Algebra 2

Name Solutions

ID: 1

11.4 Practice - Classify Conics

Period____

Classify each conic section and write its equation in standard form.

1) $-2x^2 - 24x + y - 67 = 0$

$-2(x^2 + 12x + 36) = -y + 67$
$\qquad -72$
$-2(x+6)^2 = -y - 5$
$-2(x+6)^2 = -(y+5)$

$\boxed{(x+6)^2 = \frac{1}{2}(y+5)}$
Parabola

2) $x^2 - y^2 - 6x + 8 = 0$

$x^2 - 6x - y^2 = -8$
$\quad +9 \qquad\qquad +9$

$\boxed{(x-3)^2 - y^2 = 1}$
hyperbola

3) $x^2 + y^2 - 8x - 2y + 15 = 0$

$x^2 - 8x + 16 + y^2 - 2y + 1 = -15$
$\qquad\qquad\qquad\qquad +16$
$\qquad\qquad\qquad\qquad +1$

$\boxed{(x-4)^2 + (y-1)^2 = 2}$
Circle

4) $4x^2 + 9y^2 + 8x - 36y - 104 = 0$

$4(x^2 + 2x + 1) + 9(y^2 - 4y + 4) = 104$
$\qquad\qquad\qquad\qquad\qquad\qquad +4$
$\qquad\qquad\qquad\qquad\qquad\qquad +36$
$4(x+1)^2 + 9(y-2)^2 = 144$

$\boxed{\dfrac{(x+1)^2}{36} + \dfrac{(y-2)^2}{16} = 1}$
Ellipse

5) $2y^2 + x + 12y + 20 = 0$

$2(y^2 + 6y + 9) = -x - 20$
$\qquad\qquad\qquad\qquad +18$
$2(y+3)^2 = -(x+2)$

$\boxed{(y+3)^2 = -\frac{1}{2}(x+2)}$
Parabola

6) $9x^2 + 16y^2 + 36x - 96y + 36 = 0$

$9(x^2 + 4x + 4) + 16(y^2 - 6y + 9) = -36$
$\qquad\qquad\qquad\qquad\qquad\qquad\quad +36$
$9(x+2)^2 + 16(y-3)^2 = 144 \qquad +144$

$\boxed{\dfrac{(x+2)^2}{16} + \dfrac{(y-3)^2}{9} = 1 \quad \text{Ellipse}}$

7) $-x^2 + 4y^2 - 2x - 24y + 19 = 0$

$-(x^2 + 2x + 1) + 4(y^2 - 6y + 9) = -19$
$\qquad\qquad\qquad\qquad\qquad\qquad\quad -1$
$\qquad\qquad\qquad\qquad\qquad\qquad\quad +36$
$-(x+1)^2 + 4(y-3)^2 = 16$

$\boxed{\dfrac{(y-3)^2}{4} - \dfrac{(x+1)^2}{16} = 1}$
hyperbola

8) $4x^2 + 4y^2 + 20x + 24y + 45 = 0$

$4(x^2 + 5x + \frac{25}{4}) + 4(y^2 + 6y + 9) = -45$
$\qquad\qquad\qquad\qquad\qquad\qquad\qquad +25$
$4(x + \frac{5}{2})^2 + 4(y+3)^2 = 16 \qquad +36$

$\boxed{(x + \frac{5}{2})^2 + (y+3)^2 = 4}$
Circle

9) $2x^2 + 2y^2 + 14x + 10y + 33 = 0$

$2(x^2 + 7x + \frac{49}{4}) + 2(y^2 + 5y + \frac{25}{4}) = -33$
$\quad +\frac{49}{2}$
$\quad +\frac{25}{2}$

$2(x + \frac{7}{2})^2 + 2(y + \frac{5}{2})^2 = 4$

$(x + \frac{7}{2})^2 + (y + \frac{5}{2})^2 = 2$
Circle

10) $x^2 - y^2 + 4x - 2y - 1 = 0$

$x^2 + 4x + 4 - (y^2 + 2y + 1) = 1$
$\quad +4$
$\quad -1$

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

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

11) $9x^2 - 16y^2 + 32y - 160 = 0$

$9x^2 - 16(y^2 - 2y + 1) = 160$
$\quad -16$

$9x^2 - 16(y-1)^2 = 144$

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

12) $16x^2 + 9y^2 - 128x + 54y + 193 = 0$

$16(x^2 - 8x + 16) + 9(y^2 + 6y + 9) = -193$
$\quad +256$
$\quad +81$

$16(x-4)^2 + 9(y+3)^2 = 144$

$\frac{(x-4)^2}{9} + \frac{(y+3)^2}{16} = 1$ Ellipse

13) $x^2 + 10x + 4y + 41 = 0$

$x^2 + 10x + 25 = -4y - 41$
$\quad +25$

$(x+5)^2 = -4y - 16$

$(x+5)^2 = -4(y+4)$
Parabola

14) $3y^2 + x + 12y + 18 = 0$

$3(y^2 + 4y + 4) = -x - 18$
$\quad +12$

$3(y+2)^2 = -x - 6$

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

15) $-4x^2 + y^2 + 24x + 2y - 51 = 0$

$-4(x^2 - 6x + 9) + y^2 + 2y + 1 = 51$
$\quad -36$
$\quad +1$

$-4(x-3)^2 + (y+1)^2 = 16$

$\frac{(y+1)^2}{16} - \frac{(x-3)^2}{4} = 1$ hyperbola
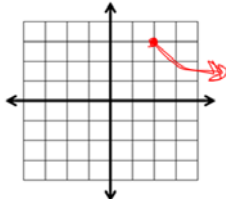
16) $x^2 + y^2 - 4y - 12 = 0$

$x^2 + y^2 - 4y + 4 = 12$
$\quad +4$

$x^2 + (y-2)^2 = 16$
Circle

17) $2x^2 - 4x + y + 5 = 0$

$2(x^2 - 2x + 1) = -y - 5$
$\quad +2$

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

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

18) $x^2 + 49y^2 - 294y + 392 = 0$

$x^2 + 49(y^2 - 6y + 9) = -392$
$\quad +441$

$x^2 + 49(y-3)^2 = 49$

$\frac{x^2}{49} + (y-3)^2 = 1$
Ellipse

Algebra Skillz:

1. Graph $f(x) = -\sqrt{x-2} + 3$

Multiply.

2. $(4 - \sqrt{3})(4 + \sqrt{3})$
$16 - 3$
$\boxed{13}$

3. $(\sqrt{x} - 2)(\sqrt{x} + 3)$
$x + 3\sqrt{x} - 2\sqrt{x} - 6$
$\boxed{x + \sqrt{x} - 6}$

Solve by factoring.

4. $4x^3 - 16x = 0$
$4x(x^2 - 4) = 0$
$4x(x-2)(x+2) = 0$
$\boxed{x = 0 \quad x = \pm 2}$

5. $14x^2 - x - 4 = 0$
$(14x - 8)(14x + 7) = 0$
$(7x - 4)(2x + 1) = 0$
$\boxed{x = \frac{4}{7} \quad x = -\frac{1}{2}}$

SAT Prep:

1. The equation
$4x^2 \ominus 9y^2 - 18x + 3y - 12 = 0$
represents which conic section?

(A) Circle   (B) Ellipse
(C) Hyperbola   (D) Parabola

Subtraction!

2. The midpoint between $(x, 2)$ and $(-5, -6)$ is $(\frac{1}{2}, -2)$. What is the value for x?

$\frac{x + -5}{2} = \frac{1}{2}$

$x - 5 = 1$

$\boxed{x = 6}$