

REVIEW: Unit 3 – Polynomial Functions

> Characteristics of polynomial functions

- Domain and range
- degree
- leading coefficient
- End behaviours
- Turning points
- intercepts

Note: I always time my tests using the most efficient method possible.

$x \rightarrow -\infty, y \rightarrow$

$, x \rightarrow \infty, y \rightarrow$

> Factored form

- Intercepts
- Order

> Developing the equation (family of functions)

$$y = a(x+1)(x-3)(x-6)^2$$

> Transformations

> Dividing polynomials

\rightarrow long div.

> Remainder theorem

\rightarrow Synthetic div.

> Factor Theorem

> Factoring higher degree polynomials

> Sum or difference of cubes

From 3.7 Entertainment: p.182 #2acegi, 3, 4acegi, 5ac, 6

Today's Work

This was assigned as Day1 Review on: Oct. 9, 2018

p. 122 #1d, 2

pp. 184-185 #1, 2*, 3, 4d, 5d, 6, 8bcd, 9cef, 10ad, 12cd

**the answer is wrong in the back for #2*

Today's **NEW** Work

pp. 184-185 #13 to 18

+ **p. 186 Chapter Self-Test** (60 minutes)

Questions 2 and 9: would be worth several marks each on a test.

Questions 4 and 6: an explanation is required as well.

Question #3a has an incorrect answer. It should be: $(x-9)(x+8)(2x+1)$

p.182 3. Factor each expression.

a) $64x^3 + 27y^3$

c) $(x+5)^3 - (2x+1)^3$
 $A^3 - B^3$

c) $(x+5)^3 - (2x+1)^3$

$$= (A-B)(A^2 + AB + B^2)$$

$$A = x+5 \quad B = 2x+1$$

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

$$= (x+5-2x-1)(\underbrace{x^2}_{\hat{=}} + \underbrace{10x+25}_{\hat{=}} + \underbrace{2x^2+11x+5}_{\hat{=}} + \underbrace{4x^2+4x+1}_{\hat{=}})$$

$$= (-x+4)(7x^2+25x+31)$$

$$= -(x-4)(7x^2+25x+31)$$

$$= (4-x)(7x^2+25x+31) \quad \text{*Book Answer}$$

p.182 4. Factor.

i) $512 - 1331x^3$

$$\sqrt[3]{512} \\ = 8$$

$$\sqrt[3]{1331x^3} \\ = 11x$$

$$= (8)^3 - (11x)^3$$

$$= (8 - 11x)(8^2 + (8)(11x) + (11x)^2)$$

$$= (8 - 11x)(64 + 88x + 121x^2)$$

$$\begin{aligned} & \times 88^2 - 4(121)(64) \\ & = 7744 - 30976 \\ & = -23232 \quad \times? \end{aligned}$$

$$\begin{aligned} \text{i) } & 512 - 1331x^3 \\ & = (8)^3 - (11x)^3 \\ & = (8 - 11x)(64 + 88x + 121x^2) \\ & = 8(3x - 1)(9x^2 + 3x + 1) \end{aligned}$$



This final line is incorrect!!

p.182 5. Factor each expression.

a) $\frac{1}{27}x^3 - \frac{8}{125}$

$$= \left(\frac{1}{3}x\right)^3 - \left(\frac{2}{5}\right)^3$$

$$= \left(\frac{1}{3}x - \frac{2}{5}\right) \left(\left(\frac{1}{3}x\right)^2 + \left(\frac{1}{3}x\right)\left(\frac{2}{5}\right) + \left(\frac{2}{5}\right)^2\right)$$

$$= \left(\frac{5x-6}{15}\right) \left(\frac{1}{9}x^2 + \frac{2x}{15} + \frac{4}{25}\right)$$

$$A^3 - B^3 \\ = (A - B)(A^2 + AB + B^2)$$

c) $(x-3)^3 + (3x-2)^3$

$$A^3 + B^3$$

$$A = x-3$$

$$B = 3x-2$$

$$= (A+B)(A^2 - AB + B^2)$$

$$= (x-3+3x-2) \left((x-3)^2 - (x-3)(3x-2) + (3x-2)^2 \right)$$

$$= (4x-5) \left(x^2 - 6x + 9 - (3x^2 - 2x - 9x + 6) + 9x^2 - 12x + 4 \right)$$

$$= (4x-5) \left(\underbrace{x^2}_{\color{red}{\cancel{x^2}}} - \underbrace{6x}_{\color{red}{\cancel{6x}}} + \underbrace{9}_{\color{red}{\cancel{9}}} - \underbrace{3x^2}_{\color{red}{\cancel{3x^2}}} + \underbrace{2x}_{\color{red}{\cancel{2x}}} + \underbrace{9x}_{\color{red}{\cancel{9x}}} - \underbrace{6}_{\color{red}{\cancel{6}}} + \underbrace{9x^2}_{\color{red}{\cancel{9x^2}}} - \underbrace{12x}_{\color{red}{\cancel{12x}}} + \underbrace{4}_{\color{red}{\cancel{4}}} \right)$$

$$= (4x-5) \left(\color{red}{7x^2} - 7x + 7 \right)$$

$$= 7(4x-5)(x^2 - x + 1)$$