

Graph the circle and label the center and radius.

1. $x^2 + y^2 = 16$

2. $x^2 + y^2 = 17$

3. $(x - 4)^2 + (y + 3)^2 = 6$

4. $x^2 + y^2 - 10x - 12y + 45 = 0$

Find the vertex, focus and directrix of the parabola.

5. $(x - 3)^2 = 4(y + 6)$

6. $(y + 6)^2 = 8(x - 4)$

7. $(x + 2)^2 = -8(y - 5)$

8. $4x = y^2 - 6y - 11$

Graph the ellipse and label the vertices and foci.

9. $\frac{x^2}{25} + \frac{y^2}{4} = 1$

10. $\frac{(x - 3)^2}{49} + \frac{(y - 7)^2}{36} = 1$

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

12. $9x^2 + 16y^2 - 54x + 32y - 47 = 0$

ADVANCED ALGEBRA/TRIG

CONIC SECTIONS

Graph the hyperbola and label the vertices, foci and asymptotes.

13. $\frac{(x-6)^2}{16} - \frac{(y+7)^2}{16} = 1$

14. $\frac{y^2}{64} - \frac{x^2}{4} = 1$

15. $\frac{(y+2)^2}{25} - \frac{(x+11)^2}{4} = 1$

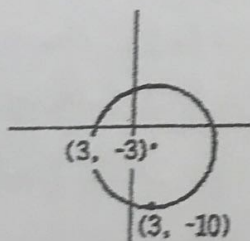
16. $9x^2 - 16y^2 - 36x + 32y - 24 = 0$

17. Find the equation of the parabola with focus $(-2, -3)$, and vertex $(4, -3)$.

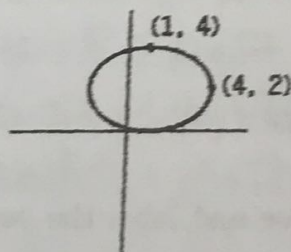
18. Find the ellipse with vertices $(2, 0)$, $(-2, 0)$, $(0, 4)$, and $(0, -4)$.

Write the equation of the conic.

19.



20.



Tell which conic is represented by the equation.

21. $2x^2 + 6y - 9 = 0$

22. $15x^2 + 5y^2 + 4x + 9y - 16 = 0$

23. $-12x^2 + 8y^2 - 9x + 7y - 5 = 0$

24. $7y^2 - 4x + 6 = 0$

25. $5x^2 + 5y^2 + 6x + 4y + 2 = 0$

26. $3x^2 + 3y^2 - 2x + 10y - 1 = 0$

27. $-4x^2 - 4y^2 - 3x + 2y + 1 = 0$

28. $-8x^2 + 6y^2 = 24$

Advanced Algebra/Trig: Conic Sections Review

★ see graph paper for #1-16

1. $x^2 + y^2 = 16$
 center $(0,0)$
 radius = 4

2. $x^2 + y^2 = 17$
 center $(0,0)$
 radius = $\sqrt{17}$ or 4.1

3. $(x-4)^2 + (y+3)^2 = 16$
 center $(4, -3)$
 radius = $\sqrt{16} = 4$

4. $x^2 + y^2 - 10x - 12y + 45 = 0$
 $(x^2 - 10x + 25) + (y^2 - 12y + 36) = -45 + 25 + 36$
 $(-\frac{10}{2})^2 = (-5)^2 \quad (-\frac{12}{2})^2 = (-6)^2$
 $(x-5)^2 + (y-6)^2 = 16$
 center $(5,6)$ $r=4$

5. $(x-3)^2 = 4(y+6)$
 vertex $(3, -6)$
 $4p=4; p=1$
 focus: $(3, -5)$
 directrix $y=-7$

6. $(y+6)^2 = 8(x-4)$
 vertex $(4, -6)$
 $4p=8; p=2$
 focus: $(6, -6)$
 directrix: $x=2$

7. $(x+2)^2 = -8(y-5)$
 vertex $(-2, 5)$
 $4p=-8; p=-2$
 focus: $(-2, 3)$
 directrix: $y=7$

