

Math Relays 2016
Analytic Geometry

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

In 1-5 name the conic section:

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

1. $(x + y)(x - y) = 16$

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

3. $x^2 - 2x + 2xy + y + y^2 + 2 = 0$

4. $xy + 2x - y = 2$

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

In 6-10 name the geometric figure in the three dimensional space:

(a) two planes, (b) plane, (c) cone, (d) cylinder, (e) none of these

6. $yz = 0$

7. $x^2 + y^2 = 1$

8. $(x + y + z)^3 = 1$

9. $x^2 + y^2 - 2z^2 = 0$

10. $x^2 + y^2 + z^2 = 9$

In 11-15 choose the center of the figure:

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

11. $xy + y - x = 1$

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

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

14. $|x - 1| + |y - 1| = 1$

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

In 16-20 find a vertical asymptote from the following:

(a) none, (b) $x = -2\pi$, (c) $x = 4$, (d) $2x + 1 = 0$, (e) none of these

16. $y = x^2 + 4x + 4$

17. $y = \cot(2x + 4\pi)$

18. $y = \frac{1}{1 + \frac{1}{1 + \frac{1}{x}}}$

19. $y = (\ln |x - 4|)^2$

20. $xy = 4$