

The Factor Theorem (3.3)

p133

day 4

Enneagram 4

Expressive, dramatic
Like to be different, unique

Core longing: personal significance
Core fear: losing identity
Deadly sin: envy

Can be moody
Feel like they don't belong

Baby stroller

Often found in the arts
Creative & empathic
Frequent change of style

8. For each dividend, determine the value of k if the remainder is 3.

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a) $(x^3 + 4x^2 - x + k) \div (x - 1)$

b) $(x^3 + x^2 + kx - 15) \div (x - 2)$

$2^3 + 2^2 + k(2) - 15 = 3$

$8 + 4 + 2k - 15 = 3$

$2k - 3 = 3$

$2k = 6$

$k = 3$

11. The area, $A(x)$, of

a) If the height of what is the width?

b) If the height of the rectangle is changed to x , what is the remainder of the division?

7. Determine the remainder of each division.

a) $(x^3 + 2x^2 - 3x + 9) \div (x - 1)$

b) $\frac{2t^3 - 4t^2 - 3t}{t - 2}$

c) $(x^3 + 2x^2 - 3x + 5) \div (x - 2)$

d) $\frac{n^4 - 3n^3 - 5n + 2}{n - 2}$

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ex1: Solve $2x^3 - 5x^2 - 4x + 3 = 0$

$2x^3 - 5x^2 - 4x + 3 = 0$

$f(1) = 2 - 5 - 4 + 3 = -4$

$f(-1) = -2 - 5 + 4 + 3 = 0$

$\therefore (x + 1)$ is a factor

$x+1 \overline{) 2x^3 - 5x^2 - 4x + 3}$

$-2x^3 + 2x^2$

$-7x^2 - 4x$

$+7x^2 + 7x$

$3x + 3$

$3x + 3$

0

$\therefore (x + 1)(2x^2 - 7x + 3) = 0$

$(x + 1)(x - 3)(2x - 1) = 0$

$x = -1, 3, \frac{1}{2}$

$2x^2 - 7x + 3$
 $2x^2 - 6x - x + 3$
 $2x(x - 3) - 1(x - 3)$
 $(x - 3)(2x - 1)$

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where does the -8 come from?

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ex2: Find the roots and sketch $f(x) = x^3 + 3x^2 - 6x - 8$

$f(1) = 1 + 3 - 6 - 8 \neq 0$

$f(-1) = -1 + 3 + 6 - 8 = 0$

$\therefore (x + 1)$

$x+1 \overline{) x^3 + 3x^2 - 6x - 8}$

$-x^3 + x^2$

$2x^2 - 6x$

$-2x^2 + 2x$

$-8x - 8$

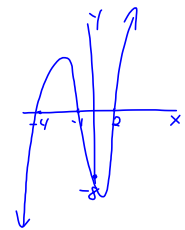
$-8x - 8$

0

$\therefore f(x) = (x + 1)(x^2 + 2x - 8)$

$= (x + 1)(x + 4)(x - 2)$

$\therefore x = -1, -4, 2$



5a

The Factor Theorem (3.3)

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if and only if

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$(x - a)$ is a factor of $f(x)$ iff $f(a) = 0$

can we do higher powers?

ex3: Factor $x^4 - 5x^3 + 2x^2 + 20x - 24$

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#W: p133 #5c, 6c, 11