1. Take $V = \langle -2, 6 \rangle$. Calculate -3V and $\frac{1}{2}V$.

$$-3V = \langle (-3) \cdot (-2), -3 \cdot 6 \rangle$$

$$= \langle 6, -18 \rangle.$$

$$\frac{1}{2}V = \langle \frac{1}{2} \cdot (-2), \frac{1}{2} \cdot 6 \rangle$$

$$= \langle -1, 3 \rangle.$$

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2. Take $V = \langle -2, 6 \rangle$. Calculate the length of V, -3V and $\frac{1}{2}V$.

$$||V|| = \sqrt{(-2)^{2} + (6)^{2}}$$

= $\sqrt{4} + 36$
= $\sqrt{40}$ or $2\sqrt{10}$
 $||-3V|| = |-3| \cdot ||V||$
= $3 \cdot \sqrt{40}$ or $6\sqrt{10}$
 $|| \pm V|| = |\pm| \cdot ||V||$
= $\frac{1}{2}\sqrt{40} \cdot \sqrt{10}$

3. Take $V = \langle -2, 6 \rangle$. Write its polar form.

$$\begin{aligned} \|V\| &= \sqrt{40} \text{ or } 2\sqrt{10} \\ \widehat{V} &= \frac{1}{11}\sqrt{11} V \\ &= \left\langle -\frac{2}{140}, \frac{6}{\sqrt{40}} \right\rangle \text{ or } \left\langle -\frac{1}{\sqrt{10}}, \frac{3}{\sqrt{10}} \right\rangle \\ \text{Polar form } \sqrt{40} \left\langle -\frac{2}{\sqrt{40}}, \frac{6}{\sqrt{40}} \right\rangle \text{ or } 2\sqrt{10} \left\langle -\frac{1}{\sqrt{10}}, \frac{3}{\sqrt{10}} \right\rangle \end{aligned}$$



4. Find the equation of the circle of radius 3 centered at (-1, 4).

distance from (-1,4) is 3

$$||(x, y) - (-1, 4)|| = 3$$

$$||(x - (-1), y - 4)|| = 3$$

$$||(x + 1, y - 4)|| = 3$$

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

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

$$(x + 1)^{2} + (y - 4)^{2} = 3^{2}$$

$$(x + 1)^{2} + (y - 4)^{2} = 9$$
final answer



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5. Find the projection of (-1, 4) onto the unit circle.



6. Write $g(x) = -2(x-1)^2 + 1$ as a composite function using pow₂. Use a graphing tool to verify your answer.

| $T_{-1}(x) = X - 1$ | $g(x) = -2(x-1)^{2} + 1$ = -2 $(T_{1}(x))^{2} + 1$ | |
|-------------------------|--|---|
| T1 (x)=x+1 | $= -2 P_{0w_2}(T_1(x)) + 1$ | $\Rightarrow 9=T_1 \circ 5_2 \circ Pow_2 \circ T_1$ |
| S ₋₂ (x)=-2x | = 5-2 (Pow2 (T-1 (x)))+1 | |
| fow2 (x) = x2 | $= T_1 \left(S_2 \left(P_{0 w_2} (T_1(x)) \right) \right)$ | |

7. Write $g(x) = 3(5x+1)^3$ as a composite function using pow₃. Use a graphing tool to verify your answer.

| T, (x)=X+1 | $9(x) = 3(5x+1)^{-1}$ |
|-----------------|---|
| $S_{s}(x) = 5x$ | $= 3(S_5(x) + 1)^3$ |
| $S_3(x) = 3x$ | $= 3(T_1(S_5(X)))^3 \qquad \Rightarrow \qquad 9 = S_3 \circ P_{ow_3} \circ T_1 \circ S_5$ |
| $fow_3(x)=X^3$ | = $3 Pow_3(T_1(S_5(X)))$ |
| | $= S_3 (P_{ow_3}(T_1(S_5(x))))$ |

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