Math 109 P Section 2 — Quiz 2 *A*

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Solutions

(1) Factor into prime components : $4x^2 - 20x + 25$.

Solutions.

This is a perfect square, because $4x^2 = (2x)^2$, $25 = 5^2$, and the middle term is twice their product $2(2x)(5) = 20x$. We have the formula:

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

Then

$$4x^2 - 20x + 25 = (2x)^2 - 2(2x)(5) + 5^2 = (2x-5)^2 \quad . \quad \blacksquare$$

(2) Solve the equation. $2x^2 + x - 3 = 0$

Solutions.

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

$$2x^2 + x - 3 = (x \pm \square)(2x \pm \square) \quad .$$

Then the free term, -3, is the product of the following pairs: $(1, -3)$ or $(-1, 3)$. Try them both:

$$(x \pm \square)(2x \pm \square) = (x+1)(2x-3) = 2x^2 - 3x + 2x - 3 = 2x^2 - x - 3 \quad ,$$
$$(x \pm \square)(2x \pm \square) = (x-3)(2x+1) = 2x^2 + x - 6x - 3 = 2x^2 - 5x - 3 \quad ,$$
$$(x \pm \square)(2x \pm \square) = (x-1)(2x+3) = 2x^2 + 3x - 2x - 3 = 2x^2 + x - 3 \quad ,$$

(this is the only one that work), and finally,

$$(x \pm \square)(2x \pm \square) = (x+3)(2x-1) = 2x^2 - x + 6x - 3 = 2x^2 + 5x - 3 \quad .$$

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

$$2x^2 + x - 3 = 0 \Rightarrow (x-1)(2x+3) = 0 \Rightarrow x - 1 = 0 \text{ or } 2x + 3 = 0 \quad .$$

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

$$2x + 3 = 0 \Rightarrow 2x = -3 \Rightarrow x = \frac{-3}{2} = -\frac{3}{2} \quad .$$

The solutions are $x = 1$ and $x = -\dfrac{3}{2}$. $\blacksquare$

(3) Simplify the rational expression. $\dfrac{x^2y^3}{x^2y^4}$

Solutions.

$$\frac{x^2y^3}{x^2y^4} = \frac{\not{x} \cdot \not{x} \cdot \not{y} \cdot \not{y} \cdot \not{y}}{\not{x} \cdot \not{x} \cdot \not{y} \cdot \not{y} \cdot \not{y} \cdot y} = \frac{1}{y} \quad . \quad \blacksquare$$