3. We label the points $A(-2,1)$ and $B(3,4)$.

$$d(A,B)=\sqrt{[3-(-2)]^2+(4-1)^2}$$
$$=\sqrt{5^2+3^2}=\sqrt{25+9}=\sqrt{34}$$

7. **(a)** The center is at (0, 0) and the radius is 2, so the equation of the circle is $x^2+y^2=4$.

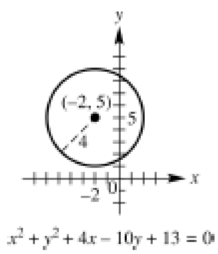
(b) The center is at (1, 4) and the radius is 1, so the equation of the circle is $(x-1)^2+(y-4)^2=1$

8. $x^2+y^2+4x-10y+13=0$

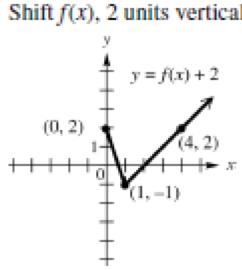
Complete the square on x and y to write the equation in standard form:

$$x^2+y^2+4x-10y+13=0$$
$$\left(x^2+4x+\quad\right)+\left(y^2-10y+\quad\right)=-13$$
$$\left(x^2+4x+4\right)+\left(y^2-10y+25\right)=-13+4+25$$
$$(x+2)^2+(y-5)^2=16$$

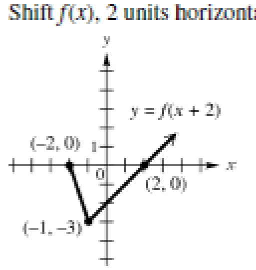
The circle has center (–2, 5) and radius 4.



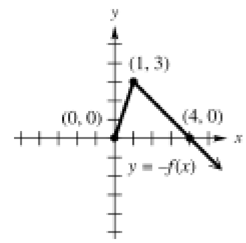
16. **(a)** Shift $f(x)$, 2 units vertically upward.



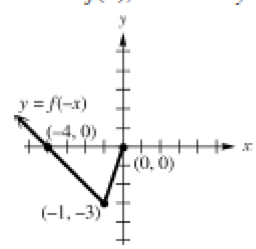
(b) Shift $f(x)$, 2 units horizontally to the left.



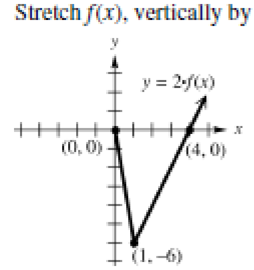
(c) Reflect $f(x)$, across the x-axis.



(d) Reflect $f(x)$, across the y-axis.



(e) Stretch $f(x)$, vertically by a factor of 2.



17. Answers will vary. Starting with $y=\sqrt{x}$, we shift it to the left 2 units and stretch it vertically by a factor of 2. The graph is then reflected over the x-axis and then shifted down 3 units.

3. $45.2025° = 45° + 0.2025°$
$= 45° + 0.2025(60')$
$= 45° + 12.15'$
$= 45° + 12' + 0.15'$
$= 45° + 12' + 0.15(60'')$
$= 45° + 12' + 09''$
$= 45°12'09''$

4. **(a)** $390°$ is coterminal with $390° - 360° = 30°$.

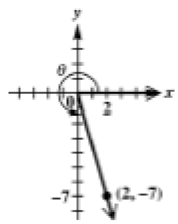
(b) $-80°$ is coterminal with $-80° + 360° = 280°$.

(c) $810°$ is coterminal with $810° - 2(360°) = 810° - 720° = 90°$.

5. $\dfrac{450(360°)}{1\text{ min}} = \dfrac{450(360°)}{60\text{ sec}} = \dfrac{450(6°)}{\text{sec}}$
$= 2700°/\text{sec}$

A point on the tire rotates 2700° in one second.

6.



