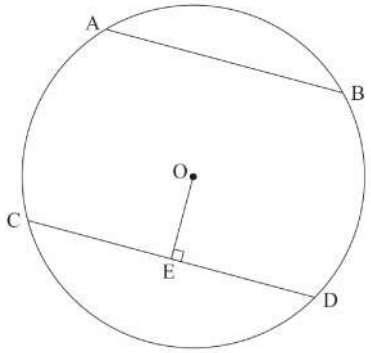
129. A circle with centre O has parallel chords AB and CD. If $AB = 12$ cm, $CD = 16$ cm, $OE = 5$ cm and $OE \perp CD$, determine the distance between the chords.



SPECS 2001

130. Determine the vertex of $x = -2(y-3)^2 - 5$

A. $(-5, 3)$ B. $(-3, 5)$ C. $(3, 5)$ D. $(5, 3)$

131. Determine the vertices of $\frac{x^2}{4} + \frac{y^2}{9} = 1$.

A. $(-4, 0), (4, 0)$ B. $(-2, 0), (2, 0)$ C. $(0, 3), (0, -3)$ D. $(0, 9), (0, -9)$

132. Identify the conic that is described by $x^2 + 6y^2 - 18y - 45 = 0$.

A. circle B. ellipse C. parabola D. hyperbola

133. Determine the slopes of the asymptotes of $\frac{(x-2)^2}{36} - \frac{(y+3)^2}{9} = 1$

A. $\pm\frac{1}{4}$ B. $\pm\frac{1}{2}$ C. ± 2 D. ± 4

134. If m and n are positive integers, determine the radius of the circle $mx^2 + my^2 - n = 0$.

A. $\sqrt{\frac{n}{m}}$ B. $\sqrt{\frac{m}{n}}$ C. $\frac{n}{m}$ D. $\frac{m}{n}$

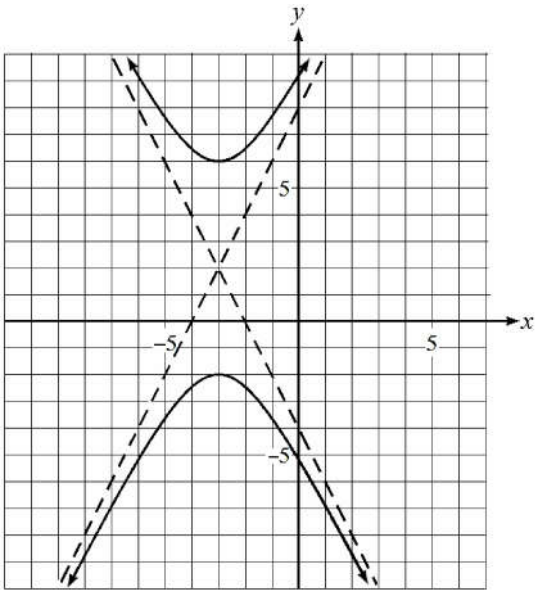
135. Determine the standard form equation of the conic graphed below.

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

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

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

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



136. Give conditions for the constants A, C, and D such that the following equation is a parabola with a horizontal axis of symmetry: $Ax^2 + Cy^2 + Dx + y = 0$

A. $A \neq 0,\ C = 0,\ D = 0$

B. $A \neq 0,\ C = 0,\ D \neq 0$

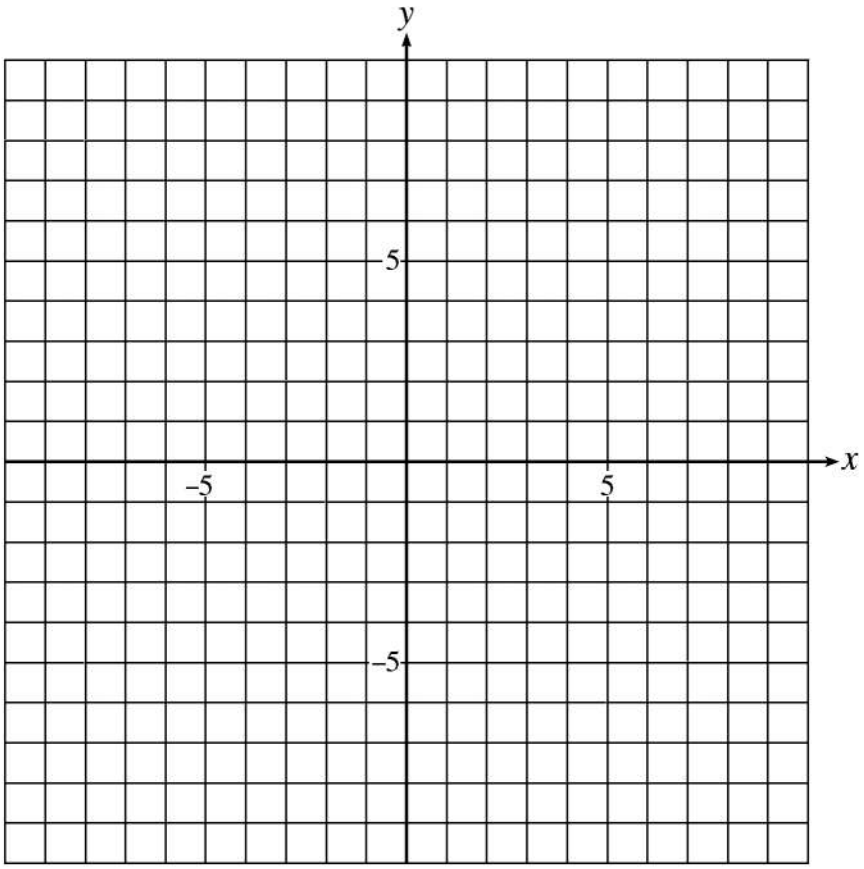
C. $A = 0,\ C \neq 0,\ D \neq 0$

D. $A = 0,\ C \neq 0,\ D = 0$

137. If $AC < 0$, which conic could be represented by the equation $Ax^2 + Cy^2 + Dx + Ey + F = 0$?

A. circle B. ellipse C. parabola D. hyperbola

138. Given the conic $25x^2 + 16y^2 + 100x - 32y - 284 = 0$:
Change the equation to standard form and graph on the grid below.



