Honors Precalculus
Unit 4 Lesson 3

Name KEY?

Hyperbolas

Match each equation to its graph.

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

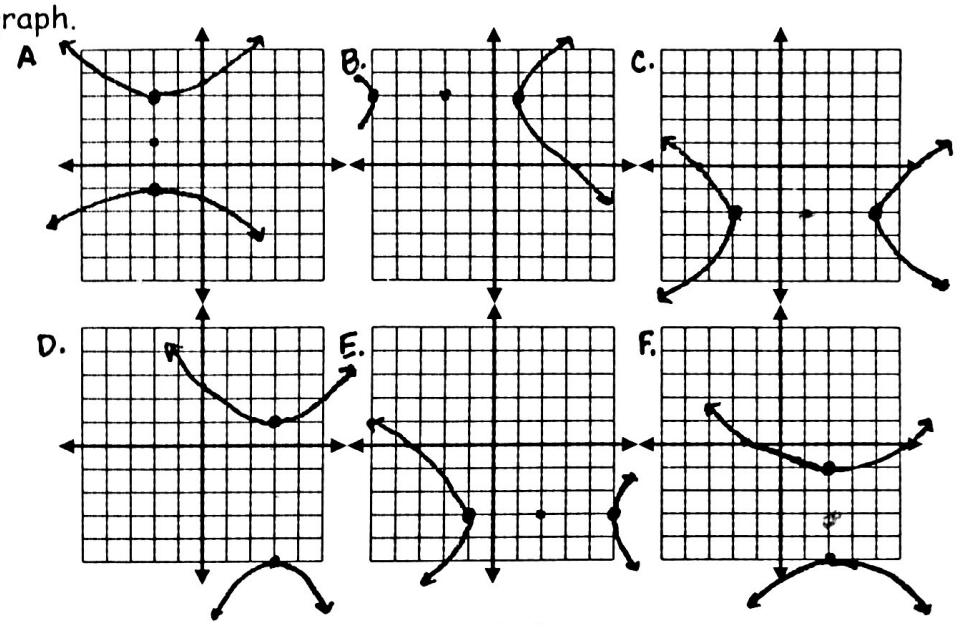
E 2. $\frac{(x-2)^2}{9} - \frac{(y+3)^2}{4} = 1$

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

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

C 5. $\frac{(x-1)^2}{9} - \frac{(y+2)^2}{4} = 1$

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



Find the vertices, asymptotes, center, and foci of each hyperbola.

7. $\frac{x^2}{9} - \frac{y^2}{49} = 1$
C: (0, 0) V: (±3, 0)
F: $(\pm 2\sqrt{10}, 0)$ As: $y = \pm\frac{7}{3}x$

8. $\frac{(y-1)^2}{16} - \frac{(x+2)^2}{25} = 1$
C: (-2, 1) V: $(-2, 1 \pm 4)$
F: $(-2, 1 \pm \sqrt{41})$ As: $y - 1 = \pm\frac{4}{5}(x+2)$

9. $\frac{(x-1)^2}{25} - \frac{(y+2)^2}{9} = 1$
C: (1, -2) V: $(1 \pm 5, -2)$
F: $(1 \pm \sqrt{34}, -2)$ As: $y + 2 = \pm\frac{3}{5}(x-1)$

Write the equation in standard form given the following information.

10. Vertices: (4, 0) (4, 8)
Foci: (4, -1) (4, 9)
C: (4, 4)
a = 4 b = 3 c = 5
$c^2 = a^2 + b^2$
$\frac{(y-4)^2}{16} - \frac{(x-4)^2}{9} = 1$

11. Vertices: (-1, 6) (9, 6)
Foci: (17, 6) (-9, 6)
C: (4, 6)
a = 5 b = 12 c = 13
$\frac{(x-4)^2}{25} - \frac{(y-6)^2}{144} = 1$

Put each equation in standard form. Find the vertices, asymptotes, and foci.

