

Name: Answer key (11)

Period: _____

Precal

10.1-10.2 Review

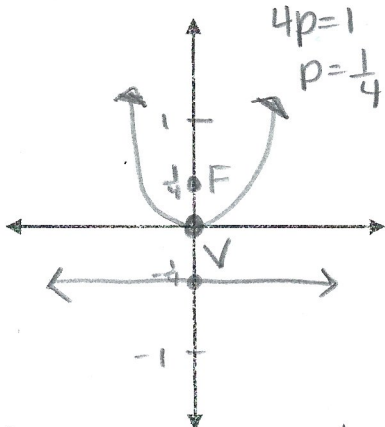
$$x^2 = 4py$$

$$y^2 = 4px$$

Graph each parabola. Label the focus and directrix.

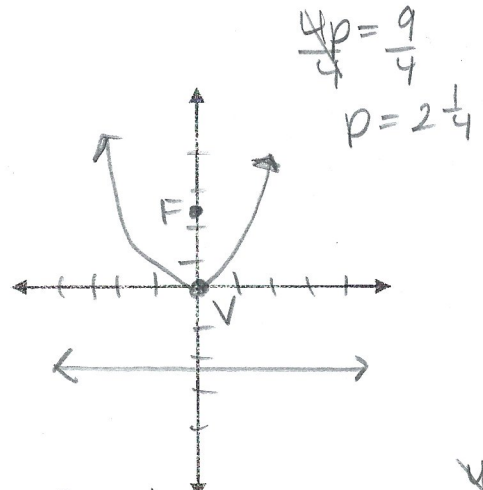
1. $y = x^2$

Focus:
 $(0, \frac{1}{4})$
Directrix:
 $y = -\frac{1}{4}$



2. $x^2 = 9y$

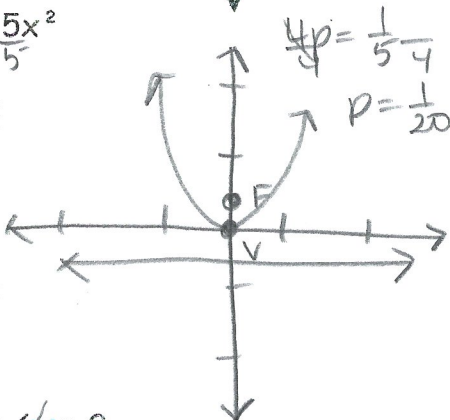
Focus:
 $(0, 2\frac{1}{4})$
Directrix:
 $y = -2\frac{1}{4}$