SAMPLE 2001

139. Determine the equations of the asymptotes of $\frac{(x-1)^2}{9} - \frac{(y+2)^2}{4} = 1$

A. $y+2 = \pm\frac{2}{3}(x-1)$ B. $y+2 = \pm\frac{3}{2}(x-1)$ C. $y+2 = \pm\frac{4}{9}(x-1)$ D. $y+2 = \pm\frac{9}{4}(x-1)$

140. Determine the vertex of a $x = -3(y+5)^2 - 2$.

A. $(-5, -2)$ B. $(-2, -5)$ C. $(-2, 5)$ D. $(5, -2)$

141. Which of the following describes the graph of the relation $Ax^2 + y^2 = 16$ where $0 < a < 1$?

A. circle with a radius 4

B. an ellipse with a vertical major axis

C. an ellipse with a horizontal major axis

D. a parabola with a vertical axis of symmetry

142. An ellipse is tangent to the lines $x = -5$ and $x = 1$. If the centre of the ellipse is on the line $y = 3$ and the length of the major axis is 12, determine the equation of the ellipse.

A. $\frac{(x-2)^2}{9} + \frac{(y-3)^2}{36} = 1$

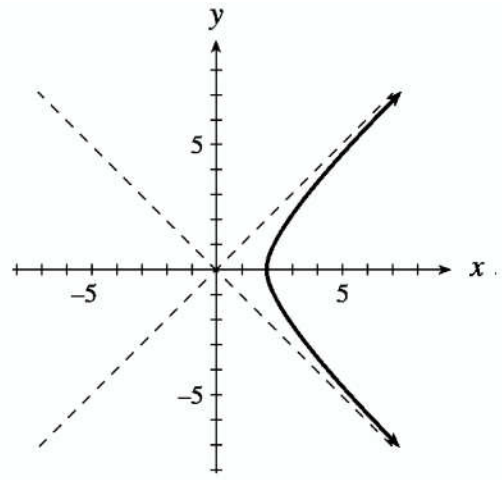
B. $\frac{(x+2)^2}{9} + \frac{(y-3)^2}{36} = 1$

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

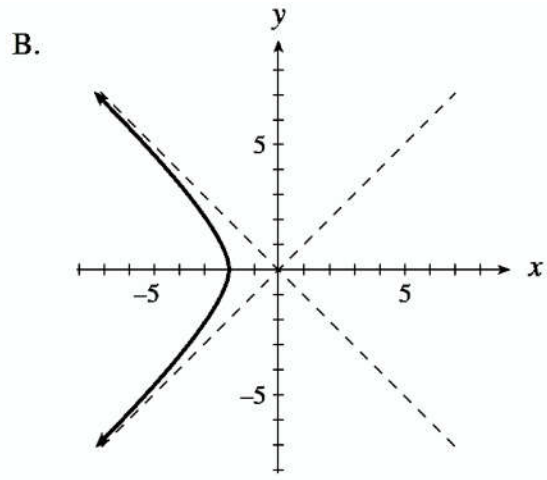
D. $\frac{(x+2)^2}{9} + \frac{(y-3)^2}{144} = 1$

143. Which of the following is the graph of the relation $\log(x-y) + \log(x+y) = \log 4$?

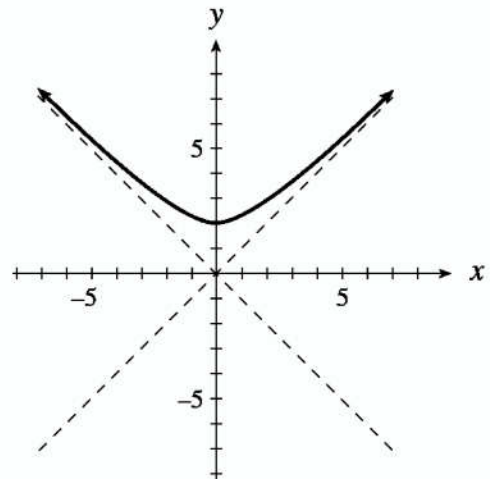
A.



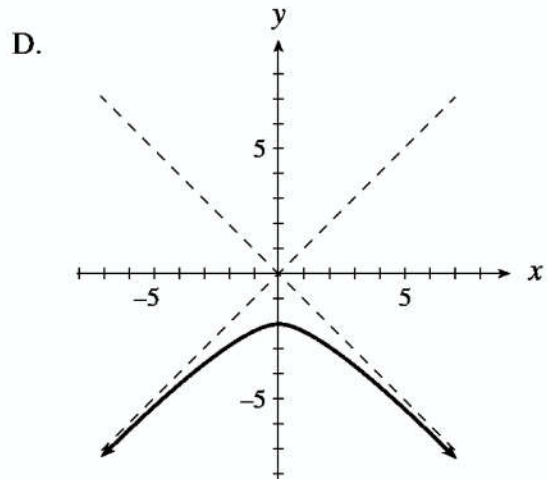
B.



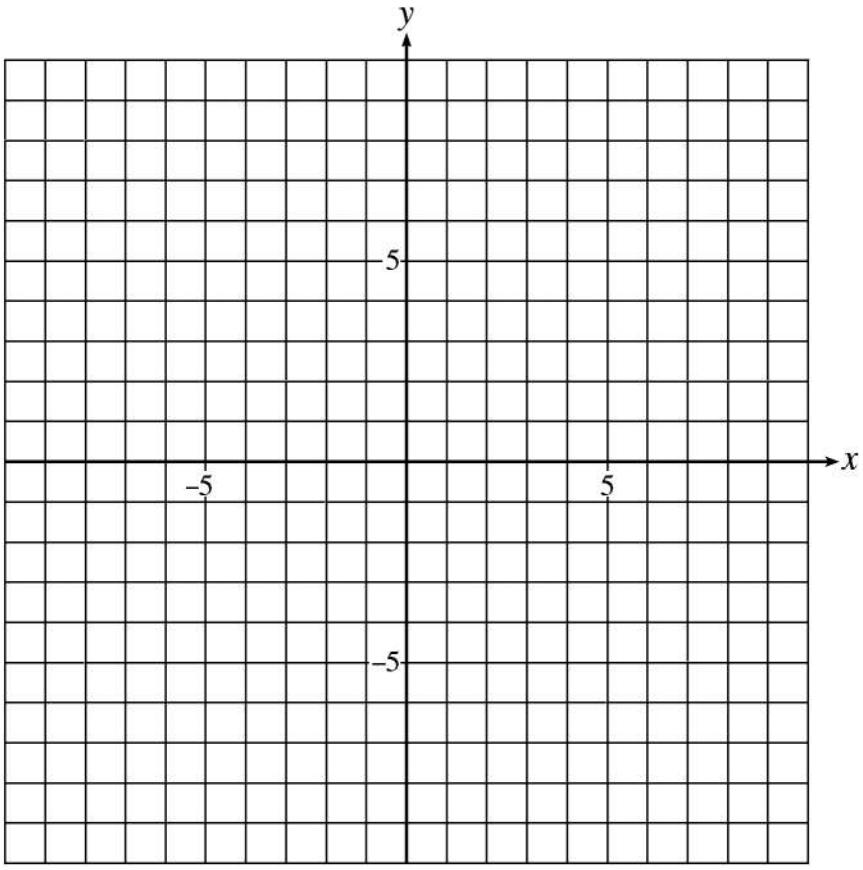
C.



