

HONORS ALGEBRA 2
Chapter 5
Test – KEY

Name _____
Date _____
Period _____

The solutions are in blue for each problem on the test. Calculators were allowed.

Simplify the following expressions.

1. $(3y-2)^2 - 4y(1+y)$

$$(9y^2 - 12y + 4) + (-4y - 4y^2)$$
$$\Rightarrow 5y^2 - 16y + 4$$

2. $\left(\frac{3x^{-2}y^{-4}}{x^4y^{-3}}\right)^{-2}$

$$\left(\frac{x^4y^{-3}}{3x^{-2}y^{-4}}\right)^2 \Rightarrow \frac{x^8y^{-6}}{9x^{-4}y^{-8}}$$
$$\Rightarrow \frac{x^{12}y^2}{9}$$

3. $2\sqrt{27} + \sqrt{8} - \sqrt{48}$

$$2\sqrt{9 \cdot 3} + \sqrt{4 \cdot 2} - \sqrt{16 \cdot 3}$$
$$\Rightarrow 2 \cdot 3\sqrt{3} + 2\sqrt{2} - 4\sqrt{3}$$
$$\Rightarrow 6\sqrt{3} + 2\sqrt{2} - 4\sqrt{3}$$
$$\Rightarrow 2\sqrt{3} + 2\sqrt{2}$$

4. $\sqrt{32a^6b^7}$

$$\sqrt{16 \cdot 2 \cdot a^6 \cdot b^6 \cdot b}$$
$$\Rightarrow 4|a|^3 b^3 \sqrt{2b}$$

5. $\frac{7}{\sqrt[3]{4x}}$

$$\frac{7}{\sqrt[3]{4x}} \cdot \frac{\sqrt[3]{2x^2}}{\sqrt[3]{2x^2}} \Rightarrow \frac{7\sqrt[3]{2x^2}}{\sqrt[3]{8x^3}}$$
$$\Rightarrow \frac{7\sqrt[3]{2x^2}}{2x}$$

6. $\frac{v^{1/3} \cdot v^{3/4}}{v^{2/3}}$

$$\frac{v^{4/12} \cdot v^{9/12}}{v^{8/12}} \Rightarrow v^{4/12} \cdot v^{9/12} \cdot v^{-8/12}$$
$$\Rightarrow v^{5/12}$$

7. i^{19}

$$\begin{aligned} i^{16} \cdot i^3 &\Rightarrow 1 \cdot (-i) \\ &\Rightarrow -i \end{aligned}$$

8. $\frac{3}{4+5i}$

$$\begin{aligned} \frac{3}{4+5i} \cdot \frac{4-5i}{4-5i} &\Rightarrow \frac{12-15i}{16-25i^2} \\ &\Rightarrow \frac{12-15i}{16+25} \\ &\Rightarrow \frac{12-15i}{41} \\ &\Rightarrow \frac{12}{41} - \frac{15}{41}i \end{aligned}$$

Factor the following expressions.

9. $c^4 - 81$

$$\begin{aligned} (c^2 - 9)(c^2 + 9) \\ (c + 3)(c - 3)(c^2 + 9) \end{aligned}$$

10. $54 - 2x^3$

$$\begin{aligned} 2(27 - x^3) \\ 2(3 - x)(9 + 3x + x^2) \end{aligned}$$

Solve the following equations.

11. $\sqrt{x-7} + \sqrt{x} = 7$

$$\begin{aligned} \sqrt{x-7} &= 7 - \sqrt{x} \\ (\sqrt{x-7})^2 &= (7 - \sqrt{x})^2 \\ x - 7 &= 49 - 14\sqrt{x} + x \\ 14\sqrt{x} &= 56 \\ \sqrt{x} &= 4 \\ (\sqrt{x})^2 &= (4)^2 \\ x &= 16 \end{aligned}$$

12. $\sqrt[3]{1-2x} = -3$

$$\begin{aligned} (\sqrt[3]{1-2x})^3 &= (-3)^3 \\ 1 - 2x &= -27 \\ -2x &= -28 \\ x &= 14 \end{aligned}$$

Answer the following.

13. Divide $(2x^3 - 3x + 5)$ by $(x + 2)$.

Synthetic division works:

$$\begin{array}{r|rrrr} -2 & 2 & 0 & -3 & 5 \\ & & -4 & 8 & -10 \\ \hline & 2 & -4 & 5 & -5 \end{array} \Rightarrow 2x^2 - 4x + 5 - \frac{5}{x+2}$$

Long division could also be used:

$$\begin{array}{r} 2x^2 - 4x + 5 \\ x+2 \overline{) 2x^3 + 0x^2 - 3x + 5} \\ \underline{-(2x^3 + 4x^2)} \\ -4x^2 - 3x \\ \underline{-(-4x^2 - 8x)} \\ 5x + 5 \\ \underline{-(5x + 15)} \\ -5 \end{array} \Rightarrow 2x^2 - 4x + 5 - \frac{5}{x+2}$$

14. Evaluate the expression $|3 + 5i|$.

$$\begin{aligned} |3 + 5i| &= \sqrt{3^2 + 5^2} \\ &= \sqrt{9 + 25} \\ &= \sqrt{34} \end{aligned}$$