

Practice 6.1

1. a) $x^2 + y^2 = 64$ b) $x^2 + y^2 = 582.5$ c) $x^2 + y^2 = 144$
 d) $x^2 + y^2 = 625$ e) $x^2 + y^2 = 73$ f) $x^2 + y^2 = 40$
2. a) 7 b) 15 c) 5.5 d) 14 e) 5.3 f) $\sqrt{5}$

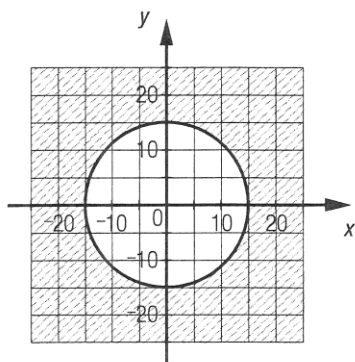
Practice 6.1 (cont'd)

3. a) $\frac{x^2}{64} + \frac{y^2}{36} = 1$ b) $\frac{x^2}{64} + \frac{y^2}{256} = 1$ c) $\frac{x^2}{289} + \frac{y^2}{196} = 1$
 d) $\frac{x^2}{144} + \frac{y^2}{729} = 1$ e) $\frac{x^2}{210.25} + \frac{y^2}{110.25} = 1$ f) $\frac{x^2}{25} + \frac{y^2}{169} = 1$
4. a) 1) (13, 0), (-13, 0), (0, 5) and (0, -5). 2) (12, 0) and (-12, 0).
 b) 1) (6, 0), (-6, 0), (0, 10) and (0, -10). 2) (0, 8) and (0, -8).
 c) 1) (8.5, 0), (-8.5, 0), (0, 7.5) and (0, -7.5). 2) (4, 0) and (-4, 0).
 d) 1) (20, 0), (-20, 0), (0, 29) and (0, -29). 2) (0, 21) and (0, -21).
 e) 1) (30, 0), (-30, 0), (0, 18) and (0, -18). 2) (24, 0) and (-24, 0).
 f) 1) (12.5, 0), (-12.5, 0), (0, 3.5) and (0, -3.5). 2) (12, 0) and (-12, 0).

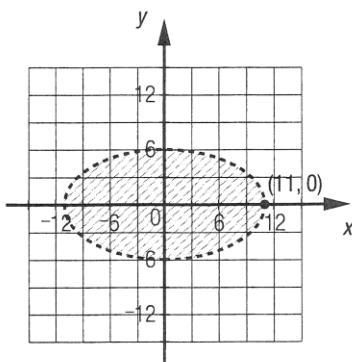
Practice 6.1 (cont'd)

5. a) $x^2 + y^2 = 16$ b) $x^2 + y^2 = 544$ c) $x^2 + y^2 = 169$ d) $x^2 + y^2 = 100$
6. a) $\frac{x^2}{16} + \frac{y^2}{25} = 1$ b) $\frac{x^2}{42.25} + \frac{y^2}{90.25} = 1$ c) $\frac{x^2}{289} + \frac{y^2}{64} = 1$ d) $\frac{x^2}{400} + \frac{y^2}{225} = 1$ e) $\frac{x^2}{11\,025} + \frac{y^2}{21\,025} = 1$

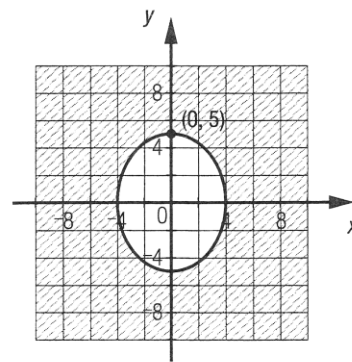
7. a)



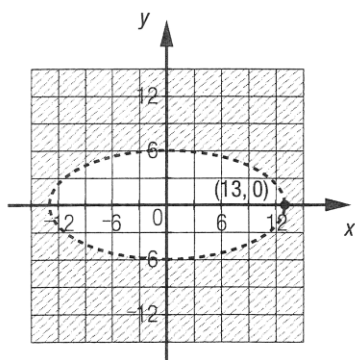
b)