8. $4x = y^2 - 6y - 11$
 $4x + 11 + 9 = y^2 - 6y + 9$
 $(-\frac{6}{2})^2 = (-3)^2$
 $4x + 20 = (y-3)^2$
 $4(x+5) = (y-3)^2$
 or $(y-3)^2 = 4(x+5)$
 vertex $(-5, 3)$ $4p=4, p=1$
 focus: $(-4, 3)$
 directrix: $x=-6$

$$9. \frac{x^2}{25} + \frac{y^2}{4} = 1$$

center (0,0)

$$a=5 \quad b=2$$

vertices: (5,0) (-5,0) (0,2) (0,-2)

$$c^2 = 25 - 4 \text{ so } c = \pm \sqrt{21}$$

foci: $(\pm \sqrt{21}, 0)$

$$10. \frac{(x-3)^2}{49} + \frac{(y-7)^2}{36} = 1$$

center (3,7)

$$a=7 \quad b=6$$

vertices: (10,7) (-4,7)
(3,1) (3,13)

$$c^2 = 49 - 36; c = \pm \sqrt{13}$$

foci: $(3 \pm \sqrt{13}, 7)$

$$11. \frac{x^2}{4} + \frac{y^2}{1} = 1$$

center (0,0)

$$a=2 \quad b=1$$

vertices (2,0) (-2,0) (0,1) (0,-1)

$$c^2 = 4 - 1; c = \pm \sqrt{3}$$

foci $(\pm \sqrt{3}, 0)$

$$12. 9x^2 + 16y^2 - 54x + 32y - 47 = 0$$

$$(9x^2 - 54x \text{ ---}) + (16y^2 + 32y \text{ ---}) = 47$$

$$9(x^2 - 6x + 9) + 16(y^2 + 2y + 1) = 47 + 81 + 16$$

$$\left(-\frac{16}{9}\right)^2 = (-3)^2 \quad \left(\frac{16}{9}\right)^2 = (1)^2$$

$$\frac{9(x-3)^2}{144} + \frac{16(y+1)^2}{144} = \frac{144}{144}$$

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

center (3,-1) $a=4 \quad b=3$

vertices (7,-1) (-1,-1) (3,2) (3,-4)

