Notes: Writing Equations of Lines & Function Composition

e the equation of the line with the following characteristics.

through (-2, 3) and (3, 5)

$m = \frac{5-3}{3-2} = \frac{2}{5}$

$y = mx + b$

$5 = \frac{2}{5}(3) + b$

$5\left(5 = \frac{6}{5} + b\right)5$

$25 = 6 + 5b$

$19 = 5b$

$19/5 = b$

y =

l to the line y = 2x and passes through (0, 4)

$m = 2$ $(0, 4)$

$y = 2x + 4$

idicular to the line y = -3x - 7 and passes through (6, -1)

$m = \frac{1}{3}$ $(6, -1)$

$y = mx + b$

$-1 = \frac{1}{3}(6) + b$

$-1 = 2 + b$

$b = -3$

$y = \frac{1}{3}x - 3$

rcept of 3 and an x-intercept of 5

(0,3)(5,0)

$m = \frac{-3}{5}$

$y = -\frac{3}{5}x + 3$

$3x - 4y =$

$m = -\frac{A}{B} = \frac{-3}{-4}$

ndicular to the line through (-4, 3) and (6, 8) and goes through (-1,3)

$\frac{8-3}{6-4} = \frac{5}{10} = \frac{1}{2} \rightarrow m = -2$ (-1, 3)

$y = mx + b$

$3 = -2(-1) + b$

$3 = 2 + b$

$1 = b$

$y = -2x + 1$

+ ky = 4, find the value of k for each condition given.

$\frac{1}{3}$ $\frac{1}{3} = \frac{-3}{k}$

$k = -9$

b) b = 8 $\frac{4}{k} = 8$

$4 = 8k$

$k = \frac{1}{2}$

c) passes through (0,6)

$6 = \frac{-3}{k}(0) + \frac{4}{k}$

$6 = \frac{4}{k} \rightarrow 6k = 4 \rightarrow k = \frac{2}{3}$

allel to 3x - 4y + 12 = 0

$\frac{3}{1} = \frac{-3}{k}$

$k = -4$

e) Is perpendicular to 3x - 4y + 12 = 0

$m = \frac{-4}{3} = \frac{-3}{k}$

$-9 = -4k$

$k = \frac{9}{4}$

n Composition

n the following function $f(x) = 3x^2 + 2$, find the requested function values.

$(-\sqrt{3}) =$

$^2 + 2$

$+ 2$

b) $f\left(\frac{1}{t}\right) =$

$3\left(\frac{1}{t}\right)^2 + 2$

$3 \cdot \frac{1}{t^2} + 2$

$\frac{3}{t^2} + 2$

c) $f(a+1) =$

$3(a+1)^2 + 2$

$3(a^2 + 2a + 1) + 2$

$3a^2 + 6a + 3 + 2$

$3a^2 + 6a + 5$

d) $f(3x^2) =$

$3(3x^2$

$3 \cdot 9x^4$

$27x^4$

the functions, perform the operation or composition and simplify the answer.

$f(x) = 2x^2 - x - 6$ and $g(x) = x - 2$

$f(g(x))$ $(g \circ f)(x$

$\cdot g)(x) =$ (x^2-x-6)

$6x - 4x^2 + 2x + 12$

$-4x + 12$

b) $\left(\frac{f}{g}\right)(x) =$

$\frac{2x^2-x-6}{x-2}$

$\frac{(x-2)(2x+3)}{x-2}$

$2x+3$

c) $(f \circ g)(x) =$

$2(x-2)^2-(x-2)-6$

$2(x^2-4x+4)-x+2-6$

$2x^2-8x+8-x-4$

$2x^2-9x+4$

d) $g(f(x)) =$

$2x^2-$

$2x^2-$

3) Given $f(x) = 7x + 11$, find and simplify the expression $\frac{f(x+h) - f(x)}{h}$.

$$\frac{7(x+h)+11 - (7x+11)}{h} = \frac{7x + 7h + 11 - 7x - 11}{h}$$

$$= \frac{7h}{h} = 7$$

4) Given $g(x) = 3x^2 - 5$, find and simplify the expression $\frac{g(x+h) - g(x)}{h}$.

$$\frac{3(x+h)^2 - 5 - (3x^2 - 5)}{h} = \frac{3(x^2 + 2xh + h^2) - 5 - 3x^2 + 5}{h}$$

$$\frac{3x^2 + 6xh + 3h^2 - 3x^2}{h} = \frac{6xh + 3h^2}{h} = 6x + 3h$$