D.



144. Change $x + 2y^2 + 12y + 16 = 0$ to standard form and graph on the grid below.



JAN 2002

145. Determine the radius of the circle: $(x-5)^2 + (y+8)^2 = 100$.

A. 10 B. 25 C. 50 D. 100

146. Determine the distance between the vertices of $\frac{(x-3)^2}{25} - \frac{(y-4)^2}{9} = 1$.

A. 3 B. 5 C. 6 D. 10

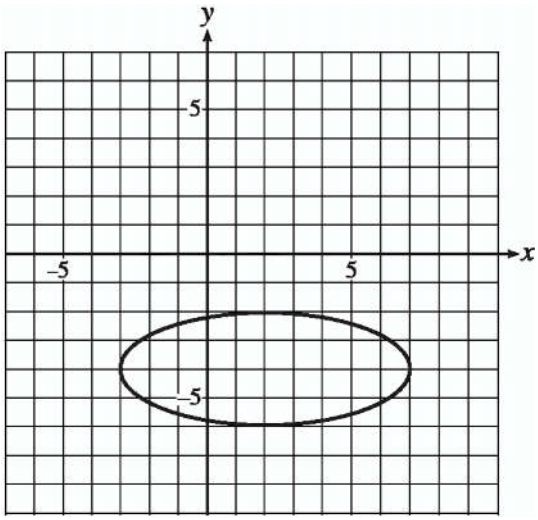
147. Determine an equation of the conic graphed below.

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

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

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

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



148. Determine the restrictions on the constants A, C, and E such that $Ax^2+Cy^2+x+Ey=0$ is a parabola with a vertical axis of symmetry.

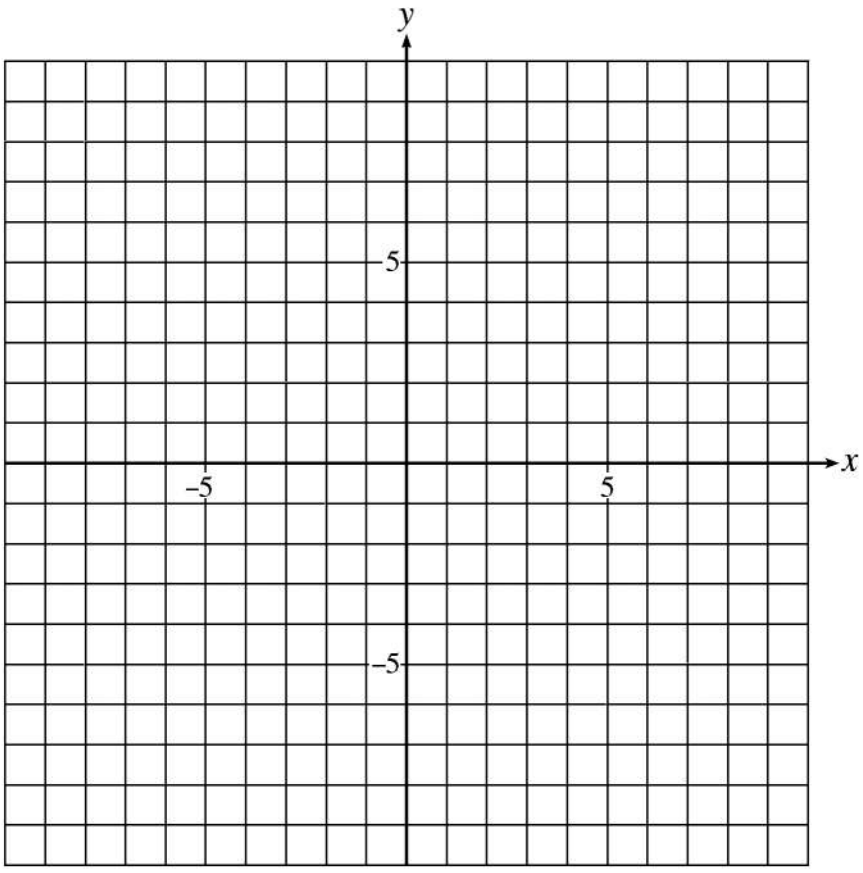
A. $A=0,\ C\neq 0,\ E\neq 0$

B. $A=0,\ C\neq 0,\ E=0$

C. $A\neq 0,\ C=0,\ E=0$

D. $A\neq 0,\ C=0,\ E\neq 0$

149. Change $9x^2-16y^2-36x-96y-252=0$ to standard form and graph on the grid below.



APR 2002

150. Determine the length of the transverse axis of $\frac{x^2}{1} - \frac{y^2}{9} = 1$.

A. 1 B. 2 C. 3 D. 6

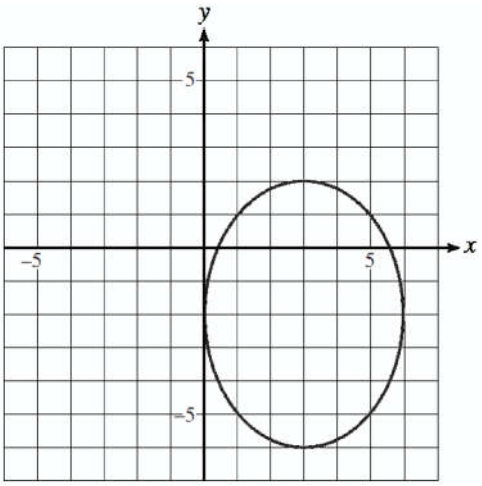
151. Determine an equation of the ellipse graphed below.

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

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

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

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

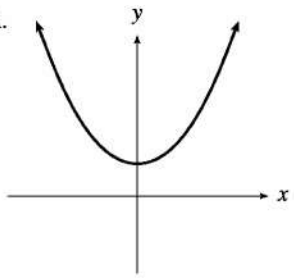


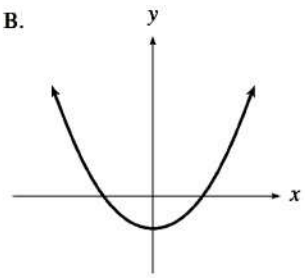
152. Determine the equation of the circle with centre (4, −3) that passes through the point (2, 1).

