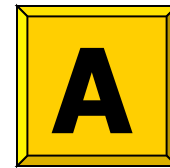


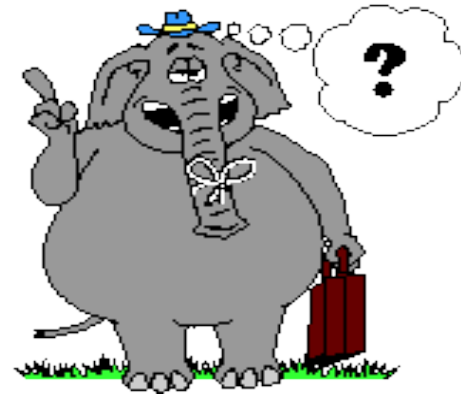
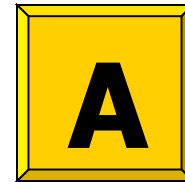
# Do Now:

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1.  $(8x^3 - 3x) \div 24x$



2.  $(12x^2 + 2x - 3) \div 2x$





# Problem 1

$$(8x^3 - 3x) \div 24x$$

**Divide each term of the polynomial by the monomial.**

$$\frac{8x^3}{24x} - \frac{3x}{24x}$$

**Factor each expression.**

$$\frac{8 \bullet x \bullet x^2}{3 \bullet 8 \bullet x} - \frac{3 \bullet x}{3 \bullet 8 \bullet x}$$

**Divide out the common factors in each expression.**

$$\frac{\cancel{8} \bullet x \bullet x^2}{3 \bullet \cancel{8} \bullet \cancel{x}} - \frac{\cancel{3} \bullet x}{\cancel{3} \bullet 8 \bullet \cancel{x}}$$

**Write in simplified form.**

$$\frac{x^2}{3} - \frac{1}{8}$$

100%



# Problem 2

$$(12x^2 + 2x - 3) \div 2x$$

**Divide each term of the polynomial by the monomial.**

$$\frac{12x^2}{2x} + \frac{2x}{2x} - \frac{3}{2x}$$

**Factor each expression.**

$$\frac{2 \cdot 6 \cdot x \cdot x}{2 \cdot x} + \frac{2 \cdot x}{2 \cdot x} - \frac{3}{2x}$$

**Divide out the common factors in each expression.**

$$\frac{\cancel{2} \cdot 6 \cdot \cancel{x} \cdot x}{\cancel{2} \cdot \cancel{x}} + \frac{\cancel{2} \cdot \cancel{x}}{\cancel{2} \cdot \cancel{x}} - \frac{3}{2x}$$

**Write in simplified form.**

$$6x + 1 - \frac{3}{2x}$$



# Dividing a Polynomial by a Polynomial

**The objective is to be able to divide a polynomial by a polynomial by using long division.**

**Dividend – the number which is being divided.**

**Divisor – The number that is being divided into the dividend.**

**Quotient – The result obtained when numbers or expressions are divided.**

**Remainder – The part that is left over when the divisor no longer goes into the dividend a whole number of times.**



# Polynomial Long Division

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Divide  $x^2 + 3x - 1$  by  $x + 2$ .

**Step 1:** Write it as you would a regular long division problem.

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

The  $x+2$  is the divisor and the  $x^2+3x-1$  is the dividend.



## Step 2

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

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

$$\underline{x^2 + 2x}$$

$$x - 1$$

**Divide  $x^2$  by  $x$  to get  $x$ .**  
**Place this on top.**

Multiply  $x+2$  by  $x$  to get  $x^2 + 2x$ .

Subtract the  $x^2+2x$  from  
the  $x^2+3x-1$ .



# Step 3

---

**Divide the  $x$  by  $x$  to get 1.**

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

**Multiply  $x+2$  by 1 to get  $x+2$ .**

$$\begin{array}{r} x^2 + 2x \\ \hline x - 1 \end{array}$$

**Subtract  $x+2$  from the  $x-1$ .**

$$\begin{array}{r} x + 2 \\ \hline -3 \end{array}$$

# Step 4

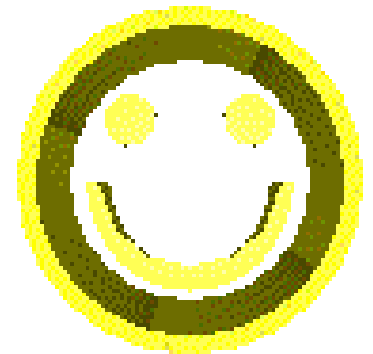
**Write your final answer.**

$x^2 + 3x - 1$  divided by  $x + 2$  is

$$x + 1 - \frac{3}{x + 2}$$

**The  $x+1$  is the quotient.**

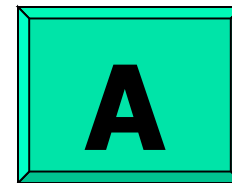
The  $-\frac{3}{x+2}$  is the remainder.



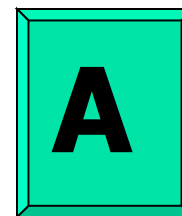


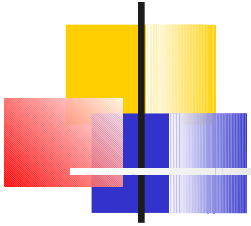
# You Try It

1.  $(x^2 + x - 15) \div (x - 2)$



2.  $(12x^2 + 5x - 10) \div (4x - 1)$





$$(x^2 + x - 15) \div (x - 2)$$

$$\begin{array}{r} x + 3 \\ x - 2 \overline{) x^2 + x - 15} \end{array}$$

**$x^2$  divided by  $x$  is  $x$ .  
Multiply  $x-2$  by  $x$ .**

$$x^2 - 2x$$

**Subtract**

$$\begin{array}{r} 3x - 15 \\ \hline \end{array}$$

**$3x$  divided by  $x$  is  $3$ .  
Multiply  $x-2$  by  $3$ .**

$$\begin{array}{r} 3x - 6 \\ \hline \end{array}$$

**Subtract**

$$x + 3 - \frac{9}{x - 2}$$

**You  
Try It**

# Problem 2

$$(12x^2 + 5x - 10) \div (4x - 1)$$

$$\begin{array}{r} 3x + 2 \\ 4x - 1 \overline{) 12x^2 + 5x - 10} \end{array}$$

**$12x^2$  divided by  $4x$  is  $3x$ .**

**Multiply  $4x-1$  by  $3x$ .**

$$\begin{array}{r} 12x^2 - 3x \\ \hline \end{array}$$

**Subtract**

$$\begin{array}{r} 8x - 10 \\ \hline \end{array}$$

**$8x$  divided by  $4x$  is  $2$ .**

**Multiply  $4x-1$  by  $2$ .**

$$\begin{array}{r} 8x - 2 \\ \hline \end{array}$$

**Subtract**

$$\begin{array}{r} - 8 \\ \hline \end{array}$$

**The solution is**

$$3x + 2 - \frac{8}{4x - 1}$$

**You  
Try It**