

Unit 1 Review Sheet- Polynomials & Complex Numbers

1. Simplify the expression $(x+2)^2 + 4(x+2) + 3$.

$$(x+2)(x+2) + 4x + 8 + 3$$

$$x^2 + 2x + 2x + 4 + 4x + 11$$

$$\boxed{x^2 + 8x + 15}$$

2. Given each expression, write each in simplest form:

a. $\sqrt[3]{27x^3y^4}$ $\sqrt[3]{16x^{11}y^{12}}$

b. $5x\sqrt{-75x^4y^5}$

$$\sqrt[3]{8 \cdot 2 \cdot x^3 \cdot x^2 \cdot y^3 \cdot y^3 \cdot y^3}$$

$$5xi \sqrt{25 \cdot 3 \cdot x^4 \cdot y^4 \cdot y}$$

$$2x^5y^4 \sqrt[3]{2x^2}$$

$$5xi (5x^2y^2) \sqrt{3y}$$

$$\boxed{25x^3y^2i \sqrt{3y}}$$

3. Write $-\frac{1}{2}i^3(\sqrt{-9}-4) - 3i^2$ in simplest $a+bi$ form.

$$-\frac{1}{2}(-i)(3i-4) + 3$$

$$\frac{1}{2}i(3i-4) + 3$$

$$\frac{3}{2}i^2 - 2i + 3$$

$$-\frac{3}{2} - 2i + 3$$

$$\boxed{\frac{3}{2} - 2i}$$

4. The expression $6 - (3x-2i)^2$ is equivalent to

1) $-9x^2 + 12xi + 10$

3) $-9x^2 + 10$

2) $9x^2 - 12xi + 2$

4) $-9x^2 + 12xi - 4i + 6$

$$6 - (3x-2i)(3x-2i)$$

$$6 - (9x^2 - 12xi - 4)$$

$$6 - 9x^2 + 12xi + 4$$

$$-9x^2 + 12xi + 10$$

5. Write a trinomial that is equivalent to $(\frac{4}{3}x + \frac{3}{5})(x-1)$.

$$\frac{4}{3}x^2 - \frac{4}{3}x + \frac{3}{5}x - \frac{3}{5}$$

$$\boxed{\frac{4}{3}x^2 - \frac{11}{15}x - \frac{3}{5}}$$

6. Determine the solution set for each equation below

a. $(\sqrt{5+4x})^2 = (10)^2$

$$5+4x = 100$$

$$4x = 95$$

$$\boxed{\begin{array}{l} x = 18.75 \\ \text{or} \\ x = \frac{95}{4} \end{array}}$$

b. $3\sqrt{2x+6} - 7 = 20$

$$3\sqrt{2x+6} = 27$$

$$(\sqrt{2x+6})^2 = (9)^2$$

$$2x+6 = 81$$

$$2x = 75$$

$$\boxed{x = \frac{75}{2} \text{ OR } 37.5}$$

7. Determine, in simplest $a + bi$ form, an expression for each:

a. $(3 - 8i)(7 + i)$

$$\begin{array}{r} 21 + 3i \\ -56i - 8i^2 \end{array}$$

$$21 - 53i + 8$$

$$\boxed{29 - 53i}$$

b. $(2 - 8xi)(3 - 2i) - (2 + 8xi)(3 - 2i)$

$$(6 - 4i - 24xi - 16x)$$

$$- (6 - 4i + 24xi + 16x)$$

$$\begin{array}{r} \cancel{6} - 4i - 24xi - 16x \\ -\cancel{6} + 4i - 24xi - 16x \end{array}$$

$$-48xi - 32x$$

$$\boxed{-32x - 48xi}$$