

February 22, 2016

-5 $3x+2$ -13

4 y^2 ± 2

$\sqrt{y^2} = 4$
 $y = \pm\sqrt{4}$
 $= \pm 2$

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$f(x) = x^2 + 3x + 1$

(b) $f(-2) = (-2)^2 + 3(-2) + 1$
 $= 4 - 6 + 1$
 $= -2 + 1$
 $= -1$

(d) $f(x-1) = (x-1)^2 + 3(x-1) + 1$
 $= (x-1)(x-1) + 3x - 3 + 1$
 $= x^2 - 2x + 1 + 3x - 3 + 1$
 $= x^2 + x - 1$

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#14) $k(a) = -4^{3a+2}$

$k(a-2) = -4^{3(a-2)+2}$
 $= -4^{3a-6+2}$
 $= -4^{3a-4}$

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#10) $f(m) = m^2 - 2m$

$f(m^2) = (m^2)^2 - 2(m^2)$
 $= m^4 - 2m^2$

$(m^2)^4 = (m^2) \cdot (m^2) \cdot (m^2) \cdot (m^2)$
 $= m \cdot m \cdot m \cdot m = m^4$
 $= m^2(m^2 - 2)$

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Operations on Functions

① Addition

$f(x) \neq g(x)$

$f(x) + g(x) = f+g(x)$

ex

$f(x) = x^2 - 4x + 2$

$g(x) = -4x - 5$

$f+g(x) = x^2 - 4x + 2 - 4x - 5$
 $= x^2 - 4x + 2 + (-4x - 5)$
 $= x^2 - 4x + 2 - 4x - 5$
 $f+g(x) = x^2 - 8x - 3$

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② Subtraction

$f - g(x) = x^2 - 3x + 2 - (-4x - 5)$
 $= x^2 - 3x + 2 + 4x + 5$
 $= x^2 + x + 7$

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$$f(x) = 4x - 3$$

$$g(x) = x^3 + 2x$$

$$\begin{aligned}(f-g)(x) &= 4x - 3 - (x^3 + 2x) \\ &= 4x - 3 - x^3 - 2x \\ &= -x^3 + 2x - 3\end{aligned}$$

$$\begin{aligned}(f-g)(4) &= 4(4) - 3 - ((4)^3 + 2(4)) \\ &= 16 - 3 - (64 + 8) \\ &= 16 - 3 - 72 \\ &= 16 - 3 - 72 \\ &= 13 - 72 \\ &= -59\end{aligned}$$

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$$g(x) = 2x + 5$$

$$f(x) = -x^2 + 5$$

$$\begin{aligned}(g+f)(x) &= 2x + 5 + (-x^2 + 5) \\ &= 2x + 5 - x^2 + 5 \\ &= -x^2 + 2x + 10\end{aligned}$$

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$$f(x) = \frac{2}{x-3}$$

$$g(x) = 5x + 2$$

$$\begin{aligned}(f-g)(x) &= \frac{2}{x-3} - (5x+2) \\ &= \frac{2}{x-3} - \frac{5x}{1} - \frac{2}{1} \quad \text{LCD: } x-3 \\ &= \frac{2 - 5x(x-3) - 2(x-3)}{x-3} \\ &= \frac{2 - 5x^2 + 15x - 2x + 6}{x-3} \\ &= \frac{-5x^2 + 13x + 8}{x-3}\end{aligned}$$

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③ Multiplication

$$(fg)(x)$$

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

$$g(x) = 2x - 5$$

$$\begin{aligned}(fg)(x) &= (x^2 - 3x + 4)(2x - 5) \\ &= 2x^3 - 5x^2 - 6x^2 + 15x \\ &\quad + 8x - 20 \\ &= 2x^3 - 11x^2 + 23x - 20\end{aligned}$$

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