

Warm-up:

Quiz on Long & Synthetic division, and the remainder thm
THURSDAY !

1) Factor: $3x^2 + 8x + 4$

2) $(3x^2 + 5x + 6) - (5x^3 + 6x^2 - 3x + 26)$

$$(3x^2 + 5x + 6) + (-5x^3 - 6x^2 + 3x - 26) = -5x^3 - 3x^2 + 8x - 20$$

3) Use long division to divide $9x^3 - 3x^2 + 15x - 5$ by $3x - 1$

4) Use synthetic division to divide $9x^3 - 3x^2 + 15x - 5$ by $3x - 1$

5. Rationalize $\sqrt{60}$

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Use long division to divide $9x^3 - 3x^2 + 15x - 5$ by $3x - 1$

Handwritten long division showing the division of $9x^3 - 3x^2 + 15x - 5$ by $3x - 1$. The quotient is $3x^2 + 5$ and the remainder is 0.

$$\begin{array}{r} 3x^2 + 5 \\ 3x - 1 \overline{) 9x^3 - 3x^2 + 15x - 5} \\ \underline{9x^3 - 3x^2} \\ 0 + 15x - 5 \\ \underline{15x - 5} \\ 0 \end{array}$$

Additional work on the right side of the page shows the synthetic division process:

$$\begin{array}{r|l} 3x & 9x^3 - 3x^2 + 15x - 5 \\ & \underline{3x^2 + 5} \\ & 0 \end{array}$$

Final result: $3x^2 + 5$

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ACT/SAT Practice:

25) . If for all x , $f(x) = x^2 - 2x + 3$ and $g(x) = x^2 - 3x + 4$, what is the value of $\frac{f(2)}{g(3)}$?

F. $-\frac{1}{2}$

G. $\frac{1}{5}$

H. $\frac{1}{2}$

J. $\frac{2}{3}$

K. $\frac{3}{4}$

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Unit 2 ~ Quadratics
Objectives: N.CN.1 & 2

Day 1:
COMPLEX NUMBERS

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The number i is defined as

$$i^2 = -1$$

and

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

i is called the imaginary unit.

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Example 1:

$$-1 =$$

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

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

a) $\sqrt{-5}$

$$\sqrt{-5} = \sqrt{-1 \cdot 5} = \sqrt{-1} \cdot \sqrt{5} = i\sqrt{5}$$

b) $\sqrt{-25}$

$$\sqrt{-25} = \sqrt{-1 \cdot 25} = \sqrt{-1} \cdot \sqrt{25} = 5i$$

c) $\sqrt{-50}$ = $i\sqrt{50}$

$$\begin{array}{c} \swarrow \quad \searrow \\ 25 \quad 2 \\ \hline 5 \quad 5 \\ \hline 5i\sqrt{2} \end{array}$$

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Example 2:

$$i^2 =$$

$$i^{20} =$$

$$i^3 =$$

$$i^{61} =$$

$$i^4 =$$

Complex Number:

$$a + bi$$

real number imaginary #

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Example 3:

Adding & Subtracting Complex Numbers

$$\text{a) } (4 + 3i) + (-4 + 5i)$$
$$0 + 8i = 8i$$

$$\text{b) } (-5 + \sqrt{-4}) - (3 - \sqrt{-16})$$
$$(-5 + 2i) + (-3 - 4i)$$
$$-8 - 2i$$

$$\text{c) } (3 + 11i) + (10 + 9i) = 13 + 20i$$

Example 4:

Multiplying Complex Numbers

$$\text{a) } (3i)(-5 + 2i) = -6 - 15i$$
$$-15i + 6i^2$$
$$-15i + 6(-1)$$
$$-15i - 6$$

$$\text{b) } (4 + 3i)(-1 - 2i)$$
$$-4 - 11i - 6i^2$$
$$-4 - 11i - 6(-1)$$
$$2 - 11i$$

| | | |
|-----|----|-------|
| | 4 | 3i |
| -1 | -4 | -3i |
| -2i | 8i | -6i^2 |

$$\text{c) } (1 - 9i)(3 + 2i) = 21 - 25i$$

$$a + bi$$

$$\sqrt{i^2} = \sqrt{-1}$$
$$i = \sqrt{-1}$$