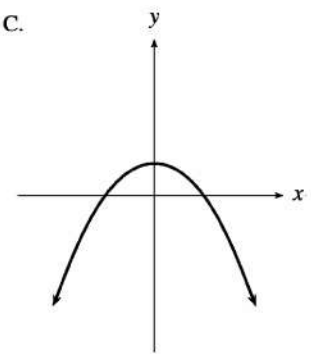
A. $(x+4)^2 + (y-3)^2 = 2\sqrt{10}$ B. $(x+4)^2 + (y-3)^2 = 40$

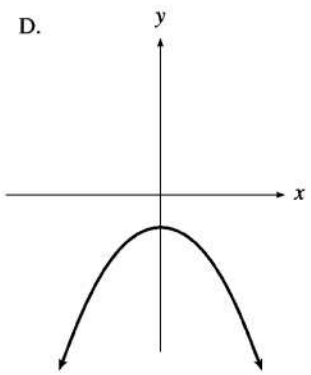
C. $(x-4)^2 + (y+3)^2 = 2\sqrt{5}$ D. $(x-4)^2 + (y+3)^2 = 20$

153. Which of the following best represents the graph of the relation $Ax^2 + By + C = 0$ where A, B, and C are positive integers?

A.


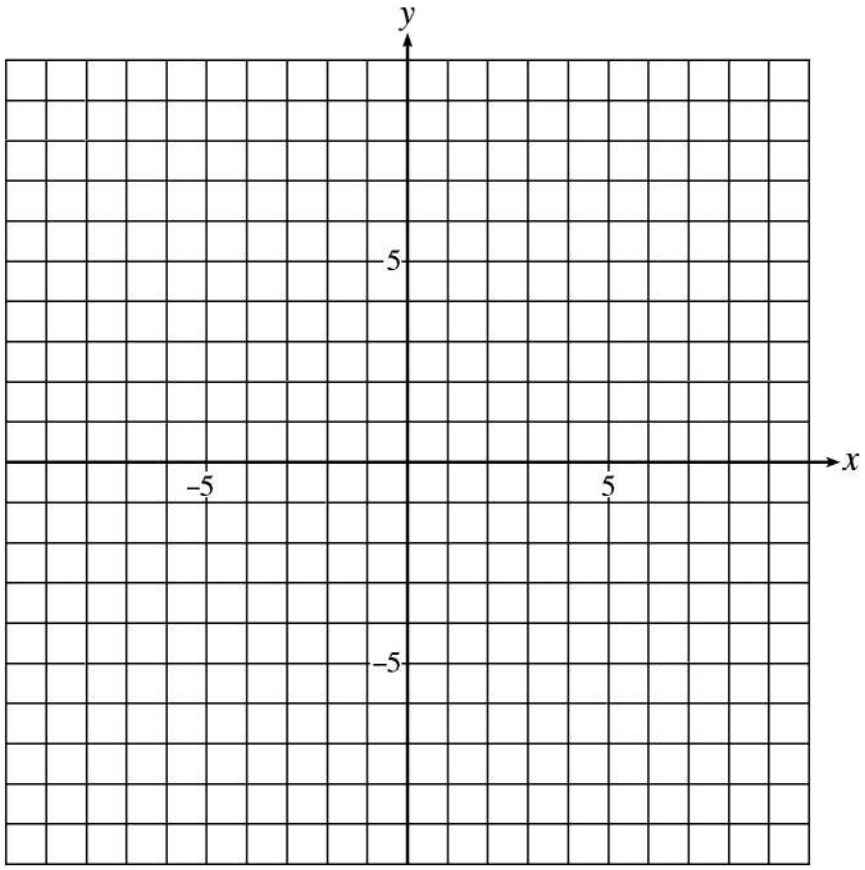
B.


C.


D.


154. Change $4x^2 - 9y^2 + 32x + 18y + 91 = 0$ to standard form.

Graph the conic on the grid below.



JUN 2002

155. Determine the slopes of the asymptotes of $\frac{x^2}{4} - \frac{y^2}{9} = 1$.

A. $\pm\frac{2}{3}$ B. $\pm\frac{3}{2}$ C. $\pm\frac{4}{9}$ D. $\pm\frac{9}{4}$

156. Determine the vertex of the parabola $x = -(y+4)^2 + 3$.

A. $(3, 4)$ B. $(3, -4)$ C. $(-4, 3)$ D. $(4, 3)$

157. Determine the coordinates of the endpoints of the major axis of $\frac{(x-1)^2}{16}+\frac{(y+2)^2}{25}=1$.

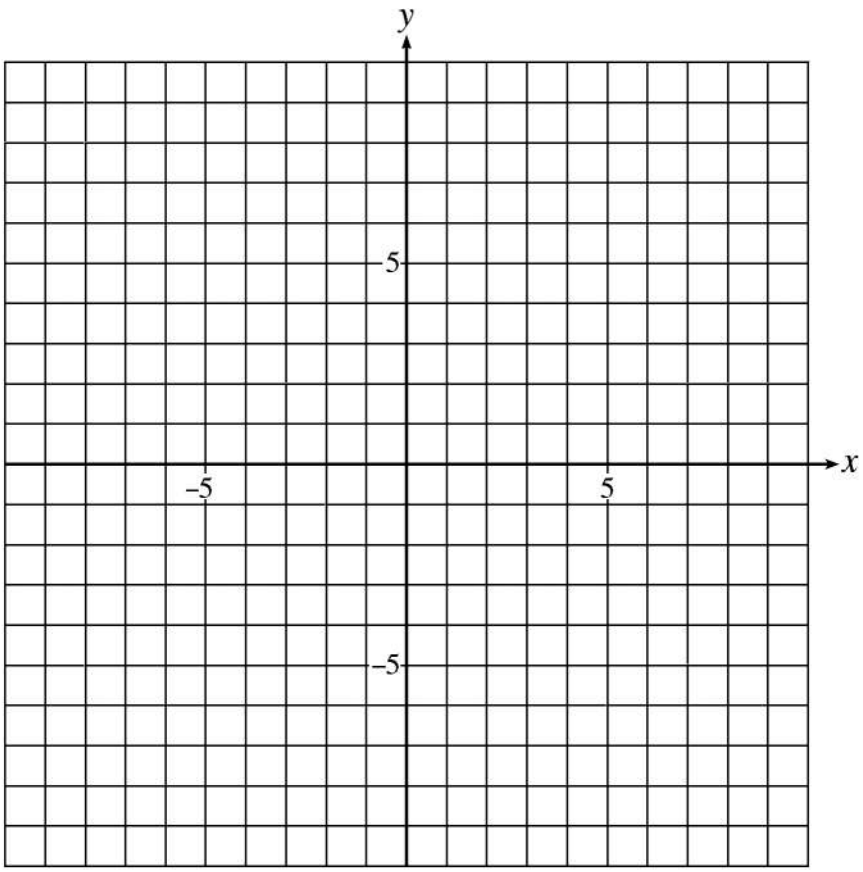
A. $(-3, -2), (5, -2)$ B. $(-3, 2), (5, 2)$ C. $(1, 3), (1, -7)$ D. $(1, 7), (1, -3)$

158. The equation $Ax^2+By^2+Cx=1$ represents an ellipse (not a circle). If $A > 0$ and $B > 0$, what conditions must be satisfied if the ellipse has its major axis on the y-axis?

