Use these functions: $f(x) = x^2 + 4x - 12$ $g(x) = 3x - 5$ $h(x) = 2x + 3$

Perform the following function operations. Simplify your answer. State the domain of the resulting function.

1. $(g - f)(x)$

2. $(f \cdot h)(x)$

Factor each completely.

3. $32x^3 + 8x^2 - 60x$

4. $6x^3 - 96x$

1

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1. $(g - f)(x)$

$$= (3x - 5) - (x^2 + 4x - 12)$$

$$= \boxed{-x^2 - x + 7}$$

$$\boxed{\text{Domain: } \mathbb{R}}$$

2. $(f \cdot h)(x)$

$$= (x^2 + 4x - 12)(2x + 3)$$

	x^2	$+4x$	-12
$2x$	$2x^3$	$+8x^2$	$-24x$
$+3$	$+3x^2$	$+12x$	-36

$$= \boxed{2x^3 + 11x^2 - 12x - 36}$$

$$\boxed{\text{Domain: } \mathbb{R}}$$

Factor each completely.

3. $32x^3 + 8x^2 - 60x$

GCF: $4x$

$$= 4x(8x^2 + 2x - 15)$$

-120

+12   ✕   -10

+2

	$2x$	$+3$
$4x$	$8x^2$	$+12x$
-5	$-10x$	-15

$$= \boxed{4x(2x+3)(4x-5)}$$

4. $6x^3 - 96x$

GCF: $6x$

$$= 6x(x^2 - 16)$$ ← DIFFERENCE OF PERFECT SQUARES

$$= \boxed{6x(x \pm 4)}$$