Background Quiz: Thu, Sep 1

Name: Solution Key

Section (circle one)

R02 (M) R03 (W) R04 (Tu)

1. (*2 points*) Simplify $\frac{7}{4} - \frac{5}{6}$ to a single fraction.

Solution:

$$\frac{7}{4} - \frac{5}{6} = \frac{7 \cdot 6}{4 \cdot 6} - \frac{4 \cdot 5}{4 \cdot 6} = \frac{42 - 20}{24} = \frac{22}{24} = \boxed{\frac{11}{12}.}$$

2. (*2 points*) Solve for x if $\frac{8}{x} - 3 = 1$.

Solution: Isolating x,

$$\frac{8}{x} = 1 + 3 = 4.$$

Cross-multiplying, we get $8 = 4x$, so $\boxed{x = 8/4 = 2.}$

3. (*1 point*) Simplify $(x^{\frac{1}{3}})^9$.

Solution:

$$(x^{\frac{1}{3}})^9 = x^{\frac{1}{3} \cdot 9} = x^{\frac{9}{3}} = \boxed{x^3.}$$

4. (*2 points*) Expand $(x-2)(x+3)-x$ and collect all like terms.

Solution: Using the FOIL mnemonic (First-Outside-Inside-Last), we have

$$(x-2)(x+3)-x = x^2+3x-2x-6-x = \boxed{x^2-6.}$$

5. (*3 points*) Factor the polynomial x^3-4x^2+3x into linear factors. What are the three roots of this polynomial?

Solution: Since x^3-4x^2+3x has no constant term, x is a factor, and $x^3-4x^2+3x = x(x^2-4x+3)$. Then, by inspection or by the quadratic formula,

$$x^2-4x+3 = (x-3)(x-1).$$

Hence, $x^3-4x^2+3x = \boxed{x(x-3)(x-1).}$ Its roots are $\boxed{x=0,\ x=3, \text{ and } x=1.}$

Background Quiz: Thu, Sep 1

Name: Solution Key

Section (circle one)

R02 (M) R03 (W) R04 (Tu)

1. (*2 points*) Simplify $\frac{11}{6} - \frac{7}{4}$ to a single fraction.

Solution:

$$\frac{11}{6} - \frac{7}{4} = \frac{11 \cdot 4}{4 \cdot 6} - \frac{6 \cdot 7}{4 \cdot 6} = \frac{44 - 42}{24} = \frac{2}{24} = \boxed{\frac{1}{12}.}$$

2. (*2 points*) Solve for x if $\frac{9}{x} - 2 = 1$.

Solution: Isolating x,

$$\frac{9}{x} = 1 + 2 = 3.$$

Cross-multiplying, we get $9 = 3x$, so $\boxed{x = 9/3 = 3.}$

3. (*1 point*) Simplify $(\sqrt{x})^4$.

Solution: $\sqrt{x} = x^{\frac{1}{2}}$, so

$$(\sqrt{x})^4 = (x^{\frac{1}{2}})^4 = x^{\frac{1}{2} \cdot 4} = x^{\frac{4}{2}} = \boxed{x^2.}$$

4. (*2 points*) Expand $(x+2)(x-4)+2x$ and collect all like terms.

Solution: Using the FOIL mnemonic (First-Outside-Inside-Last), we have

$$(x+2)(x-4)+2x = x^2-4x+2x-8-2x = \boxed{x^2-8.}$$

5. (*3 points*) Factor the polynomial x^3-6x^2+5x into linear factors. What are the three roots of this polynomial?

Solution: Since x^3-6x^2+5x has no constant term, x is a factor, and $x^3-6x^2+5x = x(x^2-6x+5)$. Then, by inspection or by the quadratic formula,

$$x^2-6x+5 = (x-5)(x-1).$$

Hence, $x^3-6x^2+5x = \boxed{x(x-5)(x-1).}$ Its roots are $\boxed{x=0,\ x=5, \text{ and } x=1.}$