Math 109 P Section 2 Quiz 2 B

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Solutions

(1) Factor into prime components : $4x^2 - 12x + 9$.

Solutions.

This is a perfect square, because $4x^2 = (2x)^2$, $9 = 3^2$, and the middle term is twice their product $2(2x)(3) = 12x$. We have the formula:

$$(a - b)^2 = a^2 - 2ab + b^2 \quad .$$

Then

$$4x^2 - 12x + 9 = (2x)^2 - 2(2x)(3) + 3^2 = (2x - 3)^2 \quad . \quad \blacksquare$$

(2) Solve the equation. $5x^2 - 6x + 1 = 0$

Solutions.

Factor first. Because the leading term is $5x^2$, our factors should start like this:

$$5x^2 - 6x + 1 = (x \pm \square)(5x \pm \square) \quad .$$

Then the free term, 1, is the product of the following pairs: $(1, 1)$ and $(-1, -1)$. Try them both:

$$(x \pm \square)(5x \pm \square) = (x + 1)(5x + 1) = 5x^2 + x + 5x + 1 = 5x^2 + 6x + 1 \quad ,$$

and

$$(x \pm \square)(5x \pm \square) = (x - 1)(5x - 1) = 5x^2 - x - 5x + 1 = 5x^2 - 6x + 1 \quad ,$$

(this is the only one that work).

Therefore, using the combination that works and the zero-factor property, we have that

$$5x^2 - 6x + 1 = 0 \Rightarrow (x - 1)(5x - 1) = 0 \Rightarrow x - 1 = 0 \text{ or } 5x - 1 = 0 \quad .$$

The first choice gives $x = 1$, and the second

$$5x - 1 = 0 \Rightarrow 5x = 1 \Rightarrow x = \frac{1}{5} \quad .$$

The solutions are $x = 1$ and $x = \frac{1}{5}$. $\blacksquare$

(3) Simplify the rational expression. $\dfrac{x^3y^3}{x^4y^3}$

Solutions.

$$\frac{x^3y^3}{x^4y^3} = \frac{\not{x} \cdot \not{x} \cdot \not{x} \cdot \not{y} \cdot \not{y} \cdot \not{y}}{\not{x} \cdot \not{x} \cdot \not{x} \cdot x \cdot \not{y} \cdot \not{y} \cdot \not{y}} = \frac{1}{x} \quad . \quad \blacksquare$$