.07**

March 2001

1. **125**
2. **6**
3. **61**

February 2002

1. **12**
2. **2 : 1**
3. **10**

March 2003

1. **.00047**
2. **12.08 or 13.51 or 13.81 or 0**
3. **50**

March 2004

1. **1**
2. **17**
3. **121.067**

March 2005

1. **6**
2. **2**
3. **50**

March 2006

1. $First: \frac{47}{63}$ $Last: \frac{63}{89}$
2. **13**
3. **47**

March 2007

1. **123**
2. **14, 15, 19, 21, 21, 24**
3. **n + m**

March 2008

1. **15**
2. **110**
3. **6**

March 2009

1. **31 and 35**
2. **17**
3. **57**

March 2010

1. **1.2 lower**
2. **$120{,}003_4$**
3. **10, -14 and -2**

March 2011

1. **6, 12, 12, 12, 18** or **7, 10, 12, 12, 19** or **5, 12, 12, 14, 17**
2. **77.2**
3. **1/2**

March 2012

1. **155**
2. **97**
3. **8**

March 2013

1. **35**
2. **85**
3. **3/23** or **0.1304**

March 2014

1. $35\frac{2}{3}$ or **107/3** (16 2/3 appealed)
2. **431** or **431_6** or **431 base 6**
3. **32**