Lesson 18

Match the functions given below to their level curves, and find the y-intercept(s) when $z = 0$ (if they exist).

1. $f(x, y) = 12\sqrt{y - 3x^2}$
2. $f(x, y) = (3e^{-x} - y)^2$
3. $f(x, y) = -\ln(3x + 2) + y$
4. $f(x, y) = 33x^2 + 33y^2$
5. $f(x, y) = (20x^2)y$
6. $f(x, y) = 20xy^2$
7. $f(x, y) = 2x^2 + y + 7$
8. $f(x, y) = x^2 + 10y^2 - 23$

(a) Rational function with x-axis symmetry

(b) Rational function with y-axis symmetry

(c) Ellipse

(d) Parabola opening upward

(e) Parabola opening downward

(f) Decreasing exponential function

(g) Natural logarithm function

(h) Circle

Solutions:

1. (d); $(0, 0)$
2. (f); $(0, 3)$
3. (g); $(0, \ln 2)$
4. (h); $(0, 0)$
5. (b); DNE
6. (a); DNE
7. (e); $(0, -7)$
8. (c); $(0, \pm\sqrt{23/10})$