"What do you get when you cross a rabbit with a kilt?"

Write an equation for a parabola in standard form: $y = a(x-h)^2 + k$. The answer to each problem will match a letter that will allow you to figure out the joke.

1. $y = x^2 - 4x + 3$

2. $y = 3x^2 + 12x - 7$

3. $y = x^2 + 10x + 30$

4. $y = 4x^2 - 12x + 23$

5. $2y - 2 = x^2 + 8x$

6. $x^2 + 8x - 3y + 1 = 0$

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

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

9. $7y - 4 = 8x^2 - 24x$

C: $y = \frac{-1}{4}(x - 2)^2$

H: $y = (x + 5)^2 + 5$

S: $y = 4\left(x - \frac{3}{2}\right)^2 + 14$

P: $y = \frac{1}{4}(x + 3)^2 - 2$

T: $y = (x - 2)^2 - 1$

H: $y = \frac{8}{7}\left(x - \frac{3}{2}\right)^2 - 2$

O: $y = 3(x + 2)^2 - 19$

C: $y = \frac{1}{3}(x + 4)^2 - 5$

O: $y = \frac{1}{2}(x + 4)^2 - 7$

9	2	7	4	8	5	1	6	3

"What do you get when you cross an Indian with a cow?"

Find the vertex, the focus, and the directrix of each parabola. The answer to each problem will match a letter that will allow you to figure out the joke.

1. $y - 7 = -2(x - 3)^2$

2. $y - 29 = \frac{1}{16}(x - 3)^2$

3. $y = 4(x - 2)^2$

4. $y = \frac{1}{4}x^2$

5. $x - 2 = \frac{1}{12}(y - 1)^2$

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

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

8. $4y - 12 = x^2 + 8x$

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

I: $V(2,0), F\left(2,\frac{1}{16}\right)$, dir.: $y = {}^{-1}/_{16}$

O: $V(-4,-1), F(-4,0)$, dir.: $y = -2$

M: $V(0,0), F(0,1)$, dir.: $y = -1$

O: $V(2,-3), F(0,-3)$, dir.: $x = 4$

E: $V(3,7), F(3,6\,{}^{7}/_{8})$, dir.: $y = 7\,{}^{1}/_{8}$

N: $V(-2,-2), F(-2,-1\,{}^{1}/_{2})$, dir.: $y = -2\,{}^{1}/_{2}$

G: $V(-3,3), F(-3,2)$, dir.: $y = 4$

O: $V(3,29), F(3,33)$, dir.: $y = 25$

R: $V(2,1), F(5,1)$, dir.: $x = -1$

9	1	5	6	7	3	4	2	8

"Where does a blackbird go to drink?"

Find the equation for the hyperbola described. The answer to each problem will match a letter that will allow you to figure out the joke.

1. Center at (0,0), focus at (4,0), vertex at (1,0)

2. Center at (0,0), focus at (0,-5), vertex at (0,3)

3. Foci at (-6,0) and (6,0), vertex at (2,0)

4. Foci at (0,-6), and (0,6), asymptote line: $y = -x$

5. Center at (-1,3), focus at (-1,6), vertex at (-1,5)

6. Center at (3,4) focus at (-1,4), vertex at (0,4)

7. Foci at (2,6) and (6,6), vertex at (5,6)

8. Focus at (-3,0), vertices at (-3,4) and (-3,2)

9. Vertices (2,5) and (2,11), focus at (2,13)

10. Vertices (-1,-1) and (3,-1), asymptote line: $y + 1 = \frac{3}{2}(x - 1)$

A: $\frac{(y-8)^2}{9} - \frac{(x-2)^2}{16} = 1$

B: $\frac{(y-3)^2}{4} - \frac{(x+1)^2}{5} = 1$

T: $(y-3)^2 - \frac{(x+3)^2}{8} = 1$

O: $\frac{x^2}{4} - \frac{y^2}{32} = 1$

C: $\frac{y^2}{18} - \frac{x^2}{18} = 1$

W: $\frac{(x-1)^2}{4} - \frac{(y+1)^2}{9} = 1$

O: $x^2 - \frac{y^2}{15} = 1$

R: $(x-4)^2 - \frac{(y-6)^2}{3} = 1$

A: $\frac{(x-3)^2}{9} - \frac{(y-4)^2}{7} = 1$

R: $\frac{y^2}{9} - \frac{x^2}{16} = 1$

8	3	6	4	7	1	10	5	9	2

"What's the name of the snake that joined the Canadian police force?"

Find the center and foci of each hyperbola. The answer to each problem will match a letter that will allow you to figure out the joke.