12. $15x^2 - 12y^2 = 180$
$\frac{x^2}{12} - \frac{y^2}{15} = 1$
C: (0, 0) F: $(\pm 3\sqrt{3}, 0)$
As: $y = \pm\frac{\sqrt{15}}{\sqrt{12}}x$

13. $6(y+1)^2 - 4(x-3)^2 = 24$
$\frac{(y+1)^2}{4} - \frac{(x-3)^2}{6} = 1$
C: (3, -1)
F: $(3, -1 \pm \sqrt{10})$
As: $y + 1 = \pm\frac{2}{\sqrt{6}}(x-3)$

14. $10x^2 - 20x - 4y^2 - 16y - 46 = 0$
$\frac{(x-1)^2}{4} - \frac{(y+2)^2}{10} = 1$
C: (1, -2)
F: $(1 \pm \sqrt{14}, -2)$
As: $y + 2 = \pm\frac{\sqrt{10}}{2}(x-1)$

Sketch the graph of each hyperbola.

15. $\frac{x^2}{121} - \frac{y^2}{9} = 1$

16. $\frac{(y+2)^2}{36} - \frac{(x-2)^2}{100} = 1$

17. $\frac{(x+1)^2}{81} - \frac{y^2}{64} = 1$

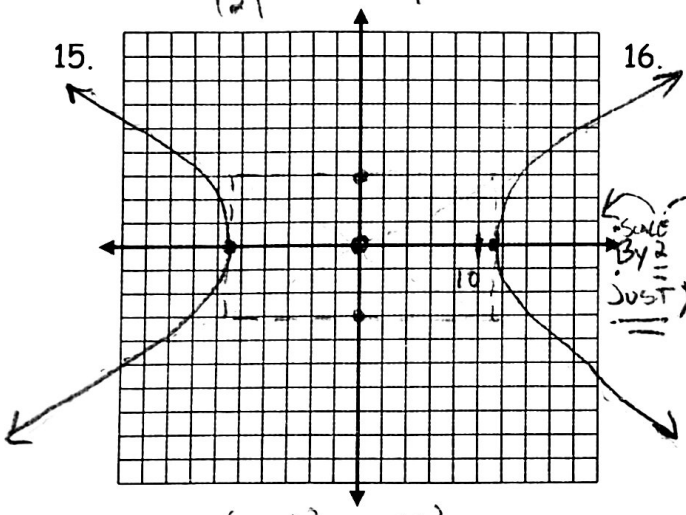
ON BACK

18. $\frac{(y-3)^2}{36} - \frac{(x+2)^2}{64} = 1$

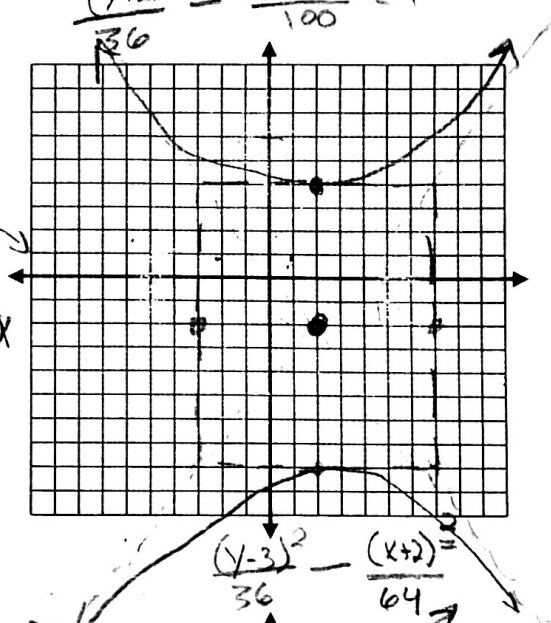
19. $\frac{(y+3)^2}{16} - \frac{x^2}{4} = 1$