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

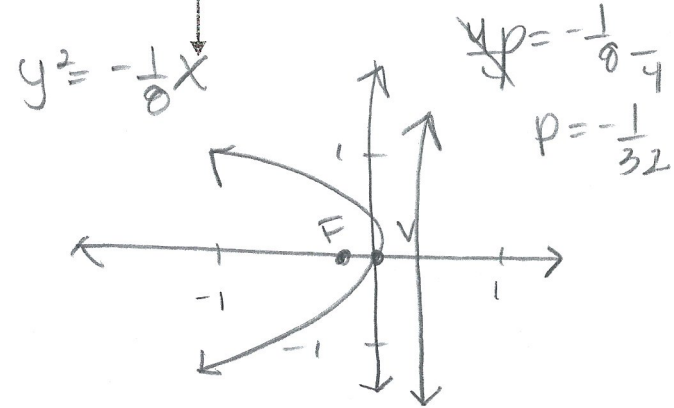
3. $y = 5x^2$

Focus:
 $(0, \frac{1}{20})$
Directrix:
 $y = -\frac{1}{20}$



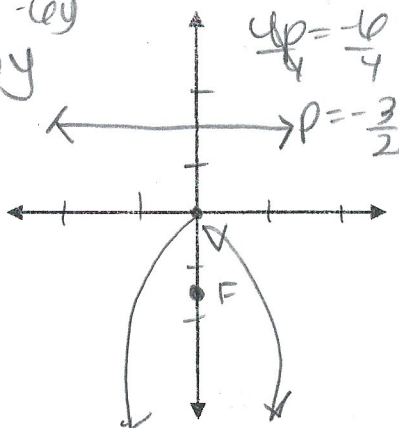
4. $x = -8y^2$

Focus:
 $(-\frac{1}{32}, 0)$
Directrix:
 $x = \frac{1}{32}$



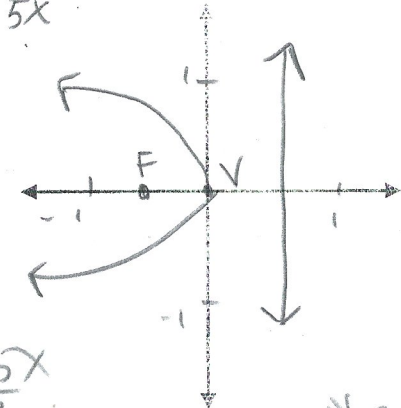
5. $x^2 + 6y = 0$
 $-6y = -x^2$
 $x^2 = -6y$

Focus:
 $(0, -\frac{3}{2})$
Directrix:
 $y = \frac{3}{2}$



6. $5x + 3y^2 = 0$
 $-5x = -3y^2$
 $y^2 = -\frac{5}{3}x$

Focus:
 $(-\frac{5}{12}, 0)$
Directrix:
 $x = \frac{5}{12}$



$\frac{3y^2}{3} = -\frac{5x}{3}$
 $y^2 = -\frac{5}{3}x$

$4p = -\frac{5}{3}$
 $p = -\frac{5}{12}$

$$x^2 = 4py \quad y^2 = 4px$$

Find the equation for the parabola. All vertices are at the origin.

7. Focus (0, -2) $p = -2$

$$x^2 = 4py \Rightarrow x^2 = 4(-2)y$$

Equation: $x^2 = -8y$

8. Focus (8, 0)

$$p = 8$$

$$y^2 = 4px$$

$$y^2 = 4 \cdot 8x$$

Equation: $y^2 = 32x$

9. Directrix $x = -2$ $p = 2$

$$y^2 = 4px \quad y^2 = 4 \cdot 2 \cdot x$$

Equation: $y^2 = 8x$

10. Directrix $y = 10$ $p = -10$

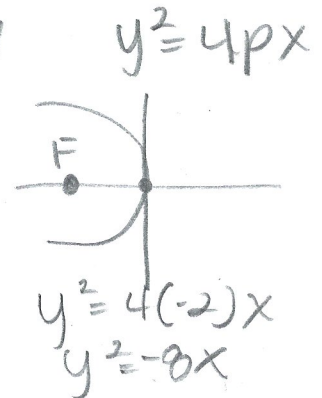
$$x^2 = 4py \quad x^2 = 4(-10)y$$

Equation: $x^2 = -40y$

11. Focus on the negative x-axis, focus is 4 units away from directrix
 p is negative

thus $p = 2$
 $p = -2$

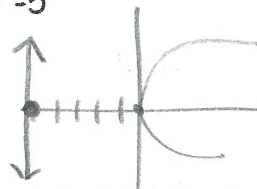
Equation: $y^2 = -8x$



12. Directrix has a x-intercept -5

$$x = -5 \quad p = 5$$

Equation: $y^2 = 20x$



$$y^2 = 4px \quad y^2 = 4(5)x$$

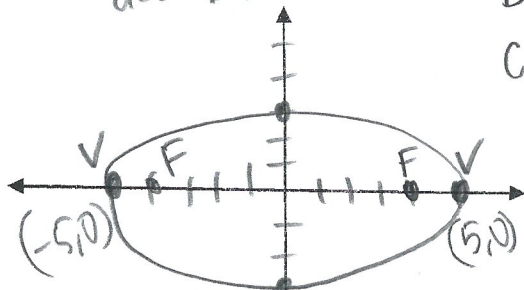
Find the vertices (two points) and foci (two points) of the ellipse. Determine the major and minor axes. Then graph the ellipse.