$$c^2 = 16 + 9 \text{ so } c = \pm 5$$

foci $(3 \pm 5, -1) \rightarrow (8, -1) \text{ and } (-2, -1)$

$$13. \frac{(x-6)^2}{16} - \frac{(y+7)^2}{16} = 1$$

center $(6, -7)$ $a=4$ $b=4$

vertices $(2, -7)$ $(10, -7)$

$c^2 = 16 + 16$ so $c = \pm\sqrt{32} = \pm 4\sqrt{2}$

foci: $(6 \pm 4\sqrt{2}, -7)$

asymptotes: $(y+7) = \pm(x-6)$

$$14. \frac{y^2}{64} - \frac{x^2}{4} = 1$$

center $(0, 0)$ $a=2$ $b=8$

vertices $(0, 8)$ $(0, -8)$

$c^2 = 64 + 4$ so $c = \pm\sqrt{68}$

foci: $(0, \pm\sqrt{68})$

asymptotes: $y = \pm 4x$

$$15. \frac{(y+2)^2}{25} - \frac{(x+11)^2}{4} = 1$$

center $(-11, -2)$ $a=5$ $b=2$

vertices $(-11, 3)$ $(-11, -7)$

$c^2 = 25 + 4$ so $c = \pm\sqrt{29}$

foci: $(-11, -2 \pm \sqrt{29})$

asymptotes: $(y+2) = \pm\frac{5}{2}(x+11)$

$$16. 9x^2 - 16y^2 - 36x + 32y - 124 = 0$$

$$(9x^2 - 36x) + (-16y^2 + 32y) = 124$$