$x = 2, y = -7$

$r = \sqrt{x^2 + y^2} = \sqrt{2^2 + (-7)^2} = \sqrt{4 + 49} = \sqrt{53}$

$\sin\theta = \dfrac{y}{r} = \dfrac{-7}{\sqrt{53}} = -\dfrac{7}{\sqrt{53}} \cdot \dfrac{\sqrt{53}}{\sqrt{53}} = -\dfrac{7\sqrt{53}}{53}$

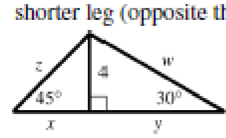
$\cos\theta = \dfrac{x}{r} = \dfrac{2}{\sqrt{53}} = \dfrac{2}{\sqrt{53}} \cdot \dfrac{\sqrt{53}}{\sqrt{53}} = \dfrac{2\sqrt{53}}{53}$

$\tan\theta = \dfrac{y}{x} = \dfrac{-7}{2} = -\dfrac{7}{2}$; $\cot\theta = \dfrac{x}{y} = \dfrac{2}{-7} = -\dfrac{2}{7}$

$\sec\theta = \dfrac{r}{x} = \dfrac{\sqrt{53}}{2}$

$\csc\theta = \dfrac{r}{y} = \dfrac{\sqrt{53}}{-7} = -\dfrac{\sqrt{53}}{7}$

14. Apply the relationships between the lengths of the sides of a $30° - 60°$ right triangle first to the triangle on the right to find the values of y and *w*. In the $30° - 60°$ right triangle, the side opposite the $60°$ angle is $\sqrt{3}$ times as long as the side opposite to the $30°$ angle. The length of the hypotenuse is 2 times as long as the shorter leg (opposite the $30°$ angle).



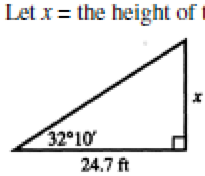
Thus, we have $y = 4\sqrt{3}$ and $w = 2(4) = 8$.

Apply the relationships between the lengths of the sides of a $45° - 45°$ right triangle next to the triangle on the left to find the values of *x* and *z*. In the $45° - 45°$ right triangle, the sides opposite the $45°$ angles measure the same. The hypotenuse is $\sqrt{2}$ times the measure of a leg. Thus, we have $x = 4$ and $z = 4\sqrt{2}$

19. $\csc\theta = -\dfrac{2\sqrt{3}}{3}$

Since $\csc\theta$ is negative, θ must lie in quadrant III or quadrant IV. The absolute value of $\csc\theta$ is $\dfrac{2\sqrt{3}}{3}$, so $\theta' = 60°$. The quadrant III angle θ equals $180° + \theta' = 180° + 60° = 240°$, and the quadrant IV angle θ equals $360° - \theta' = 360° - 60° = 300°$.

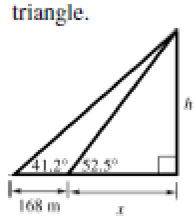
26. Let *x* = the height of the flagpole.



$\tan 32°10' = \dfrac{x}{24.7}$
$x = 24.7 \tan 32°10' \approx 15.5344$

The flagpole is approximately 15.5 ft high.

30. Let x = the side adjacent to 52.5° in the smaller triangle.



In the larger triangle, we have

$\tan 41.2° = \dfrac{h}{168 + x} \Rightarrow h = (168 + x)\tan 41.2°.$

In the smaller triangle, we have

$\tan 52.5° = \dfrac{h}{x} \Rightarrow h = x \tan 52.5°.$

Substitute for h in this equation to solve for x.

$$(168 + x)\tan 41.2° = x\tan 52.5°$$
$$168\tan 41.2° + x\tan 41.2° = x\tan 52.5°$$
$$168\tan 41.2° = x\tan 52.5° - x\tan 41.2°$$
$$168\tan 41.2° = x(\tan 52.5° - \tan 41.2°)$$
$$\frac{168\tan 41.2°}{\tan 52.5° - \tan 41.2°} = x$$

Substituting for x in the equation for the smaller triangle gives

$$h = x\tan 52.5°$$
$$h = \frac{168\tan 41.2°\tan 52.5°}{\tan 52.5° - \tan 41.2°} \approx 448.0432$$

The height of the triangle is approximately 448 m (rounded to three significant digits).