Key

AP Calculus AB

Selected Ch. P Review problems from Summer Packet

1) Write the equation of the line with the following characteristics

a) passes through (3, -4) and (5, 2)

* $m = \frac{y_2 - y_1}{x_2 - x_1}$

point-slope form: $y - y_1 = m(x - x_1)$

$m = \frac{2-(-4)}{5-3} = \frac{6}{2} = 3$

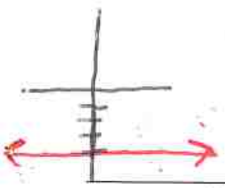
point: $(5, 2)$

slope: $m = 3$

$y - y_1 = m(x - x_1)$

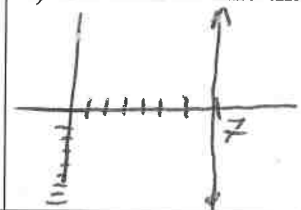
$\boxed{y - 2 = 3(x-5)}$

b) is a horizontal line with a y-intercept at -4



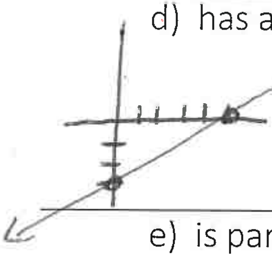
$\boxed{y = -4}$

c) is a vertical line that passes through (7, -8)



$\boxed{x = 7}$

d) has an x-intercept at 5 and a y-intercept at -3



points: $(5, 0)$ and $(0, -3)$

$m = \frac{-3-0}{0-5} = \frac{-3}{-5} = \frac{3}{5}$

point: $(5, 0)$

slope: $m = 3/5$

$y - y_1 = m(x - x_1)$

$\boxed{y - 0 = \frac{3}{5}(x-5)}$

e) is parallel to the line $3x + 4y = 7$, passes through the point (-6, 4) and is written in point-slope form

* Find slope of line $3x + 4y = 7$

$4y = -3x + 7$

$y = \frac{-3}{4}x + \frac{7}{4}$

$m = -3/4$

point: $(-6, 4)$

slope: $m = -3/4$

$y - y_1 = m(x - x_1)$

$\boxed{y - 4 = \frac{-3}{4}(x+6)}$

f) is perpendicular to the line $5x - 3y = 0$, passes through the point $\left(\frac{3}{4}, \frac{7}{8}\right)$ and is written in point-slope form

* find slope of line $5x - 3y = 0$

$-3y = -5x$

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

$m_1 = 5/3$ $\boxed{m_2 = \frac{-3}{5}}$

point $\left(\frac{3}{4}, \frac{7}{8}\right)$

slope: $m = -3/5$

$y - y_1 = m(x - x_1)$

$\boxed{y - 7/8 = \frac{-3}{5}\left(x - \frac{3}{4}\right)}$

6) Find the value of $\frac{f(x+h)-f(x)}{h}$ for each of the following functions:

a) $f(x) = 3x + 7$

$f(\ ) = 3(\ ) + 7$

$f(x+h) = 3(x+h) + 7$

$\frac{3(x+h)+7-(3x+7)}{h}$

$\frac{\cancel{3x}+3h+\cancel{7}-\cancel{3x}-\cancel{7}}{h}$

$\frac{3h}{h} \rightarrow \boxed{3}$

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

$f(\ ) = 3(\ )^2 - 2(\ ) + 1$

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

$\frac{3(x+h)^2-2(x+h)+1-(3x^2-2x+1)}{h}$

c) $f(x) = \frac{6}{x}$

$f(\ ) = \frac{6}{(\ )}$

$f(x+h) = \frac{6}{(x+h)}$

$\frac{\frac{6}{x+h} - \frac{6}{x}}{h}$

$\frac{6}{x+h}(x) - \frac{6}{x}(x+h)$

$\frac{6x}{x(x+h)} - \frac{6(x+h)}{x(x+h)}$

$\frac{\frac{6x-6(x+h)}{x(x+h)}}{h}$

$\frac{\frac{\cancel{6x}-\cancel{6x}-6h}{x(x+h)}}{h}$

$\frac{\frac{-6h}{x(x+h)} \cdot \frac{1}{h}}{h \cdot \frac{1}{h}}$

$\boxed{\frac{-6}{x(x+h)}}$

24) State horizontal asymptote(s), vertical asymptote(s) and hole(s) for each of the following:

a) $y = \frac{2x^2-7x-4}{6x^2+7x+2} = \frac{\cancel{(2x+1)}(x-4)}{(3x+2)\cancel{(2x+1)}}$

x-int: $x=4 \rightarrow (4,0)$

VA: $3x+2=0 \quad x=-2/3$

hole: $2x+1=0 \quad x=-1/2 \rightarrow (-1/2, -9)$

H.A: $y=2/6 \rightarrow y=1/3$

b) $y = \frac{5x^2+20x}{x^3-3x^2-28x}$ $\frac{5\cancel{x}\cancel{(x+4)}}{\cancel{x}(x-7)\cancel{(x+4)}}$

x-int: none

VA: $x-7=0 \rightarrow x=7$

hole: $x=0$ and $x+4=0 \rightarrow x=-4$

$(0, -5/7)$ and $(-4, \frac{-5}{11})$

H.A: $y=0$ ← *denominator has the higher degree