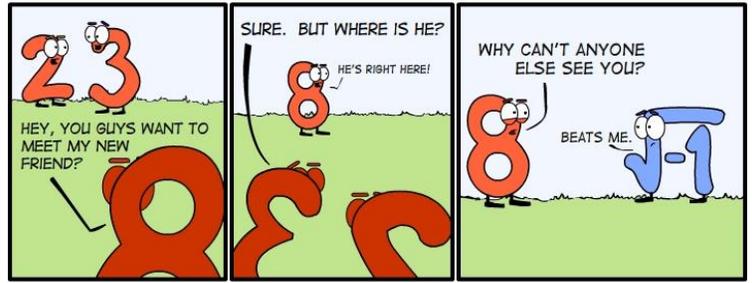


Name key

Date _____

Hour _____

Section 5.4 – Day 2 Algebra 2 Trig G



Pure imaginary numbers –
Square roots of negative real numbers

Complex numbers – example: $5 + 2i$
an expression that has a real number and a pure imaginary number

Simplifying radicals with negative numbers –

1) $\sqrt{-32y^3}$

$$\sqrt{\underline{-1} \cdot \underline{4^2} \cdot \underline{2} \cdot \underline{y^2} \cdot y}$$

$$\boxed{4yi\sqrt{2y}}$$

2) $\sqrt{-160x^2y^5}$

$$\sqrt{\underline{-1} \cdot \underline{4^2} \cdot \underline{(10)} \cdot \underline{x^2} \cdot \underline{y^2} \cdot \underline{y^2} \cdot \underline{y}}$$

$$\boxed{4xy^2i\sqrt{10y}}$$

3) $\sqrt{-45x^3y^2z}$

$$\sqrt{\underline{-1} \cdot \underline{3^2} \cdot \underline{(5)} \cdot \underline{x^2} \cdot \underline{y^2} \cdot z}$$

$$\boxed{3xyi\sqrt{5xz}}$$

Multiplying imaginary numbers – $i^0 = 1, i^1 = i, i^2 = -1, i^3 = -i$

4) $-3i \cdot 2i$

$$-6i^2$$

$$-6 \cdot -1$$

$$\boxed{6}$$

5) $10i \cdot 5i$

$$50i^2$$

$$50 \cdot -1$$

$$\boxed{-50}$$

6) $-2i^3 \cdot 4i^8$ $i^{11} = i^3$

$$-8 \cdot i^{11}$$

$$-8 \cdot -i$$

$$\boxed{8i}$$

7) $\sqrt{-12} \cdot \sqrt{-2}$

$$i\sqrt{12} \cdot i\sqrt{2}$$

$$i^2 \sqrt{24}$$

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

$$\boxed{-2\sqrt{6}}$$

8) $\sqrt{-18} \cdot \sqrt{3}$

$$i\sqrt{54}$$

$$i\sqrt{3^2 \cdot 6}$$

$$\boxed{3i\sqrt{6}}$$

9) $\sqrt{-81} \cdot \sqrt{-4}$

$$i\sqrt{81} \cdot i\sqrt{4}$$

$$i^2 \cdot 9 \cdot 2$$

$$-1 \cdot 18$$

$$\boxed{-18}$$

$$10) (2+3i)(4-2i)$$

$$8 - 4i + 12i - 6i^2$$

$$8 + 8i + 6$$

$$\boxed{14 + 8i}$$

$$11) (-5-i)(6+3i)$$

$$-30 - 15i - 6i - 3i^2$$

$$-30 - 21i + 3$$

$$\boxed{-27 - 21i}$$

Solving equations with imaginary solutions –

$$12) 5y^2 + 20 = 0$$

$$5y^2 = -20$$

$$y^2 = -4$$

$$y = \sqrt{-4}$$

$$\boxed{y = 2i}$$

$$13) 2x^2 - 15 = -65$$

$$2x^2 = -50$$

$$x^2 = -25$$

$$x = \sqrt{-25}$$

$$\boxed{x = 5i}$$