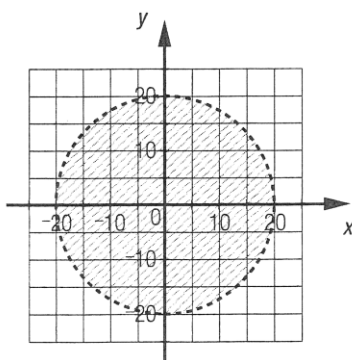
c)



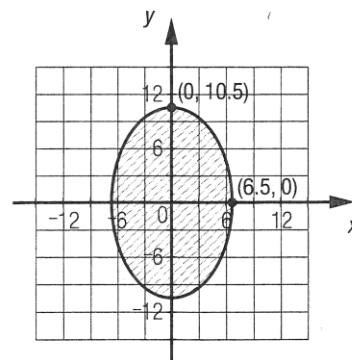
d)



e)



f)



Equation of the ellipse	Coordinates of the vertices	Length of the major axis	Length of the minor axis	Coordinates of the foci
$\frac{x^2}{400} + \frac{y^2}{841} = 1$	(20, 0), (-20, 0) (0, 29), (0, -29)	58 u	40 u	(0, 21), (0, -21)
$\frac{x^2}{81} + \frac{y^2}{225} = 1$	(0, 15), (9, 0) (0, -15), (-9, 0)	30 u	18 u	(0, 12), (0, -12)
$\frac{x^2}{169} + \frac{y^2}{25} = 1$	(13, 0), (-13, 0) (0, 5), (0, -5)	26 u	10 u	(12, 0), (-12, 0)
$\frac{x^2}{100} + \frac{y^2}{210.25} = 1$	(10, 0), (-10, 0) (0, 14.5), (0, -14.5)	29 u	20 u	(0, 10.5), (0, -10.5)
Two answers possible: $\frac{x^2}{5329} + \frac{y^2}{2304} = 1$ or $\frac{x^2}{2304} + \frac{y^2}{5329} = 1$	Two answers possible: (73, 0), (-73, 0) (0, 48), (0, -48) or (48, 0), (-48, 0) (0, 73), (0, -73)	146 u	96 u	Two answers possible: (55, 0), (-55, 0) or (0, 55), (0, -55)

Practice 6.1 (cont'd)

9. a) $x^2 + y^2 \leq 9$ b) $\frac{x^2}{100} + \frac{y^2}{36} < 1$ c) $\frac{x^2}{64} + \frac{y^2}{36} > 1$
d) $x^2 + y^2 > 13.69$ e) $\frac{x^2}{9} + \frac{y^2}{4} \geq 1$ f) $\frac{x^2}{49} + \frac{y^2}{625} \leq 1$

10. a) Since the perimeter $P \approx \pi[3(a + b) - \sqrt{(a + 3b)(3a + b)}]$ and that the values of parameters **a** and **b** are respectively 48 and approximately 87.37, you obtain:

$$P \approx \pi(3(48 + 87.37) - \sqrt{(48 + 3 \times 87.37)(3 \times 48 + 87.37)})$$

$$\approx \pi(138.24)$$

$$\approx 138.24 \times \pi$$

The perimeter is approximately 434.31 u.

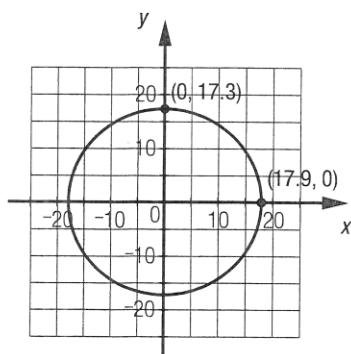
- b) Since the area $A = \pi ab$, you obtain:

$$A \approx \pi \times 48 \times 87.37$$

The area is approximately 13 174.64 u².

Practice 6.1 (cont'd)

11. a) Several answers possible. Example:



- b) Based on the adjacent graph, $a = 17.9$, $b = 17.3$ and c is determined using $a^2 + b^2 = c^2$, since $a > b$.

$$17.9^2 = 17.3^2 + c^2 \Rightarrow c \approx 4.6$$

The coordinates of the foci are $(\approx 4.6, 0)$ and $(\approx -4.6, 0)$.

12. a) $x^2 + y^2 = 3600$

- b) (60, 0), (-60, 0), (52, 30), (-52, 30), (52, -30), (-52, -30), (30, 52), (-30, 52), (30, -52), (-30, -52), (0, 60) and (0, -60).