18. $25x^2 + 100x - 9y^2 + 18y - 134 = 0$

15. $\frac{x^2}{121} - \frac{y^2}{9} = 1$

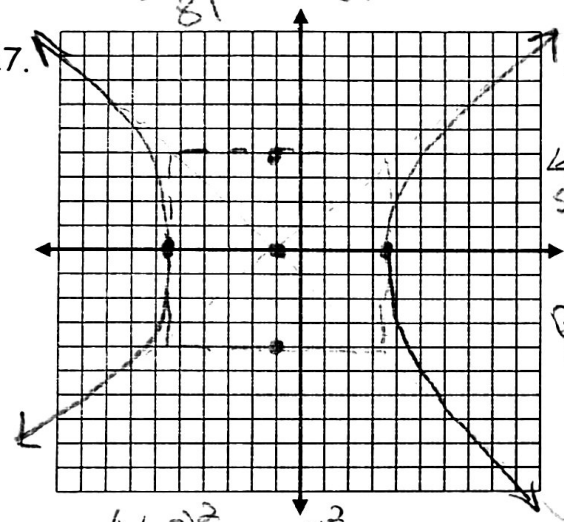


16. $\frac{(y+2)^2}{36} - \frac{(x-2)^2}{100} = 1$

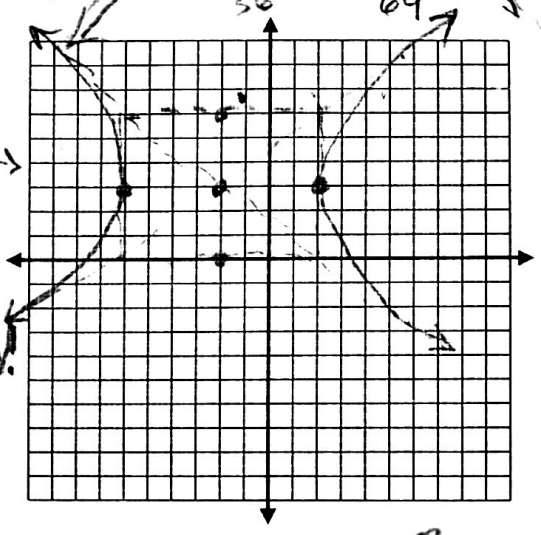


SCALE BY 2 = JUST X

17. $\frac{(x+1)^2}{81} - \frac{y^2}{64} = 1$

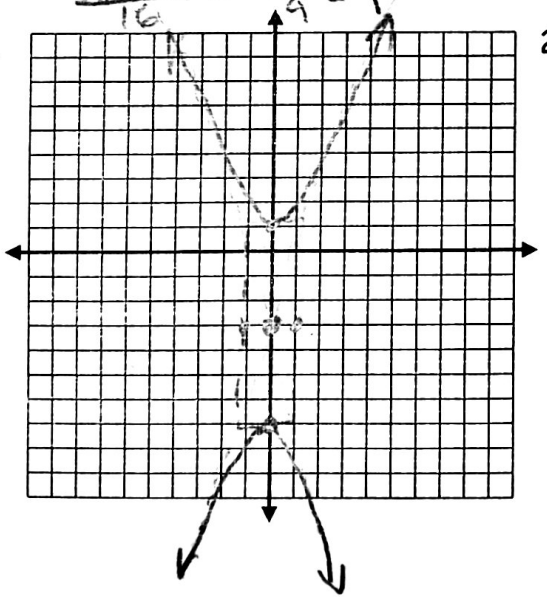


18. $\frac{(y-3)^2}{36} - \frac{(x+2)^2}{64} = 1$

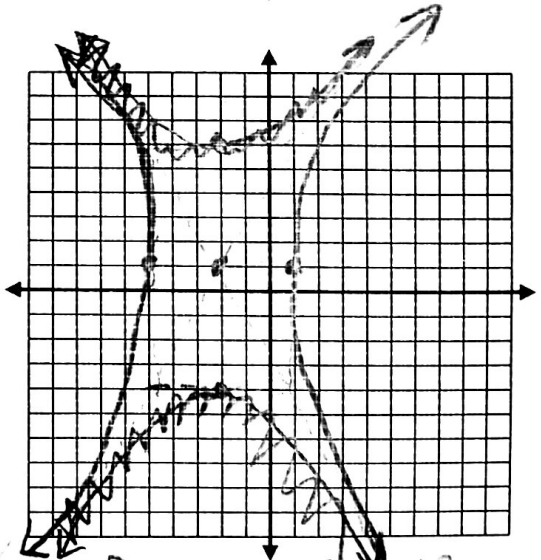


SCALE BY 2 = BOTH X AND Y.

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



20.



$25x^2 + 100x - 9y^2 + 18y - 134 = 0$

$(25x^2 + 100x) + (-9y^2 + 18y) = 134$

$25(x^2 + 4x + \underline{4}) - 9(y^2 - 2y + \underline{1}) = 134 + \underline{100} + \underline{-9}$

$25(x+2)^2 - 9(y-1)^2 = 225$

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