**Multiply polynomial Notes**

**Example 1 Multiply a Polynomial by a Monomial Find 3*x*(2*x*2 + 8*x* – 1).**

**Horizontal Method**

3*x*(2*x*2 + 8*x* – 1) Original expression

= 3*x*(2*x*2) + 3*x*(8*x*) – 3*x*(1) Distributive Property / Multiply

6*x*3 + 24*x*2 – 3*x* New expression

**Vertical Method**

2*x*2 + 8*x* – 1

() 3*x* Distributive Property/ Multiply

6*x*3 + 24*x*2 – 3*x* .

# Multiplying binomials

# Example 1 The Distributive Property Find each product.

**a. (*r* + 6)(*r* + 4)**

# Vertical Method

|  |  |  |
| --- | --- | --- |
| Multiply by 4. | Multiply by *r*. | Combine like terms. |
| *r* + 6 () *r* + 4 4*r* + 24  4(*r* + 6) = 4*r* + 24 | *r* + 6 () *r* + 4 4*r* + 24  *r*2 + 6*r*  *r*(*r* + 6) = *r*2 + 6*r* | *r* + 6 () *r* + 4 4*r* + 24  *r*2 + 6*r*  *r*2 + 10*r* + 24 |

**Horizontal Method**

(*r* + 6)(*r* + 4) = *r*(*r* + 4) + 6(*r* + 4) Rewrite as the sum of two products.

= *r*2 + 4*r* + 6*r* + 24 Distributive Property

= *r*2 + 10*r* + 24 Combine like terms.

# Example 2 FOIL Method Find each product.

**a. (*x* – 9)(*x* – 2)**

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(*x* – 9)(*x* – 2) = (*x*)(*x*) + (*x*)(-2) + (-9)(*x*) + (-9)(-2) FOIL method



= *x*2 – 2*x* – 9*x* + 18 Multiply.

I = *x*2 – 11*x* + 18 Combine like terms. O

**b. (3*a* – 5)(5*a* – 2)**

(3*a* – 5)(5*a* – 2) = (3*a*)(5*a*) + (3*a*)(-2) + (-5)(5*a*) + (-5)(-2) FOIL method

= 15*a*2 – 6*a* – 25*a* + 10 Multiply.

= 15*a*2 – 31*a* + 10 Combine like terms.

There is also the box method!