A. $C=0,\ A<B$ B. $C=0,\ A>B$ C. $C\neq 0,\ A<B$ D. $C\neq 0,\ A>B$

159. Change $4y^2+16y-9x^2+18x-29=0$ to standard form.

Graph the conic on the grid below.



AUG 2002

160. Identify the conic: $2x^2 - 3y + 2x - 5 = 0$

A. circle B. ellipse C. parabola D. hyperbola

161. Change to standard form: $2x^2 + y^2 - 4x - 8 = 0$

A. $\frac{(x-1)^2}{4} + \frac{y^2}{8} = 1$ B. $\frac{(x-1)^2}{5} + \frac{y^2}{10} = 1$ C. $\frac{(x-1)^2}{6} + \frac{y^2}{12} = 1$ D. $\frac{(x-1)^2}{\frac{9}{2}} + \frac{y^2}{9} = 1$

162. Determine the axis of symmetry for $x = 2(y+1)^2 - 3$.

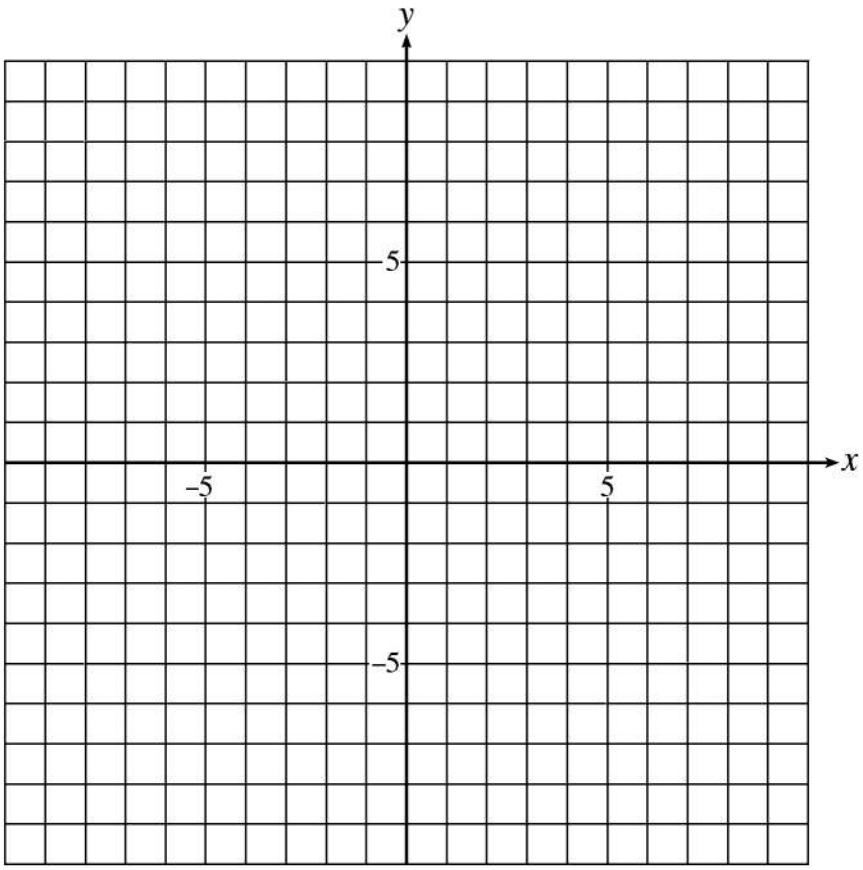
A. $x = -3$ B. $x = 3$ C. $y = 1$ D. $y = -1$

163. Given the hyperbola $Ax^2 - By^2 = 1$, determine values for the constants A, and B such that the hyperbola will have vertices on the y-axis.

A. $A < 0,\ B < 0$ B. $A > 0,\ B < 0$ C. $A < 0,\ B > 0$ D. $A > 0,\ B > 0$

164. An ellipse has vertices at $(-6, -4)$ and $(2, -4)$. If the length of the minor axis is 6, determine the equation of the ellipse in standard form.

Graph the conic on the grid below.



JAN 2003

165. Identify the conic: $8x^2 - 8y^2 + 4x - 4y - 32 = 0$

A. circle B. ellipse C. parabola D. hyperbola

166. Determine an equation of the circle with centre $(-2, 5)$ and radius 4.

A. $(x-2)^2 + (y+5)^2 = 4$ B. $(x-2)^2 + (y+5)^2 = 16$

C. $(x+2)^2 + (y-5)^2 = 4$ D. $(x+2)^2 + (y-5)^2 = 16$

167. Determine an equation of the parabola with vertex $(3, -2)$ that passes through the point $(0, 1)$ and has a horizontal axis of symmetry.

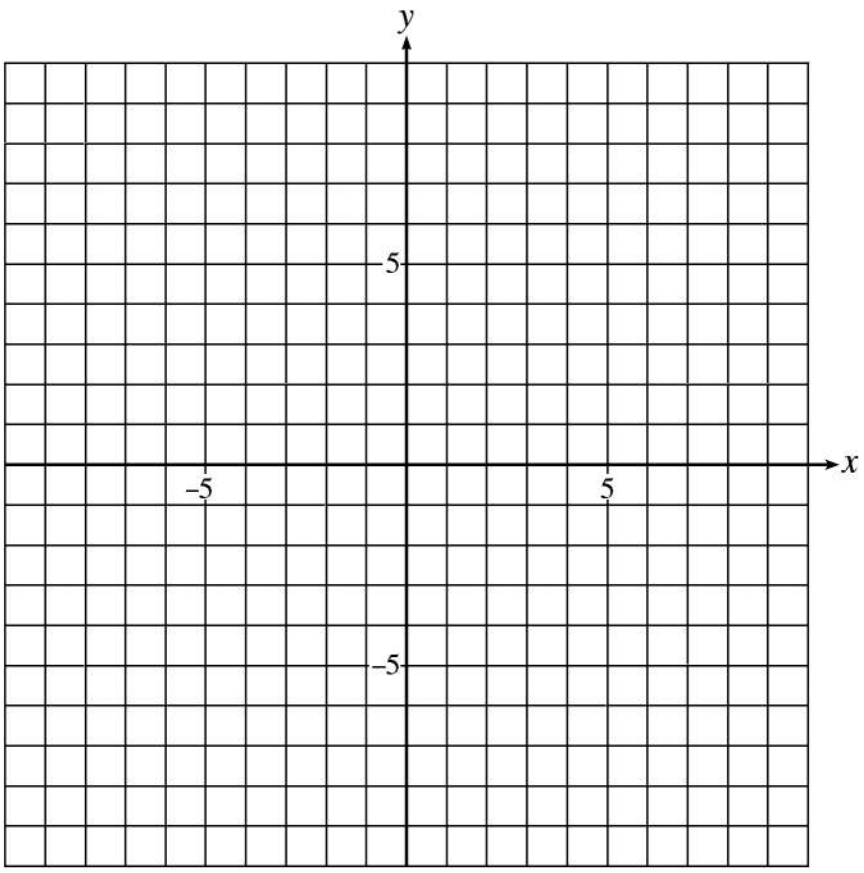
A. $x = -\frac{1}{2}(y+2)^2 + 3$ B. $x = -\frac{1}{3}(y+2)^2 + 3$ C. $y = \frac{1}{3}(x-3)^2 - 2$ D. $y = \frac{1}{2}(x-3)^2 - 2$