1. $\frac{y^2}{9} - \frac{x^2}{36} = 1$

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

3. $\frac{(x+2)^2}{11} - \frac{(y-3)^2}{25} = 1$

4. $(x-1)^2 - 4(y+4)^2 = 64$

5. $4y^2 - x^2 - 16y + 2x + 11 = 0$

6. $y^2 - 3x^2 + 6x + 6y = 18$

7. $4x^2 - 25y^2 - 8x - 96 = 0$

8. $144y^2 - 25x^2 - 576y - 150x = 3249$

9. $25x^2 - 4y^2 + 100x + 24y - 36 = 0$

10. $3y^2 - 4x^2 + 12y + 24x = 36$

P: C(3,-2) and F$(3, -2\pm\sqrt{7})$

N: C(1,0) and F$(1\pm\sqrt{29}, 0)$

Y: C(1,-4) and F$(1\pm4\sqrt{5}, -4)$

H: C(0,0) and F$(0, \pm2\sqrt{5})$

O: C(-3,2), $F_1(-3,15)$, $F_2(-3,-11)$

U: C(0,0) and F$(0, \pm3\sqrt{5})$

T: C(-2,3) and F$(-2\pm\sqrt{29}, 3)$

E: C(-2,3), $F_1(4,3)$, $F_2(-8,3)$

M: C(1,-3) and F$(1, -3\pm4\sqrt{2})$

I: C(1,2) and F$(1, 2\pm\sqrt{5})$

6	8	1	7	9	5	3	10	4	9	2	8	7

"What do you get if you divide the circumference of a pumpkin by its diameter?"

Find the equation for each ellipse. The answer to each problem will match a letter that will allow you to figure out the joke.

1. Center at (0,0), focus at (0,3), vertex at (0,5)

2. Foci at (0,±2), length of the major axis is 8

3. Foci at (±3,0) length of the minor axis is 4

4. Center at (3,-3), vertex at (8,-3), focus at (5,-3)

5. Center at (4,1), vertex at (10,1), focus at (0,1)

6. Foci at (2,5) and (-2,5), vertex at (-3,5)

7. Foci at (1,5) and (1,-1), length of the major axis is 10

8. Center at (-1,2), focus at (3,2), length of minor axis is 4

9. Vertices (2,4), (2,8), (-2,6), and (6,6)

U: $\frac{(x+1)^2}{20} + \frac{(y-2)^2}{4} = 1$

P: $\frac{(x-2)^2}{16} + \frac{(y-6)^2}{4} = 1$

M: $\frac{x^2}{13} + \frac{y^2}{4} = 1$

I: $\frac{x^2}{12} + \frac{y^2}{16} = 1$

P: $\frac{x^2}{16} + \frac{y^2}{25} = 1$

K: $\frac{x^2}{9} + \frac{(y-5)^2}{5} = 1$

I: $\frac{(x-3)^2}{25} + \frac{(y+3)^2}{21} = 1$

N: $\frac{(x-4)^2}{36} + \frac{(y-1)^2}{20} = 1$

P: $\frac{(x-1)^2}{16} + \frac{(y-2)^2}{25} = 1$

7	8	3	1	6	2	5	9	4

"Why did the cemetery worker not like burying the 500 pound man?"

Find the center and foci for the following ellipses. The answer to each problem will match a letter that will allow you to figure out the joke.

1. $\frac{x^2}{25} + \frac{y^2}{36} = 1$

2. $\frac{(x-2)^2}{4} + \frac{(y-3)^2}{9} = 1$

3. $36y^2 + 4x^2 = 144$

4. $2x^2 + y^2 = 32$

5. $\frac{(x+1)^2}{16} + \frac{(y-2)^2}{4} = 1$

6. $2x^2 + y^2 + 4x = 2$

7. $4x^2 + y^2 + 8x - 6y + 9 = 0$

8. $x^2 + 10x + 4y^2 + 48y = -153$

9. $x^2 + 3y^2 + 6x + 6 = 0$

10. $2x^2 + 8x + 4y^2 - 24y + 4 = 0$

11. $3x^2 + 4y^2 + 8y = 8$

JO: $C(-3,0)\ F(-3\pm\sqrt{2},0)$

TA: $C(0,0)\ F(0,\pm4)$

ER: $C(-1,3)\ F(-1,3\pm\sqrt{3})$

RU: $C(0,0)\ F(0,\pm\sqrt{11})$

KI: $C(0,-1)\ F(\pm1,1)$

ND: $C(0,0)\ F(\pm4\sqrt{2},0)$

SA: $C(2,3)\ F(2,3\pm\sqrt{5})$

IT: $C(-5,-6)\ F(-5\pm2\sqrt{3},-6)$

MA: $C(-1,2)\ F(-1\pm2\sqrt{3},2)$

NG: $C(-1,0)\ F(-1,\pm\sqrt{2})$

WA: $C(-2,3)\ F(-2\pm\sqrt{10},3)$

8	8	10	10	2	2	5	5	9	9	1

1	3	3	7	7	4	4	11	11	6	6