TEST YOUR SKILLS

1 **TEST** Given a circle centered at (3; 4) that passes through point (7; 1), which of the following is the equation of the tangent line to the circle at point (7; 1)?

A $4x - 3y = 25$
B $3x + 4y = 25$
C $3x - 4y = 17$
D $4x + 3y = 31$
E None of these.

(USA *North Carolina State High School Mathematics Contest*, 2004)

2 What is the y-component of the center of the circle which passes through $(-1; 2)$, $(3; 2)$ and $(5; 4)$?

(USA *Lehigh University: High School Math Contest*, 2001)

[6]

3 Find the equation of the circle that has a diameter with endpoints (1; 1) and (7; 5).

(USA *Southern Illinois University Carbondale*, Final Exam, 2003)

[$x^2 + y^2 - 8x - 6y + 12 = 0$]

4 **TEST** Consider the circles with radii $4\sqrt{5}$ and which are tangent to the line $x - 2y = 20$ at the point $(6; -7)$. The sum of the x coordinates of the centers of the circles is:

A 12.
B -14.
C 3.
D -5.
E 2.

(USA *North Carolina State High School Mathematics Contest*, 2004)

5 Classify the curve $\frac{x^2}{4} + \frac{y^2}{36} = 1$ as one of parabola, ellipse, or hyperbola. Sketch the graph, with foci and vertices clearly labeled. [ellipse]

6 Another way to define eccentricity for a hyperbola or an ellipse is $e = \frac{c}{a}$. Find the eccentricity of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$.

(USA *Central Lake College*, Worksheet)

$\left[e = \frac{3}{5}\right]$

7 **TEST** How many points do the graphs of $4x^2 - 9y^2 = 36$ and $x^2 - 2x + y^2 = 15$ have in common?

A 0
B 1
C 2
D 3
E 4

(USA *University of South Carolina: High School Math Contest*, 2000)

GLOSSARY

circle: circonferenza
conic: curva conica
eccentricity: eccentricità
ellipse: ellisse
endpoint: estremo
focus (foci): fuoco (fuochi)
graph: grafico
hyperbola: iperbole
radium (radii): raggio (raggi)
tangent line: retta tangente