168. The equation $Ax^2 + Cy^2 + Dx + Ey - 1 = 0$ represents an ellipse (not a circle). If $A > 0$ and $C > 0$, what conditions must be satisfied if the ellipse has its major axis on the x-axis?

A. $A < C,\ D = 0$ B. $A < C,\ E = 0$ C. $A > C,\ D = 0$ D. $A > C,\ E = 0$

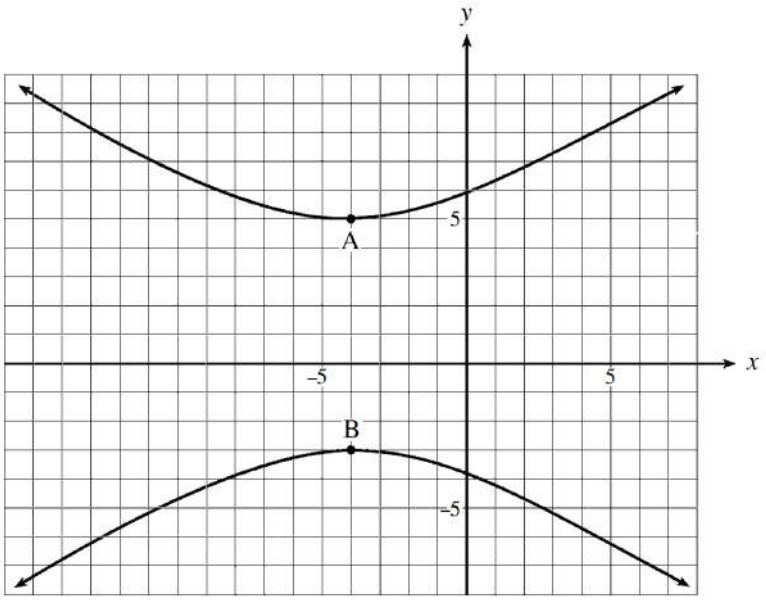
169. Change $2y^2 + x + 12y + 23 = 0$ to standard form.

Graph the conic on the grid below.



APR 2003

170. Determine an equation of the hyperbola graphed below if the slopes of the asymptotes are $\pm\frac{2}{3}$ and the vertices are points A and B.



JUN 2003

171. When a plane is parallel to the generator of a double-napped cone, which conic section is formed by the intersection of the plane and the cone?

A. circle B. ellipse C. parabola D. hyperbola

172. Determine the vertex of the parabola $x = 2(y+1)^2 - 4$.

A. $(-1, -4)$ B. $(-4, -1)$ C. $(1, 4)$ D. $(4, 1)$

173. The length of the transverse axis of a hyperbola is 12. The equations of the asymptotes for the hyperbola are $\pm\frac{2}{3}x$. If the vertices of the hyperbola are on the y-axis, determine its equation.

A. $\frac{x^2}{9} - \frac{y^2}{4} = 1$ B. $\frac{x^2}{16} - \frac{y^2}{36} = 1$ C. $\frac{x^2}{36} - \frac{y^2}{16} = 1$ D. $\frac{x^2}{81} - \frac{y^2}{36} = 1$

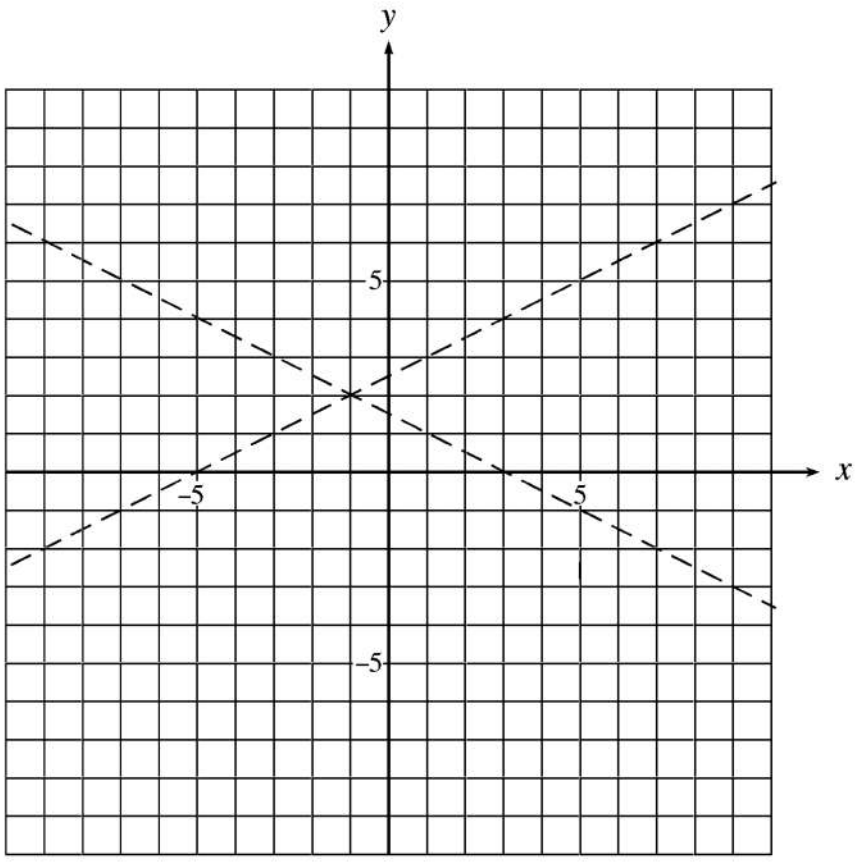
174. The equation $Ax^2 + By^2 + Cy = 0$ represents an ellipse. If $A < B < C$, then the vertices of the ellipse are

A. on the y-axis
B. on the x-axis
C. parallel to the y-axis
D. parallel to the x-axis

175. Change $3x^2 - 2y^2 - 6x - 12y - 27 = 0$ to standard form.

AUG 2003

176. The asymptotes of a hyperbola are shown below.



a) Determine an equation of the hyperbola if the transverse axis is horizontal and has a length of 8.

b) Sketch the graph of the relation above.

