

14.1

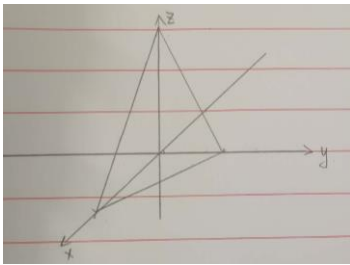
1. $f(2,2) = 18$ $f(-1,4) = -5$

3. $h(3,8,2) = 6$ $h(3,-2,-6) = \frac{-1}{6}$

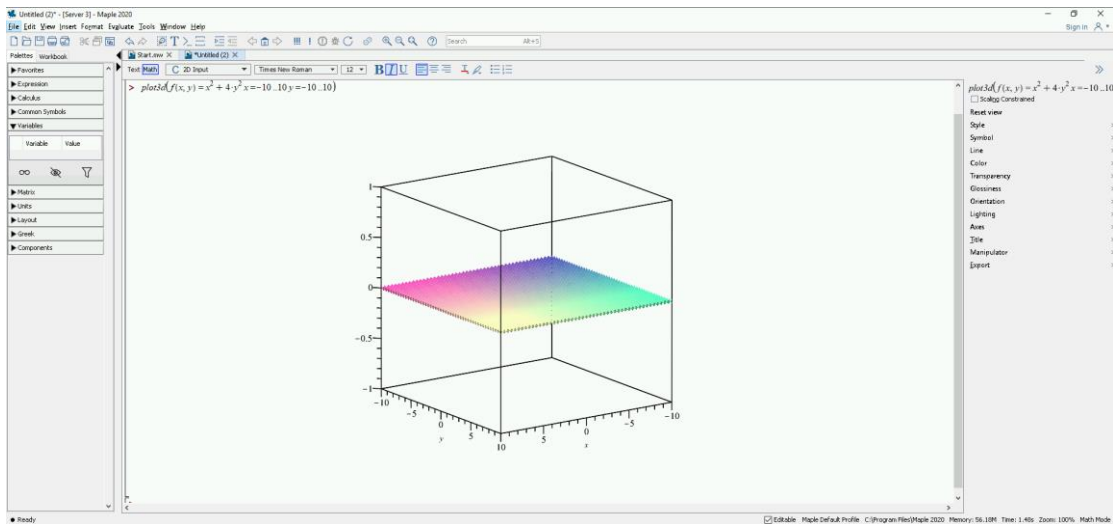
7. $4x^2 - y > 0$

21. horizontal trace is $3x + 4y = 12 - z$

vertical trace is $4y + z - 12 = -3x$ and $3x + z - 12 = 4y$



23



37. $m = 6$ $f(x,y) = 2x + 6y + 6$

$m = 3$ $f(x,y) = x + 3y + 3$

14.2

$$15. f(x, y) = \frac{x^3 + y^3}{xy^2} = \frac{(1+m^3)x^3}{m^2x^3} = \frac{(1+m^3)}{m^2}$$

21. *plugging $y = mx$ into the equation*

$$\lim_{(x,y) \rightarrow (0,0)} \frac{xy}{3x^2 + 2y^2} = \frac{mx^2}{(3 + 2m^2)x^2} = \frac{m}{3 + 2m^2}$$

its value depends on value of m , so the limit doesn't exist.

23. *plugging $y = z = x$ into the equation*

$$\lim_{(x,y,z) \rightarrow (0,0,0)} \frac{x + y + z}{x^2 + y^2 + z^2} = \frac{3x}{3x^2} = \frac{1}{x} = \infty$$

$$27. \lim_{(z,w) \rightarrow (-2,1)} \frac{z^4 \cos(\pi w)}{e^{z+w}} = -16e$$

$$31. \lim_{(x,y) \rightarrow (3,4)} \frac{1}{\sqrt{x^2 + y^2}} = \frac{1}{5}$$

$$35. \lim_{(x,y) \rightarrow (-3,-2)} x^2 y^3 + 4xy = -48$$