$$9(x^2 - 4x + 4) - 16(y^2 - 2y + 1) = 124 + 36 - 16$$

$$(-\frac{4}{2})^2 = (-2)^2 \quad (-\frac{2}{2})^2 = (-1)^2$$

$$\frac{9(x-2)^2}{144} - \frac{16(y-1)^2}{144} = \frac{144}{144}$$

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

center $(2, 1)$ $a=4$ $b=3$

vertices $(6, 1)$ $(-2, 1)$

$c^2 = 16 + 9$ so $c = \pm\sqrt{25} = \pm 5$

foci $(7, 1)$ $(-3, 1)$

asymptotes $(y-1) = \pm\frac{3}{4}(x-2)$

17. see graph

vertex $(4, -3)$ $p = -6$

$$(y+3)^2 = 4(-6)(x-4)$$

$$(y+3)^2 = -24(x-4)$$

see graph

18. center $(0, 0)$ $a=3$ $b=3$

$$\frac{x^2}{4} + \frac{y^2}{9} = 1$$

center $(3, -3)$ $r=7$

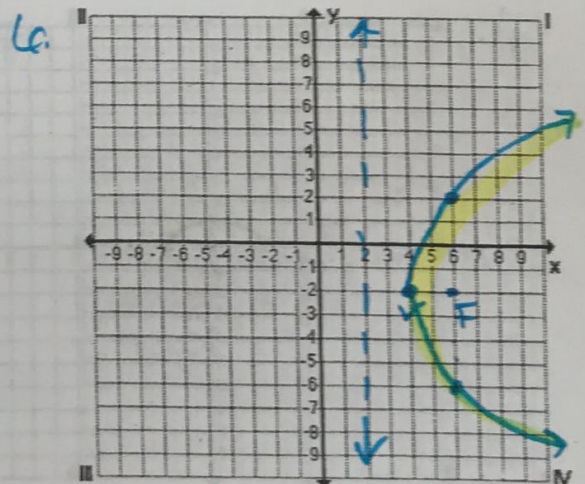
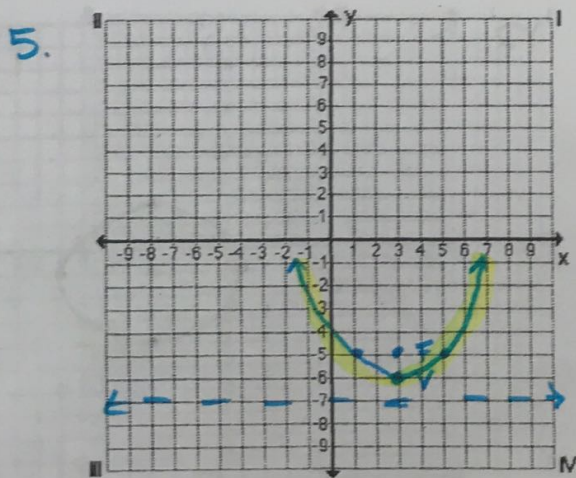
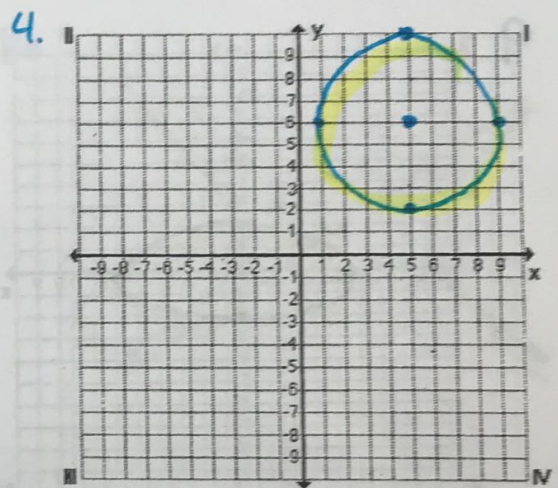
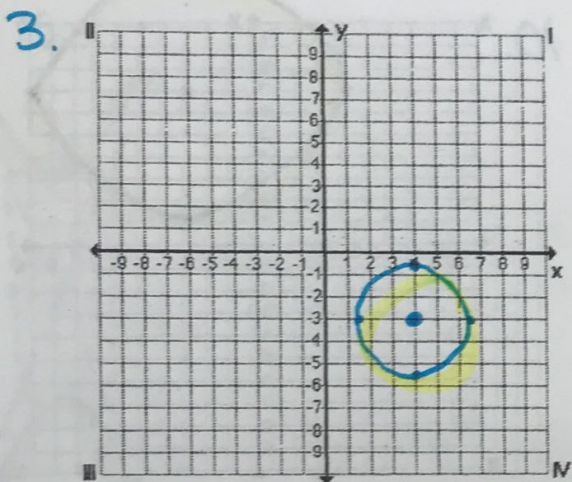
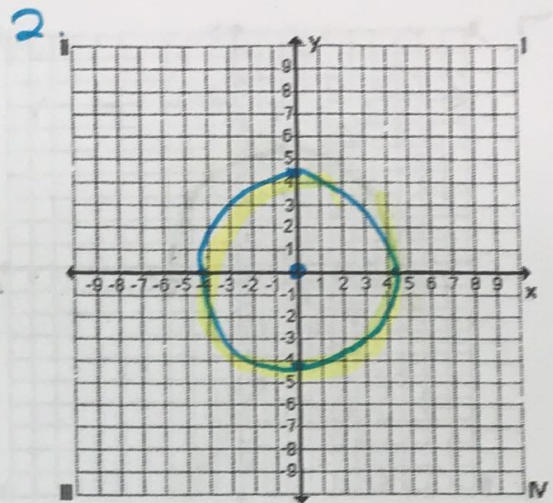
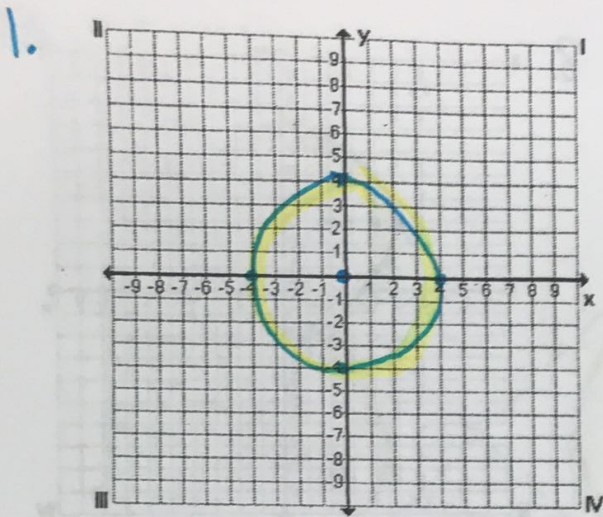
$$19. (x-3)^2 + (y+3)^2 = 49$$

