MIAMI SUNSET INVITATIONAL PRE-CALCULUS JANUARY, 1998
TEAM SOLUTIONS

1. **21** Rewrite equation as
$(x-1)^2 + (y-6)^2 = 25$
From (-9,30) to (1,6) is 26.
Subtract the radius length.

2. **18** The terms are:
1, 4, 5, 9, 14, 23, 37, 60
97, 157, 254, 411, 665, 1076
1741, 2817, 4558, 7375
7375 is the 18th term

3. $\mathbf{a^2 + b^2 + 2a}$ $a^{12} - b^{12} =$
$(a^6+b^6)(a^6-b^6) =$
$((a^2)^3+(b^2)^3)(a^3+b^3)(a^3-b^3) =$
When factored further, the three binomial factors are
$(a^2+b^2)(a+b)(a-b)$

4. **7** This is best solved by using a graphing calculator.
Notice that the two graphs have 7 points in common.

5. **1998** $a_1 = 8$
$a_1 + a_2 = 26$
$a_2 = 18$; hence d = 10.
$a_{200} = 8 + 199(10) = 1998$

6. **14/3** A: (0,10/3) to 4x+3y+25=0
35/5 = 7
B: 10/3 +25/3 = 35/3
B-A = 35/3 -21/3 = 14/3

7. **19.2** A vertex of the square is (x,x).
$16x^2 + 9x^2 = 144$; $x = 12/5$.
Perim. of square: (8)(12/5)= 19.2

8. **-17** $x^2 +9x +19=1$; x=-6 or -3
$x^2 -x-2=0$; x=2 or -1
$x^2 +9x+19=-1$ and exponent is even.
x=-5 or -4
-6 -3 +2-1-5-4= -17

9. **73** A: rectangle, (5)(6) = 30
B: 4 triangles, (4)(0.5)(4)(4)=32
C. circle, 3π
D. ellipse, $(0.5)(1)\pi$
Sum: 72.99...

10. **154** A = 11!/[2 x 2 x 2]
$= 180^2 \times 154$

11. **1.3** h tan 55 = x

h tan 40 = 3 - x

h = 3/(tan 55 + tan 40) = 1.32...

12. $x^{10} = \dfrac{x\left(1 + x + x^2 + \ldots + x^8\right)}{x^{-9}\left(1 + x + x^2 + \ldots + x^8\right)}$

13. **0.5** $(x+y)^2 = 12 + 2xy$

$16 = 12 + 2xy$

$2 = xy$

$\frac{x+y}{xy} = \frac{1}{a} = \frac{4}{2}$

14. $\frac{\pi}{4}$ $\sqrt{\sin\theta\cos\theta} = \sin\theta$

$\sin\theta\cos\theta = \sin^2\theta$

$\sin\theta(\cos\theta - \sin\theta) = 0$

$\sin\theta = 0$ or $\tan\theta = 1$

Reject $0, \pi, \frac{5\pi}{4}, 2\pi$

15. $x \geq \frac{-3}{2}$ $|2x + 3| = 2x + 3$

$2x + 3 \geq 0$

$x \geq \frac{-3}{2}$