13. $\frac{x^2}{25} + \frac{y^2}{9} = 1$
 $a = 5 \quad b = 3$

$$a = 5 \text{ (x-axis)}$$

$$b = 3 \text{ (y-axis)}$$

$$c = 4$$



$$c^2 = a^2 - b^2$$

$$c^2 = 5^2 - 3^2$$

$$c^2 = 25 - 9$$

$$\sqrt{c^2} = \sqrt{16}$$

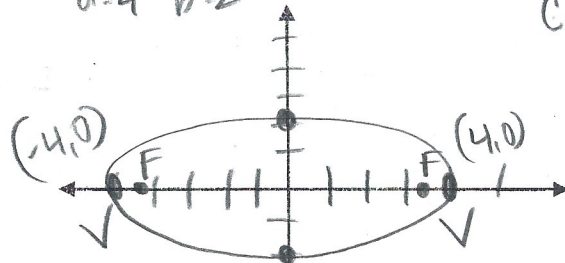
$$c = 4$$

14. $\frac{x^2}{16} + \frac{y^2}{4} = 1$
 $a = 4 \quad b = 2$

$$a = 4 \text{ (x-axis)}$$

$$b = 2 \text{ (y-axis)}$$

$$c =$$



$$c^2 = a^2 - b^2$$

$$c^2 = 4^2 - 2^2$$

$$c^2 = 16 - 4$$

$$\sqrt{c^2} = \sqrt{12}$$

$$c = 2\sqrt{3} = 3.5$$

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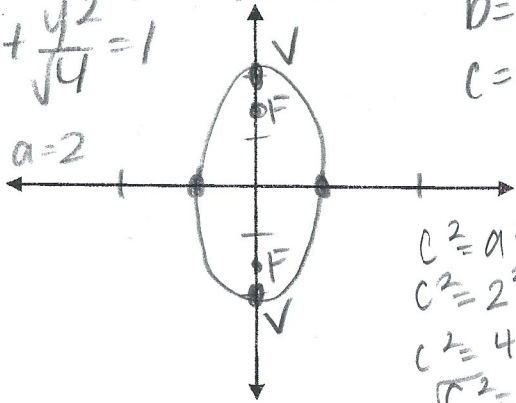
Vertices: $(5,0), (-5,0)$
 Foci: $(4,0), (-4,0)$
 Major axis: $\underline{10}$ $2a$
 Minor axis: $\underline{6}$ $2b$

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Vertices: $(4,0), (-4,0)$
 Foci: $(2\sqrt{3},0), (-2\sqrt{3},0)$
 Major axis: $\underline{8}$ $2a$
 Minor axis: $\underline{4}$ $2b$

15. $4x^2 + y^2 = 4$

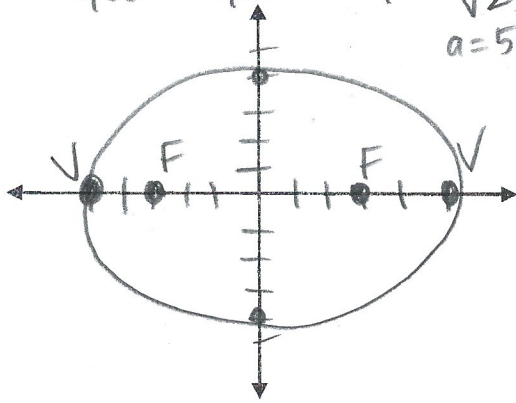
$\frac{x^2}{1} + \frac{y^2}{4} = 1$
 $b=1$ $a=2$



$a = 2$ y-axis
 $b = 1$ x-axis
 $c^2 = a^2 - b^2$
 $c^2 = 2^2 - 1^2$
 $c^2 = 4 - 1$
 $\sqrt{c^2} = \sqrt{3}$
 $c = \sqrt{3} = 1.7$

