Simplify each.

When simplifying the $\sqrt{\ }$ symbol is asking only for the positive square root.

1. $\sqrt{75}$

$= \sqrt{25 \cdot 3}$

$= \sqrt{25} \cdot \sqrt{3}$

$= 5\sqrt{3}$

2. $\sqrt{27}$

$= \sqrt{9 \cdot 3}$

$= \sqrt{9} \cdot \sqrt{3}$

$= 3\sqrt{3}$

3. $\sqrt{80}$

$= \sqrt{16 \cdot 5}$

$= \sqrt{16} \cdot \sqrt{5}$

$= 4\sqrt{5}$

4. $\sqrt{192}$

$= \sqrt{64 \cdot 3}$

$= \sqrt{64} \cdot \sqrt{3}$

$= 8\sqrt{3}$

# Topic 6: Polynomial Equations

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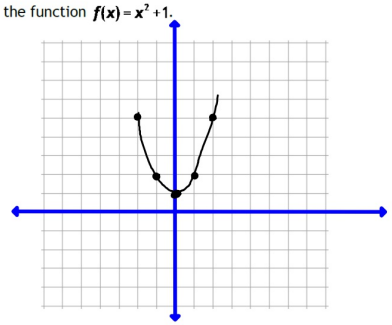
SAS2 - Question #'s 13 & 14

**Polynomial equations**

Student Activity Sheet 2; *Exploring* "Quadratic equations" Page 11 of 17

13. Sketch a graph of the function $f(x) = x^2 + 1$.



14. What equation would you write and then solve to find the $x$-intercepts of the function, if they existed?

$x^2 + 1 = 0$

# Topic 6: Polynomial Equations

Exploring: "Quadratic Equations"

SAS2 - Question #15

## Topic 6: Polynomial Equations

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Answer to question #15

## The imaginary unit

$$\sqrt{-1} = i$$

$$i^2 = \left(\sqrt{-1}\right)^2 = -1$$

This means that whenever you see $i^2$ in a problem you can replace it with -1

## Topic 6: Polynomial Equations

SAS2 - Question #16

## Topic 6: Polynomial Equations

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Answer to question #16

Solve: $x^2 = -9$

$\sqrt{x^2} = \sqrt{-9} = \sqrt{-1} \cdot \sqrt{9}$

$x = \pm 3i$

when your are solving you want ALL the square roots of a number which is why you use ±.

Simplify each.

1. $\sqrt{-121}$

$= \sqrt{-1 \cdot 121}$

$= \sqrt{-1} \cdot \sqrt{121}$

$= i \cdot 11$

$= 11i$

2. $\sqrt{-24}$

$= \sqrt{-1 \cdot 24}$

$= \sqrt{-1} \cdot \sqrt{4 \cdot 6}$

$= \sqrt{-1} \cdot \sqrt{4} \cdot \sqrt{6}$

$= i \cdot 2 \cdot \sqrt{6}$

$= 2i\sqrt{6}$ or $2\sqrt{6}i$

3. $\sqrt{-96}$

$= \sqrt{-1 \cdot 96}$

$= \sqrt{-1} \cdot \sqrt{16 \cdot 6}$

$= \sqrt{-1} \cdot \sqrt{16} \cdot \sqrt{6}$

$= 4i\sqrt{6}$

4. $\sqrt{-147}$

$= \sqrt{-1 \cdot 147}$

$= \sqrt{-1} \cdot \sqrt{49 \cdot 3}$

$= \sqrt{-1} \cdot \sqrt{49} \cdot \sqrt{3}$

$= 7i\sqrt{3}$

# Topic 6: Polynomial Equations

Exploring: "Quadratic Equations"

SAS2 - Question #17

# Topic 6: Polynomial Equations

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answer to Question #17