# Warm-up:

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

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

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

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

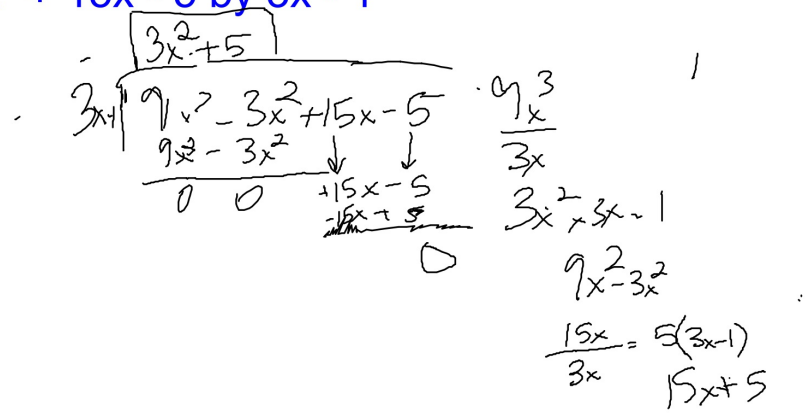
3) Use long division to divide $9x^3 - 3x^2 + 15x - 5$ by $3x - 1$

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

5. Rationalize $\sqrt{60}$



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






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

Unit 2 ~ Quadratics

Objectives: N.CN.1 & 2

# Day 1:
# COMPLEX NUMBERS



The number $i$ is defined as

$i^2 = -1$

and

$\sqrt{-1} = i$

i is called the imaginary unit.



## Example 1:

$-a =$

$\sqrt{-1} = i$

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

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

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

25 2

5 5

$5i\sqrt{2}$



## Example 2:

$i^2 =$

$i^3 =$

$i^4 =$

$i^{20} =$

$i^{61} =$

## Complex Number:

$a + bi$

real number  imaginary #

# Example 3:

*Adding & Subtracting Complex Numbers*

a) $(4 + 3i) + (-4 + 5i)$

$0 + 8i = 8i$

b) $(-5 + \sqrt{-4}) - (3 - \sqrt{-16})$

$i\sqrt{4}$ $\quad i\sqrt{16}$

$(-5 + 2i) + (-3 + 4i)$

$-8 + 6i$

c) $(3 + 11i) + (10 + 9i) = 13 + 20i$



# Example 4:

$a + bi$

*Multiplying Complex Numbers*

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

$i = \sqrt{-1}$

a) $(3i)(-5 + 2i) = -6 - 15i$

$-15i + 6i^2$

$-15i + 6(-1)$

$-15i - 6$

b) $(4 + 3i)(-1 - 2i)$

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

$-4 - 11i - 6i^2$

$-4 - 11i - 6(-1)$

$2 - 11i$

c) $(1 - 9i)(3 + 2i)$ $\quad -21 - 25i$