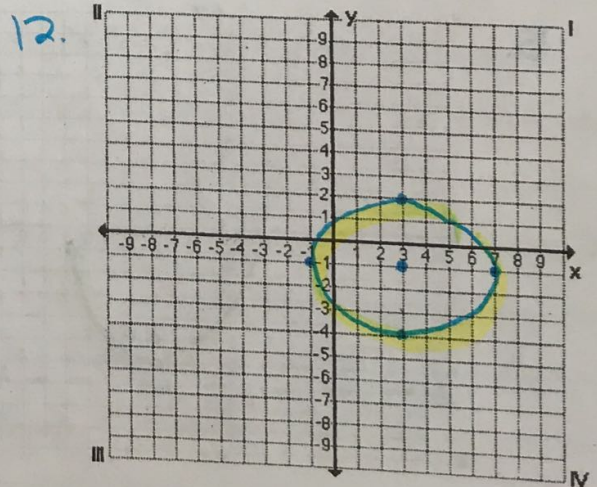
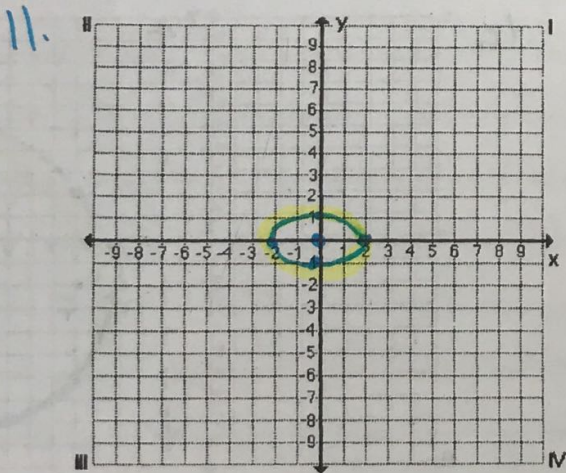
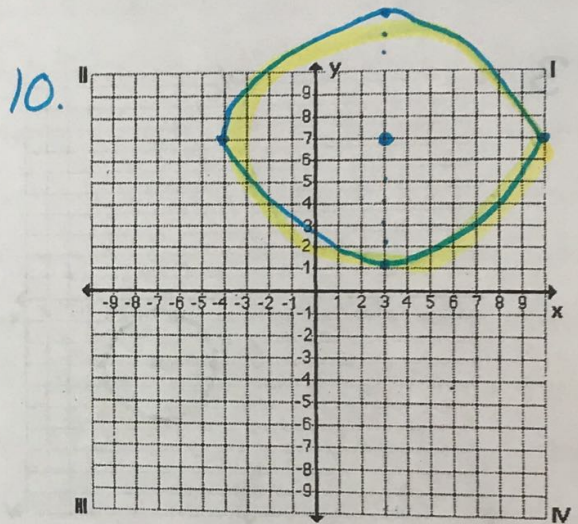
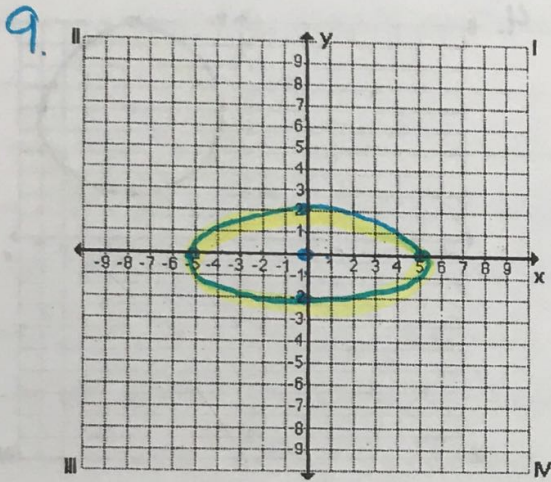
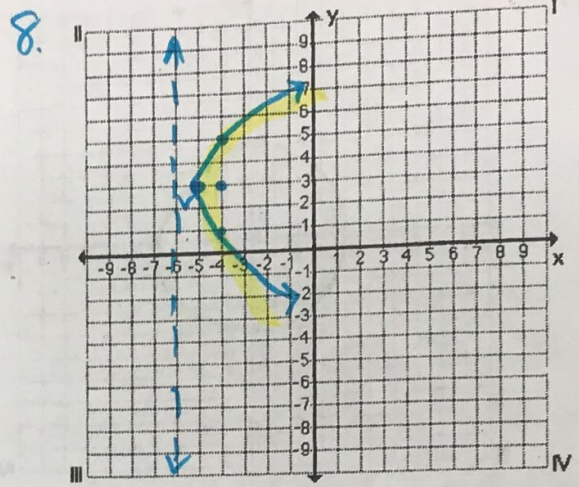
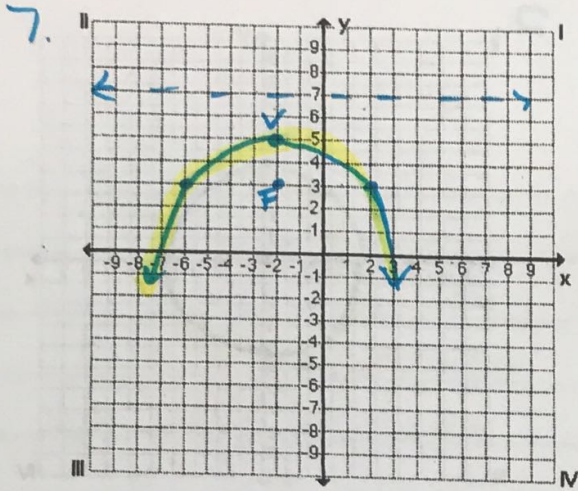
20. center $(1, 2)$ $a=3$ $b=2$

