

LESSON 84

- $(5x^2 + x + 2) - (4x - 2)$
 $= 5x^2 + x + 2 - 4x + 2$
 $= 5x^2 - 3x + 4$
- $(x + 3)(2x - 1) - (x + 3)^2$
 $= (2x^2 - x + 6x - 3) - (x^2 + 6x + 9)$
 $= 2x^2 + 5x - 3 - x^2 - 6x - 9$
 $= x^2 - x - 12$
- $(px + 1)(3x - q)$
 $= 3px^2 - pqx + 3x - q$
 $= 3px^2 + (3 - pq)x - q$
 $= 6x^2 + rx - 2$
- $x^3 - 2x^2 - x + 2$
 $= x^2(x - 2) - (x - 2)$ Factor by grouping.
 $= (x - 2)(x^2 - 1)$
 $= (x - 2)(x + 1)(x - 1)$ Difference of squares
- $x^4 - 16$
 $= (x^2 + 4)(x^2 - 4)$ Difference of squares
 $= (x^2 + 4)(x + 2)(x - 2)$ Difference of squares
- The answer is C.

 $x^3 - 2x^2 - 3x$
 $= x(x^2 - 2x - 3)$ Factor out the GCF.
 $= x(x + 1)(x - 3)$ Factor the quadratic.
- The answer is C.

$ \begin{array}{r} x - 2 \\ 2x + 1 \overline{) 2x^2 - 3x + 2} \\ \underline{2x^2 + x} \\ -4x + 2 \\ \underline{-4x - 2} \\ 4 \end{array} $	$\Rightarrow$ Quotient = $x - 2$ Remainder = 4 Answer: $x - 2 + \frac{4}{2x + 1}$
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- You can use long division or synthetic division.

$ \begin{array}{r rrrrrr} -3 & 2 & 5 & -3 & 1 & 0 \\ & & -6 & 3 & 0 & -3 \\ \hline & 2 & -1 & 0 & 1 & -3 \end{array} $	
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The quotient is $2x^3 - x^2 + 1$. The remainder is -3 .
- The answer is D.

By the Remainder Theorem, if $p(x)$ is divided by $(x + 4)$, then the remainder is $p(-4)$.
- The answer is D.

By the Factor Theorem, if a polynomial evaluates to 0 when $x = 1$, then $(x - 1)$ is a factor of the polynomial.

A) $p(1) = 2(1^2) + 1 + 1 = 4$
B) $q(1) = 1^2 + 4(1) - 1 = 4$
C) $p(1) + q(1) = 4 + 4 = 8$
D) $p(1) - q(1) = 4 - 4 = 0$

- Domain: $[-1, 4)$, Range: $[-2, 2]$
- The answer is D.

 $f(x - 2) = -3(x - 2) + 4 = -3x + 10$
- $f(3) = -3^2 + 3k + k = -1$
 $-9 + 4k = -1$
 $k = 2$
- $f(-1) = 3(-1) - 4 = -7$
 $g(-1) = (-1)^2 + 2(-1) + 1 = 0$
 $(f \cdot g)(-1) = f(-1) \cdot g(-1) = -7(0) = 0$
- The answers are C and D.

See the graphs in Lesson 40.
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|-------------------|-----------------------------|
| $f(x) = x $ | Parent function |
| $y = - x $ | Reflect over the x -axis. |
| $g(x) = - x - 2 $ | Shift right 2 units. |
- $\frac{f(5) - f(0)}{5 - 0} = \frac{-1 - (-1)}{5 - 0} = 0$

The average rate of change is 0.
- | | |
|--|-----------------------------|
| $y = 3x - 1$ | Set y equal to $f(x)$. |
| $x = 3y - 1$ | Switch x and y . |
| $x + 1 = 3y$ | Add 1 to both sides. |
| $3y = x + 1$ | Switch sides. |
| $y = \frac{1}{3}x + \frac{1}{3}$ | Divide both sides by 3. |
| $f^{-1}(x) = \frac{1}{3}x + \frac{1}{3}$ | Write in function notation. |
- $f(-4) = 0$
 $f(0) = -0 + 2 = 2$
 $f(-4) + f(0) = 0 + 2 = 2$
- | | |
|------------------------|--------------------------|
| $x^2 + 2xy + y^2 = 36$ | First equation expanded |
| $x^2 - 2xy + y^2 = 4$ | Second equation expanded |
| $4xy = 32$ | Subtract the equations. |
| $xy = 8$ | Divide both sides by 4. |