

Math 45 Examples, 6.4 (Day 2)

Factor completely.

④ $64x^3y^3 - 125z^3$

$$a = \sqrt[3]{64x^3y^3} = 4xy$$

$$b = \sqrt[3]{125z^3} = 5z$$

$$(a-b)(a^2+ab+b^2)$$

$$= (4xy - 5z)((5z)^2 + (4xy)(5z) + (5z)^2)$$

$$= \boxed{(4xy - 5z)(25z^2 + 20xyz + 25z^2)}$$

- 2 terms
- subtracted
- both are perfect cubes

Difference of Two Cubes.

$$a^3 - b^3 = (a-b)(a^2+ab+b^2)$$

⑤ $\frac{x^6}{27} + 8y^3$

$$a = \sqrt[3]{\frac{x^6}{27}} = \frac{x^2}{3}$$

$$b = \sqrt[3]{8y^3} = 2y$$

$$(a+b)(a^2-ab+b^2)$$

$$= \left(\frac{x^2}{3} + 2y\right)\left(\left(\frac{x^2}{3}\right)^2 - \left(\frac{x^2}{3}\right)(2y) + (2y)^2\right)$$

$$= \boxed{\left(\frac{x^2}{3} + 2y\right)\left(\frac{x^4}{9} - \frac{2x^2y}{3} + 4y^2\right)}$$

- 2 terms
- added
- both are perfect cubes

Sum of Two Cubes

$$a^3 + b^3 = (a+b)(a^2-ab+b^2)$$

⑥ $36x^2 + 4$

$$= \boxed{\text{PRIME}}$$

- 2 terms
- added
- both are perfect squares

Sum of two squares

is PRIME