Simplify the following expressions.

1 $\sqrt{36+64}$

First add $36+64$ to get 100; then since $100 = 10^2$ (and $10 \geq 0$), $\sqrt{100} = 10$. In summary,

$$\sqrt{36+64} = \sqrt{100} = 10.$$

2 $\sqrt{(2x+3)^2}$

Notice that $(2x+3)^2 = (-2x-3)^2$. The answer might be either $2x+3$ or $-2x-3$, depending on which is positive (or at least not negative). We can't know this without knowing something about what x is, but we do know that the answer is the absolute value:

$$\sqrt{(2x+3)^2} = |2x+3|.$$

3 $\sqrt[5]{\frac{1}{32}}$

Since $(1/2)^5 = 1/2^5 = 1/32$,

$$\sqrt[5]{\frac{1}{32}} = \frac{1}{2}.$$

4 $(-27)^{1/3}$

First, $(-27)^{1/3} = \sqrt[3]{-27}$. Next, $-27 = -3^3 = (-3)^3$, so $\sqrt[3]{-27} = -3$. (It doesn't matter that $-3 < 0$, since the index 3 is odd.) In summary,

$$(-27)^{1/3} = \sqrt[3]{-27} = -3.$$