

Standard 1.02 - Key

① $y = \frac{1}{12}x^2$ $4p = 12$

$12y = x^2$ $p = 3$
3 feet

② $4y^2 - 2x - 16y = -13 - x^2$

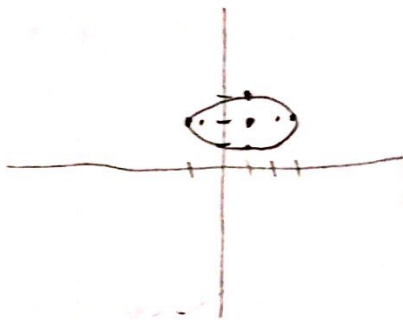
$x^2 - 2x + 4y^2 - 16y = -13$

A) Ellipse

B) $x^2 - 2x + 1 + 4(y^2 - 4y + 4) = -13 + 1 + 4(4)$
 $(x-1)^2 + 4(y-2)^2 = 4$

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

$a = 2$ $b = 1$ $c^2 = a^2 - b^2$
 $c^2 = 4 - 1$
 $c^2 = 3$
 $c = 1.7$

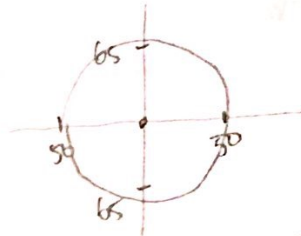


③ $\frac{x^2}{100} - \frac{y^2}{4} = 1$
 $b^2 = 4$ $b = 2$
2 feet

④ $\frac{y^2}{4025} + \frac{x^2}{2500} = 1$

A) $\sqrt{2500} = 50 + 50 = \text{span style="border: 1px solid black; padding: 2px;">100 ft}$

B)



$25 + 65 + 65 = \text{span style="border: 1px solid black; padding: 2px;">155 feet}$

⑤ A) $\frac{(x-h)^2}{a^2/b^2} + \frac{(y-k)^2}{a^2/b^2} = 1$

$(-6, 15)$ $a = 9$ $(-6, 6 + 3\sqrt{5})$ $(-6, 6)$ $(-6, 3)$	 $\frac{(x+6)^2}{36} + \frac{(y-6)^2}{81} = 1$
in middle →	$c^2 = a^2 - b^2$ $(3\sqrt{5})^2 = 81 - b^2$ $45 = 81 - b^2$ $36 = b^2$ $b = 6$


B)

$(-8, 4)$ $11 = a$	$(3, 4)$ $(-8 + \sqrt{146}, 4)$ $(4, 14)$
$c = 12.1$ $c^2 = a^2 + b^2$ $12.1^2 = 11^2 + b^2$ $146.41 = 121 + b^2$ $b = 5$	

$\frac{(x+8)^2}{121} - \frac{(y-4)^2}{25} = 1$

⑤ $(y-b)^2 = 8(x+4)$
 vertex: $(-4, b)$
 opens: right
 Focus: $4p=8$ $(-2, b)$
 $p=2$
 Directrix: $x = -6$

⑦ $(x-6)^2 + (y+2)^2 = 10$
 center: $(6, -2)$
 radius: $\sqrt{10}$

⑧ $\frac{x^2}{16} + \frac{(y-4)^2}{9} = 1$ 
 center: $(0, 4)$
 vertices: $a=4$ $b=3$
 $(4, 4)$ $(-4, 4)$
 co-vertices:
 $(0, 7)$ $(0, 1)$
 Foci: $c^2 = a^2 - b^2$
 $c^2 = 16 - 9 = 7$
 $c = 2.6$
 $(2.6, 4)$ $(-2.6, 4)$
 major axis: $2(4) = 8$
 minor axis: $2(3) = 6$

⑨ $\frac{x^2}{16} - \frac{(y-4)^2}{9} = 1$
 center: $(0, 4)$
 vertices: $(4, 4)$ $(-4, 4)$
 foci: $c^2 = a^2 + b^2$
 $c^2 = 16 + 9 = 25$
 $c = 5$
 $(5, 4)$ $(-5, 4)$
 Asymptote: $y = \pm \frac{3}{4}(x-0) + 4$
 $y = \pm \frac{3}{4}x + 4$

⑩ A) $x^2 + y^2 + 8x + 11 = 0 \rightarrow$ circle
 $(x^2 + 8x + 16) + y^2 = -11 + 16$
 $(x+4)^2 + y^2 = 5$

B) $3y^2 + x + 30y + 73 = 0 \rightarrow$ parabola
 $3(y^2 + 10y + 25) = -x - 73 + 3(25)$
 $3(y+5)^2 = -x + 2$
 $3(y+5)^2 = -1(x-2)$
 $(y+5)^2 = -\frac{1}{3}(x-2)$

C) $25x^2 + 16y^2 + 150x - 32y - 159 = 0 \rightarrow$ ellipse
 $25x^2 + 150x + 16y^2 - 32y = 159$
 $25(x^2 + 6x + 9) + 16(y^2 - 2y + 1) = 159 + 25(9) + 16(1)$
 $25(x+3)^2 + 16(y-1)^2 = 400$
 $\frac{(x+3)^2}{16} + \frac{(y-1)^2}{25} = 1$

D) $-x^2 + 4y^2 + 6x - 16y + 3 = 0 \rightarrow$ hyperbola
 $4y^2 - 16y - x^2 + 6x = -3$
 $4(y^2 - 4y + 4) - 1(x^2 - 6x + 9) = -3 + 4(4) - 1(9)$
 $4(y-2)^2 - 1(x-3)^2 = 4$
 $\frac{(y-2)^2}{1} - \frac{(x-3)^2}{4} = 1$