Vertices: $(0,2), (0,-2)$
 Foci: $(0,\sqrt{3}), (0,-\sqrt{3})$
 Major axis: $\underline{4}$ $2a$
 Minor axis: $\underline{2}$ $2b$

16. $\frac{16x^2}{400} + \frac{25y^2}{400} = \frac{400}{400}$ $\frac{x^2}{25} + \frac{y^2}{16} = 1$
 $a=5$ $b=4$



$a = 5$ x-axis
 $b = 4$ y-axis
 $c = 3$
 $c^2 = a^2 - b^2$
 $c^2 = 5^2 - 4^2$
 $c^2 = 25 - 16$
 $\sqrt{c^2} = \sqrt{9}$
 $c = 3$

Vertices: $(5,0), (-5,0)$
 Foci: $(3,0), (-3,0)$
 Major axis: $\underline{10}$ $2a$
 Minor axis: $\underline{8}$ $2b$

Find an equation for the ellipse that satisfies the given conditions.

17. Foci $(\pm 4, 0)$, vertices $(\pm 5, 0)$

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

$a = 5$ x-axis
 $b = 3$ y-axis

Equation: $\underline{\frac{x^2}{25} + \frac{y^2}{9} = 1}$

$c^2 = a^2 - b^2$
 $4^2 = 5^2 - b^2$
 $16 = 25 - b^2$
 $-9 = -b^2$
 $3 = b$
 $c = 4$

18. Length of major axis 8, length of minor axis 4, foci on y-axis

$\frac{x^2}{4} + \frac{y^2}{16} = 1$

Equation: $\underline{\frac{x^2}{4} + \frac{y^2}{16} = 1}$

$a = 4$ y-axis
 $b = 2$ x-axis
 $c =$

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

$$c^2 = a^2 - b^2$$

$$3^2 = a^2 - b^2$$

$$9 = a^2 - 36$$

$$+36 \quad +36$$

$$\sqrt{a^2} = \sqrt{45}$$

$$a = \sqrt{45}$$

$$2b = 12$$

19. Foci $(0, \pm 3)$, length of minor axis 12

$$\frac{x^2}{b^2} + \frac{y^2}{45} = 1$$

Equation: $\frac{x^2}{36} + \frac{y^2}{45} = 1$

$$c^2 = a^2 - b^2$$

$$3^2 = 5^2 - b^2$$

$$9 = 25 - b^2$$

$$-25 -25$$

$$\sqrt{16} = \sqrt{b^2}$$

$$b = 4$$

$$2a = 10$$

20. Endpoints of major axis $(\pm 10, 0)$,

distance between foci $\frac{6}{2} = 3$

$$\frac{x^2}{5^2} + \frac{y^2}{4^2} = 1$$

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

$$a = 5 \text{ x-axis}$$

$$b = 4 \text{ y-axis}$$

$$c = 3$$

21. foci $(\pm 5, 0)$, length of major axis 6

~~$$c^2 = a^2 - b^2$$

$$5^2 = 3^2 - b^2$$

$$25 = 9 - b^2$$

$$-9 -9$$~~

~~$$a = 3 \text{ x-axis}$$

$$b = \text{y-axis}$$

$$c = 5$$~~

22. Endpoints of minor axis $(0, \pm 3)$,

distance between foci $\frac{8}{2} = 4$

~~$$c^2 = a^2 - b^2$$

$$4^2 = a^2 - 3^2$$

$$16 = a^2 - 9$$

$$+9 \quad +9$$~~

~~$$a = 5 \text{ x-axis}$$

$$b = 3 \text{ y-axis}$$

$$c = 4$$~~

~~$$\sqrt{25} = \sqrt{a^2}$$

$$5 = a$$~~

$$\frac{x^2}{5^2} + \frac{y^2}{3^2} = 1$$

Equation: $\frac{x^2}{25} + \frac{y^2}{9} = 1$