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

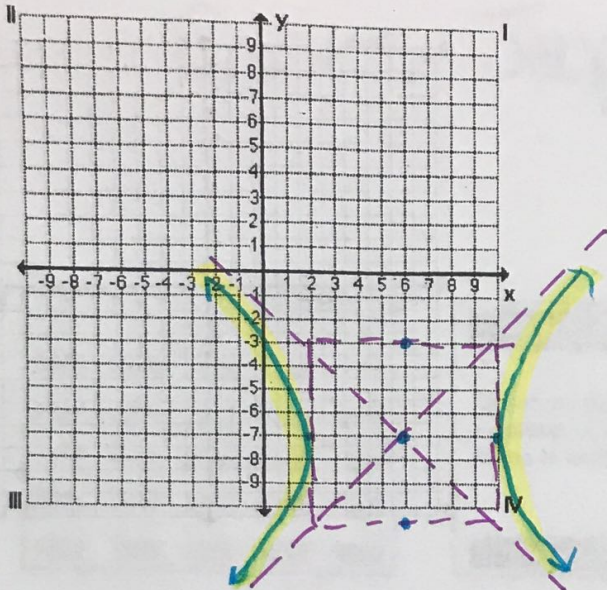
21. parabola 22. ellipse 23. hyperbola 24. parabola

25. circle 26. circle 27. circle 28. hyperbola

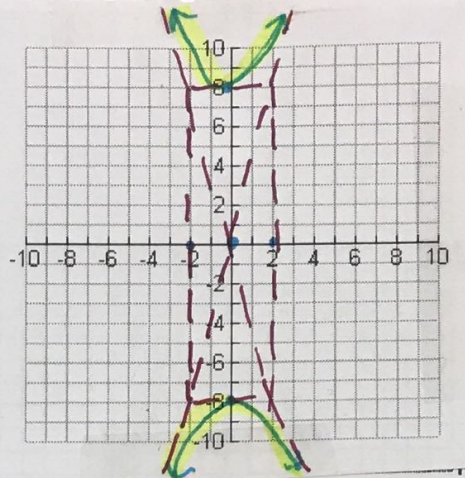




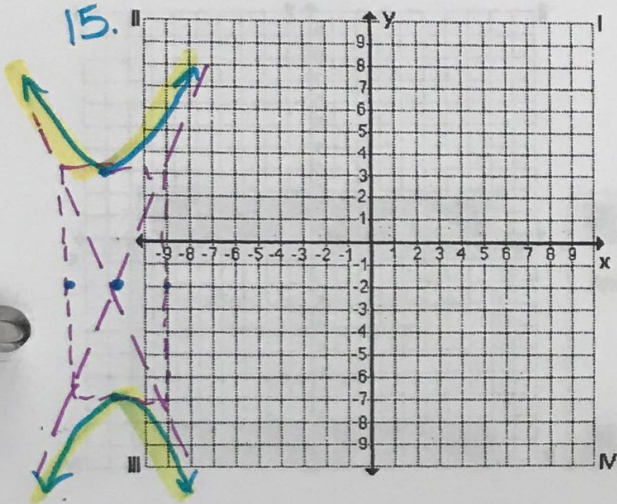
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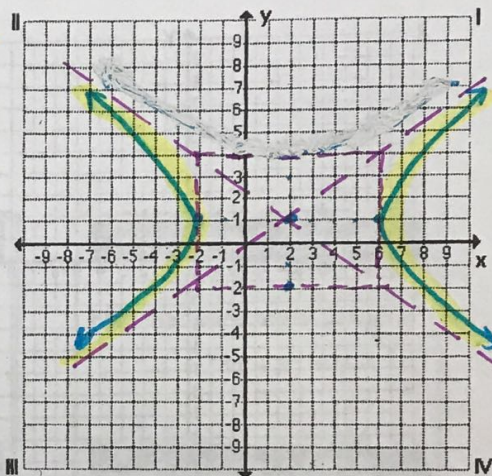
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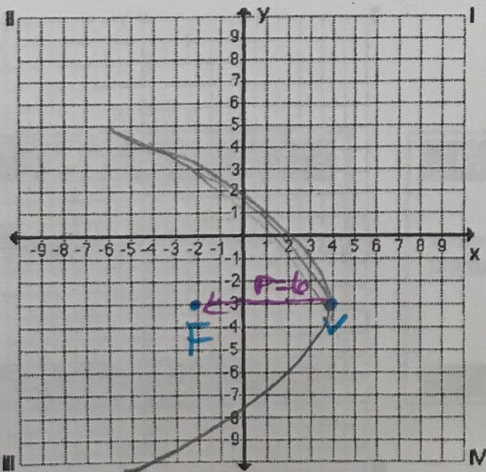
15.



16.



17.



18.

