

Happy Monday!

-Place your cell phone in holder.

Homework Answers

$$1. (4x^4 - 10x^2 - 25) \div (x + 2) = \boxed{A} - 8x^2 \boxed{H} - 12 - \frac{1}{x+2}$$

$$A = 4x^3 \quad H = 6x$$

$$2. (2x^5 - 15x^3 - 19x + 22) \div (x + 3) = 2x^4 \boxed{U} + 3x^2 \boxed{V} + 8 + \frac{\boxed{E}}{x+3}$$

$$U = -6x^3 \quad V = -9x \quad E = -2$$

$$3. (3x^4 + 8x^3 - 4x^2 + 1) \div (x + 1) = \boxed{O} + 5x^2 \boxed{B} + 9 + \frac{\boxed{Y}}{x+1}$$

$$O = 3x^3 \quad B = -9x \quad Y = -8$$

$$4. (3x^4 - 2x^3 - 15x^2) \div (x + 2) = 3x^3 \boxed{I} + x - 2 + \frac{\boxed{G}}{x+2}$$

$$I = -8x^2 \quad G = 4$$

$$5. (3x^5 + 5x^4 - 5x^2 + 3x) \div (x + 1) = 3x^4 \boxed{R} - 2x^2 \boxed{M} + 6 + \frac{\boxed{T}}{x+1}$$

$$R = 2x^3 \quad M = -3x \quad T = -6$$

$$6. (x^4 + 5x^3 + 5x^2 - 4x - 1) \div (x + 3) = \boxed{W} + 2x^2 \boxed{D} - 1 + \frac{2}{x+3}$$

$$W = x^3 \quad D = -x$$

$$7. (2x^4 + 12x^3 + 10x^2 - 29x - 20) \div (x + 4) = 2x^3 \boxed{N} - 6x \boxed{S}$$

$$N = 4x^2 \quad S = -5$$

Synthetic Division

Set up: $\begin{array}{r} \text{divisor} \rightarrow \# \end{array} \Bigg| \text{Coefficients from polynomial}$

divisor: take expression dividing by $= 0$, then solve for coefficients: Every term (present or not) needs to be represented

How to synthetically divide:

1. Drop down 1st coefficient.
2. mult. the divisor & 1st coefficient
3. Place # under next coefficient.
4. Add down
5. Repeat til done

Division

Change to Polynomial: Take original degree - 1 have descending x .

Answer: Polynomial

Substitution

Answer: remainder

Example 1

$$(8x^3 - 54x^2 + 44x - 45) \div (x - 6)$$

$x - 6 = 0$
 $+6 +6$
 $x = 6$

<u>6</u>	8	-54	44	-45	
	↓	48	-36	48	
8	-6	8	3	remainder	

$8x^2 - 6x + 8 + \frac{3}{x-6}$

Example 2

$$(x^4 - 13x^3 + 36x^2 + 35x + 49) \div (x - 7)$$

$x - 7 = 0$
 $+7 +7$
 $x = 7$

<u>7</u>	1	-13	36	35	49
	↓	7	-42	-42	-49
1	-6	-6	-7	0	

$x^3 - 6x^2 - 6x - 7$

Example 3

$$(x^4 - x^3 - 88x^2 + 16x - 21) \div (x + 9)$$

$$\begin{array}{r}
 \underline{-9} \overline{) \quad 1 \quad -1 \quad -88 \quad 16 \quad -21} \\
 \quad \downarrow \quad -9 \quad 90 \quad -18 \quad 18 \\
 \hline
 \quad 1 \quad -10 \quad 2 \quad -2 \quad \boxed{-3} \\
 \quad \quad \quad x^3 - 10x^2 + 2x - 2 - \frac{3}{x+9}
 \end{array}$$

Example 4

$$(x^3 + x^2 - 14x + 30) \div (x + 5)$$

$$\begin{array}{r}
 \underline{-5} \overline{) \quad 1 \quad 1 \quad -14 \quad 30} \\
 \quad \downarrow \quad -5 \quad 20 \quad -30 \\
 \hline
 \quad 1 \quad -4 \quad 6 \quad \boxed{0} \\
 \quad \quad \quad \boxed{x^2 - 4x + 6}
 \end{array}$$

$$(3x^3 - 3x^2 - 10) \div (x - 1)$$

Place holder

$$\begin{array}{r} \overline{) 3 \quad -3 \quad 0 \quad -10} \\ \underline{3 \quad 0 \quad 0 \quad -10} \\ 0 \quad 0 \quad 0 \quad 0 \end{array}$$

↓

$$3x^2 - \frac{10}{x-1}$$

