

1.) vertex at (0,0), p=2

B $y = \frac{1}{8}x^2$

2.) $4x^2 + 16x + 9y^2 - 90y = 245$

A $4(x^2 + 4x + 4) + 9(y^2 - 10y + 25) = 245 + 16 + 225$

$4(x+2)^2 + 9(y-5)^2 = 486$

center (-2, 5)

3.) $x^2 + 2Ax + A^2 + y^2 = -2 + A^2$
 $-2 + A^2 = 7, A^2 = 9, |A| = 3$

B

4.) $x^2 = 4 - y^2, 4 - y^2 + 9y^2 = 9$
 $8y^2 = 5, y = \pm \frac{\sqrt{5}}{4}$
 $x^2 = 4 - \frac{5}{8}, x = \pm \frac{\sqrt{27}}{8}$

E

$x^2 = \frac{27}{8} = \pm \frac{3\sqrt{6}}{4}$



5.) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ solve this system
 $\begin{cases} \frac{2}{a^2} + \frac{4}{b^2} = 1 \\ \frac{4}{a^2} + \frac{3}{b^2} = 1 \end{cases}$
 $a^2 = 10, b^2 = 5$
area = $ab\pi = \sqrt{10} \cdot \sqrt{5} \cdot \pi = 5\pi\sqrt{2}$

B

6.) $a=3, c=4, c^2 = a^2 + b^2$

C

$\frac{x^2}{9} - \frac{y^2}{7} = 1$

7.) $c=5; 4 = a+b+5; 7 = 4a+2b+5$

C

$a=2, b=-3; a+b=-1$

8.) $c=2, a=3; c^2 = a^2 - b^2$

B

center (0,0)

$\frac{x^2}{9} + \frac{y^2}{5} = 1$

$5x^2 + 9y^2 = 45$

9.) an ellipse; $a=5, c=3$

A $a^2 = 25 - b^2, b^2 = 16$ center (0,0)

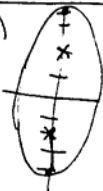
$\frac{x^2}{25} + \frac{y^2}{16} = 1$

10.) (2,-1) to (2,1)

D

$d=2$

11.) **E**



$a=4, c=2, c^2 = a^2 - b^2$
 $4 = 16 - b^2$

$b = 2\sqrt{3}$

minor axis = $2\sqrt{3} \cdot 2 = 4\sqrt{3}$

12.) center (-2,3), $c=5, a=3, b=4$
axis vertical

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

13.) $(x-1)^2 + (y-2)^2 = 9$

E

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

14.) **C**

$\frac{1}{a^2} + \frac{12}{b^2} = 1$

$a^2 = 5$

$b^2 = 3$

$\frac{10}{a^2} + \frac{1}{b^2} = 1$

$a^2 + 2b^2 = 5 + 6 = 11$

15.) **C**

$a=3$

$y = \pm \frac{4}{3}x$

$b=4$

16.) $x = \frac{1}{4}y^2$, vertex (0,0), focus (1,0)

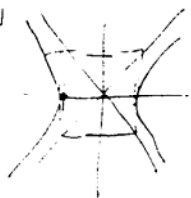
D $\frac{1}{8}(x-3)^2 - 5 = y$, vertex (3,-5), focus (3,-3)

AB has slope $\frac{2}{3}$, pt on line is midpoint segment joining foci (2, -3/2)

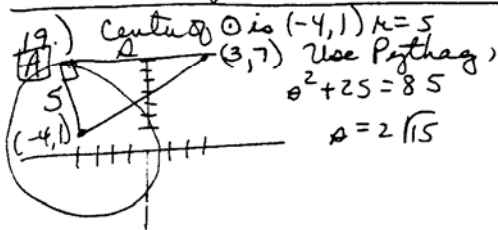
$4x - 6y = 17$

17.) **C**

$x^2 - y^2 = 1$ I, II, III



18.) $y = \frac{1}{8}(x^2 - 4x + 4) + \frac{7}{2} - \frac{1}{2}$
 $= \frac{1}{8}(x-2)^2 + 3$
 vertex (2, 3) $p=2$
 focus (2, 5)



20.) $y = ax^2$
 $(\frac{5}{2}, 42+k)$
 $(3, k)$
 $(0, 0)$
 $42+k = \frac{225}{4}a$
 $11k = 9a$
 $a = \frac{8}{9}$; $y = \frac{8}{9}x^2$
 $k = \frac{8}{9} \cdot 9$ ($k=8$)

21.) $\begin{cases} 2x-3y=5 \\ 2x+3y=-1 \end{cases}$ Center (1, -1)
 $2x-3y=5$ $b=2, a=3$
 $y = \frac{2}{3}x - \frac{5}{3}$ $\frac{(x-1)^2}{9} - \frac{(y+1)^2}{4} = 1$

22.) $(x-2)^2 + (y-3)^2 = 9$
 (2, 3) $r=3$

23.) $0 = 2(x^2 - \frac{b}{2}x + 1)$
 (D) b may be + or -

24.) $y = -2x^2 + 4x - 1$
 $= -2(x^2 - 2x + 1) - 1 + 2$
 $= -2(x-1)^2 + 1$
 vertex (1, 1)
 (1, 1) & (0, 0) $\therefore y=x$

25.) $9x^2 + 4y^2 + 36x - 24y + 36 = 0$
 (A) $\frac{(x+2)^2}{4} + \frac{(y-3)^2}{9} = 1$
 $a=3, c^2 = a^2 - b^2$ $\frac{c}{a} = \frac{\sqrt{5}}{3}$
 $c^2 = 9 - 4$
 $c = \sqrt{5}$

26.) Center is on \perp bisector of chord.
 (C) Find eq of \perp bisector of chord.
 midpoint (5, 2)
 slope of chord = -1 so slope of line is 1. $x - y = 3$ is eq of line
 & all choices but C are on the line

27.) $(x+3)^2 + y^2 = 16$
 (E) $x^2 + kx + 9 + y^2 = 9 - c$; $9 - c = 16$
 $k + c = 6 + -7 = -1$ $c = -7$

28.) $y = ax^2 + bx + c$
 (A) $\begin{cases} 0 = a + b + c \\ 0 = 4a + 2b + c \\ 2 = 9a + 3b + c \end{cases}$ $a=1$
 $b=-3$
 $c=2$
 $y = x^2 - 3x + 2$
 vertex $(\frac{3}{2}, -\frac{1}{4})$

29.) $r=3$, center = (3, -2) pt (-2, 4)
 (C) distance to center $\sqrt{25+36} = \sqrt{61} \approx 7.8$
 $7.8 - 3 = 4.8$

30.) parabola by definition
 (B) $p=2$, vertex (0, 2)
 $y - 2 = \frac{1}{8}x^2$
 $8y - 16 = x^2$
 $x^2 - 8y + 16 = 0$