JAN 2004

177. Identify the conic: $3x^2 + 5x - 2y + 6 = 0$

A. circle B. ellipse C. parabola D. hyperbola

178. Change to general form: $\frac{(x-1)^2}{4} + \frac{(y+2)^2}{7} = 1$

A. $7x^2 + 4y^2 - 5 = 0$ B. $7x^2 + 4y^2 + 22 = 0$

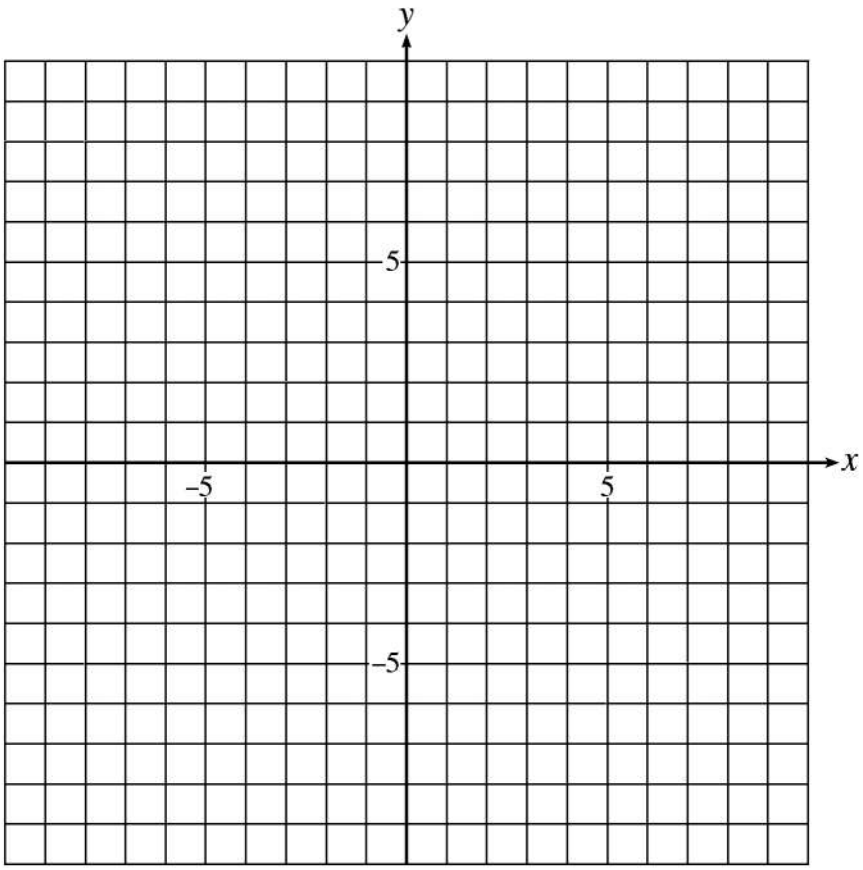
C. $7x^2 + 4y^2 - 14x + 16y - 5 = 0$ D. $7x^2 + 4y^2 - 14x + 16y + 22 = 0$

179. Given the hyperbola $\frac{(x-1)^2}{25} - \frac{(y+3)^2}{4} = 1$, determine an equation of one of its asymptotes.

A. $y = \frac{2}{5}x - \frac{17}{5}$ B. $y = \frac{2}{5}x + \frac{17}{5}$ C. $y = \frac{2}{5}x - \frac{11}{2}$ D. $y = \frac{2}{5}x + \frac{11}{2}$

180. An ellipse has vertices at $(3, -2)$ and $(3, 6)$. If the ellipse passes through the point $(0, 0)$, determine the equation of the ellipse in standard form.

Graph the conic on the grid below.



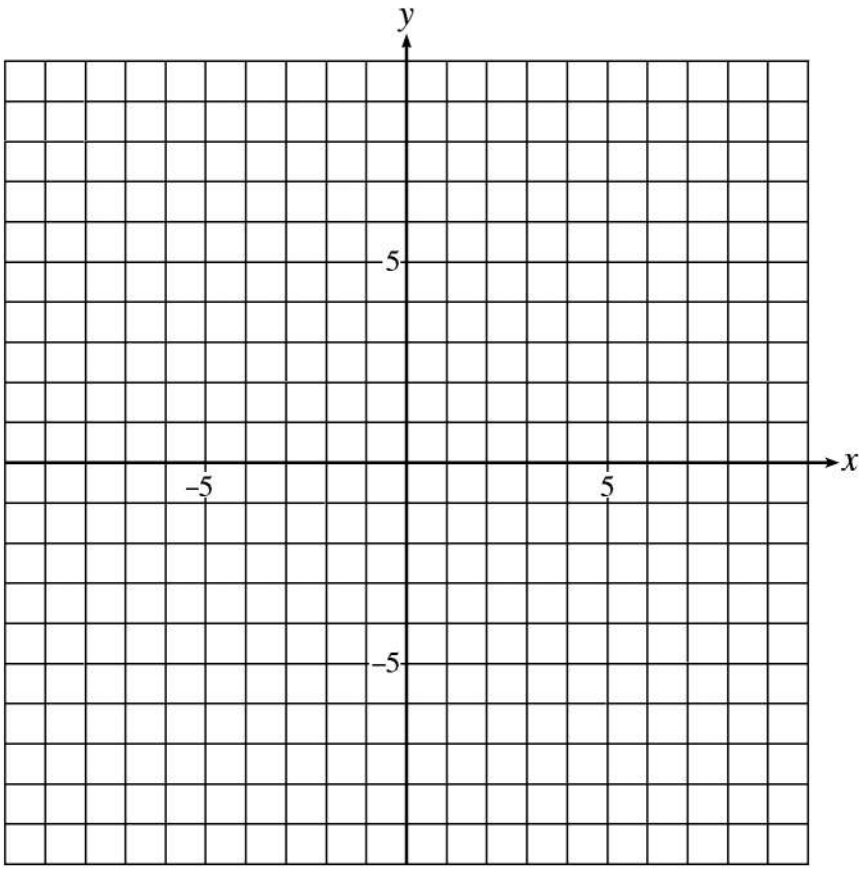
APR 2004

181. If $Ax^2 + By^2 = 1$ is an ellipse with its major axis on the x-axis, determine the length of the major axis.

A. $2A^2$ B. $2\sqrt{A}$ C. $\frac{2}{A^2}$ D. $\frac{2}{\sqrt{A}}$

182. The circle with equation $x^2 + 6x + y^2 + 2y = 0$ is translated 2 units to the right to form a new circle. Determine the equation of the new circle and change to standard form.

