

**Math Relays 2018**  
**Analytic Geometry**

Shade the letter of the correct answer on the answer sheet. No calculators are allowed on this test.

In 1-10 use one of the following as an answer in identifying the curve:

(a) parabola, (b) ellipse, (c) hyperbola (d) a pair of intersecting lines, (e) none of these

1.  $x^2 + 3y^2 + 4x + 6y = 0$

2.  $3x - 5y^3 - 10 = 0$

3.  $\frac{x^2}{2} = 2y^2 + 3$

4.  $y + 3 + xy + 3x = 0$

5.  $4x^2 + x + y^2 + y + 2 = 0$

6.  $20 - (x + y)(x - y) = 0$

7.  $(x + 1)^2 + \sqrt{(y - 1)^2} = 0$

8.  $x^2 - y^2 + 8x - 12y = -50$

9.  $y^2 = x^4$

10.  $2x - 2y = y^2 + 1$

In 11-20 choose the center of the figure:

(a)  $(2, -1)$ , (b)  $(-1, 1)$ , (c)  $(1, 1)$ , (d)  $(1, -1)$ , (e) none of these

11.  $3x^2 = 4 - 2y^2$

12.  $3(x + 1)^2 + (y - 1)^2 = 16$

13.  $x^2 + y^2 + 2x - 20y = 11$

14.  $3x^2 + y^2 + 6x - 2y = 8$

15.  $x^2 - y^2 = 2x + 2y + 4$

16.  $y - x = 1 - xy$

17.  $(y + 1)^2 + \sqrt{(x - 2)^2} = 0$

18.  $|x - 1| = 1 - |y - 1|$

19.  $4x^2 + 5y^2 - 24x + 40y = -50$

20.  $18x^2 - 18^2 + 6y^2 - 6^2 = 48$

In 21-25 give the equation of the asymptotes from the following:

(a) no asymptotes, (b)  $xy = 0$ , (c)  $2|y| = |x - 1|$ , (d)  $|y| = 2|x|$ , (e) none of these

21.  $x^2 + 2x = y - 1$

22.  $\frac{x^2}{25} - \frac{y^2}{100} = 1$

23.  $\frac{(x-1)^2}{4} - y^2 = 1$

24.  $\frac{(x-1)^2}{4} = y^2 - 1$

25.  $xy = 10$