13. a) $x^2 + y^2 = 9$

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

14. a) It is possible to deduce that the value of parameter **a** is 200 and that parameter **c** is 375. Using the relation $a^2 + c^2 = b^2$, you can deduce that the value of parameter **b** is 425.

The inequality that corresponds to the surface of the lake is $\frac{x^2}{40\,000} + \frac{y^2}{180\,625} \leq 1$.

- b) The minimum distance is $425 - 375 = 50$ m.
 c) The distance that separates the coach from each of the buoys is 425 m.
15. a) Pool **A** has the shape of a circle and Pool **B** has the shape of an ellipse.
 b) Pool **A**:
 Since the extended string measures 4 m, the radius of the circle is 4 m. The equation that corresponds to the perimeter of this pool is $x^2 + y^2 = 16$.
 Pool **B**:
Several answers possible. Example:
 It is possible to deduce parameters **a** and **b** based on parameter **c**, which is equal to 3 and based on parameter **a**, which is equal to 5. The equation that corresponds to the perimeter of this pool is $\frac{x^2}{25} + \frac{y^2}{16} = 1$.
 c) 1) The maximum width of Pool **A** is 8 m (diameter of the circle).
 2) The maximum width of Pool **B** is 10 m (major axis of the ellipse).

16. a) The inequality that corresponds to the surface of this lot is $x^2 + y^2 \leq 2500$.

- b) 1) Circumference of the lot: $\pi \times 100 \approx 314.16$ m
 Total cost of the fence: $12 \times 314.16 \approx \$3,769.92$
 2) Area of the lot: $\pi \times 50^2 \approx 7853.98$ m²
 Total cost of the sod: $8 \times 7853.98 \approx \$62,831.85$

17. a) The equation of the small ellipse is: $\frac{x^2}{1190.25} + \frac{y^2}{361} = 1$.

The equation of the large ellipse is: $\frac{x^2}{4422.25} + \frac{y^2}{2550.25} = 1$.

- b) Using the relation $b^2 + c^2 = a^2$, it is possible to deduce the coordinates of each flag.
 Flag **A**: ($\approx -43.27, 0$) Flag **B**: ($\approx -28.8, 0$)
 Flag **C**: ($\approx 28.8, 0$) Flag **D**: ($\approx 43.27, 0$)
- c) 1) The distance between Flags **A** and **B** is approximately 14.47 m.
 2) The distance between Flags **B** and **C** is approximately 57.6 m.
 3) The distance between Flags **A** and **D** is approximately 86.54 m.

18. a) The equation of the small circle is $x^2 + y^2 = 9$.

The equation of the ellipse is $\frac{x^2}{64} + \frac{y^2}{9} = 1$.

The equation of the large circle is $x^2 + y^2 = 64$.

- b) $x^2 + y^2 < 9$

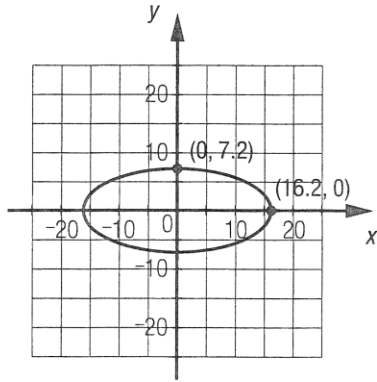
- c) 1) $\frac{x^2}{64} + \frac{y^2}{9} < 1$

2) $x^2 + y^2 < 64$

$x^2 + y^2 > 9$

$\frac{x^2}{64} + \frac{y^2}{9} > 1$

19. a) Several answers possible. Example:



The equation of the circle associated with this situation is $x^2 + y^2 = 81$ because $6.5^2 + 6.23^2 \approx 81$. The radius of the circular coin measures approximately 9 mm.

The major axis measures 32.4 mm since it is 1.8 times longer than the diameter of the circle: $9 \times 2 \times 1.8 = 32.4$.

The minor axis measures 14.4 mm since it is 1.25 times shorter than the diameter of the circle: $9 \times 2 \div 1.25 = 14.4$.

b) $\frac{x^2}{262.44} + \frac{y^2}{51.84} = 1$

c) Determine the coordinates of each focus by using the relation $a^2 + c^2 = b^2$. The coordinates of the foci are $(\approx -14.51, 0)$ and $(\approx 14.51, 0)$.