Graph the conic on the grid below.



JUN 2004

183. Change to standard form: $x^2 + 2y^2 + 16y - 36 = 0$

A. $\frac{x^2}{68} + \frac{(y+4)^2}{34} = 1$ B. $\frac{x^2}{4} + \frac{(y+4)^2}{2} = 1$ C. $\frac{x^2}{52} + \frac{(y+4)^2}{26} = 1$ D. $\frac{x^2}{20} + \frac{(y+4)^2}{10} = 1$

184. Determine an equation of the hyperbola that has centre $(3, -2)$, a vertex $(9, -2)$ and an asymptote $2x - 3y = 12$.

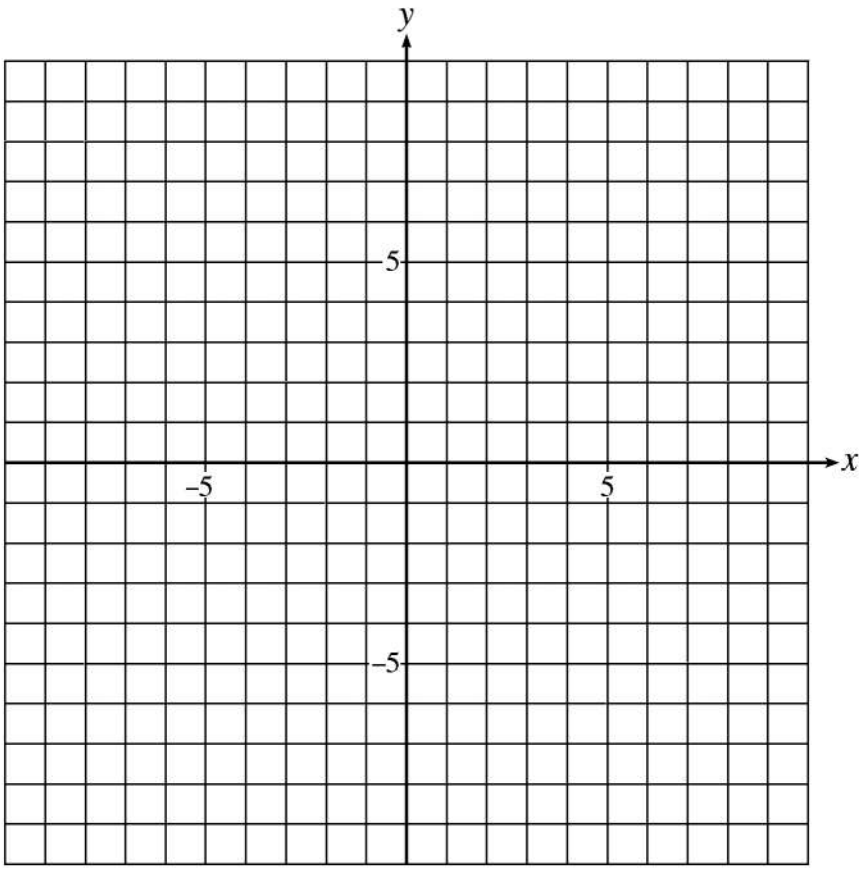
A. $\frac{(x-3)^2}{6} - \frac{(y+2)^2}{4} = 1$

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

C. $\frac{(x-3)^2}{36} - \frac{(y+2)^2}{16} = 1$

D. $\frac{(x-3)^2}{36} - \frac{(y+2)^2}{81} = 1$

185. Determine the equation in standard form of the parabola with vertex $(5, -2)$ that passes through the point $(2, 0)$ and has a horizontal axis of symmetry. Graph the conic on the grid below.



AUG 2004

186. An ellipse is defined by $3x^2 + 2y^2 = k$ and the length of its major axis is 6. Determine the value of k.

A. 108 B. 72 C. 27 D. 18

AUG 2005

187. An ellipse has vertices at (1, 4) and (1, −4). If the ellipse passes through the point (4, 0), determine the length of the minor axis.

A. 3 B. 4 C. 6 D. 8

188. Which hyperbola has asymptotes $y = \pm\frac{2}{3}x$?

A. $\frac{x^2}{3} - \frac{y^2}{2} = 1$ B. $\frac{x^2}{2} - \frac{y^2}{3} = 1$ C. $\frac{x^2}{16} - \frac{y^2}{36} = 1$ D. $\frac{x^2}{36} - \frac{y^2}{16} = 1$

189. Change to standard form $2x^2 - 3y^2 + 12y = 0$.

A. $\frac{x^2}{6} - \frac{(y+2)^2}{4} = -1$ B. $\frac{x^2}{6} - \frac{(y-2)^2}{4} = -1$

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

190. Determine the restriction on the constants A and C such that $Ax^2 + Cy^2 = AC$ represents an ellipse (not a circle) with major axis on the y-axis. (where $A > 0, C > 0$)

A. $A > C$ B. $A < C$ C. $A = C$ D. $AC = -1$

AUG 2006

191. Determine the radius of the circle $16x^2 + 16y^2 = 25$.

A. $\frac{5}{4}$ B. $\frac{25}{16}$ C. 5 D. 25

192. The equation $x^2 + Cy^2 + F = 0$ represents a hyperbola. What conditions must be satisfied if the hyperbola has a vertical transverse axis?

A. $C > 0,\ F < 0$ B. $C > 0,\ F > 0$ C. $C < 0,\ F < 0$ D. $C < 0,\ F > 0$

193. Determine a possible value for D such that $x^2 + y^2 + Dx - 6y - 4 = 0$ represents a circle with radius 7.

A. 6 B. 12 C. 18 D. 36

194. The following diagram shows two ellipses that are the reflections of one another in the line $y = x$. If an equation of ellipse A is $\frac{(x-d)^2}{a^2} + \frac{(y-e)^2}{b^2} = 1$, determine an equation of ellipse B.

A. $\frac{(x-e)^2}{a^2} + \frac{(y-d)^2}{b^2} = 1$

B. $\frac{(x-d)^2}{b^2} + \frac{(y-e)^2}{a^2} = 1$

C. $\frac{(x-d)^2}{a^2} + \frac{(y-e)^2}{b^2} = 1$

D. $\frac{(x-e)^2}{b^2} + \frac{(y-d)^2}{a^2} = 1$