

2.4

7) P(20, 650) Q<sub>1</sub>(10, 225) Q<sub>2</sub>(14, 375) Q<sub>3</sub>(16.5, 475)

PQ<sub>1</sub>  $\frac{650-225}{20-10} = \text{~~42.5~~ 42.5$

Q<sub>4</sub>(18, 550)

PQ<sub>2</sub>  $\frac{650-375}{20-14} = 46$

PQ<sub>3</sub>  $\frac{650-475}{20-16.5} = 50$

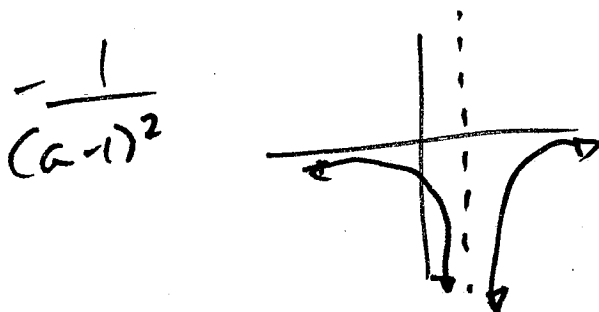
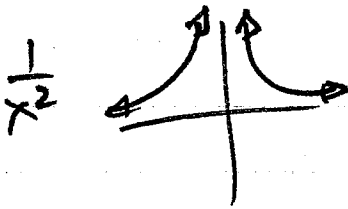
PQ<sub>4</sub>  $\frac{650-550}{20-18} = 50$

$$\frac{3}{4} - \frac{1}{3} = \frac{9-4}{12}$$

$$\frac{9-4}{12}$$

21)  $\lim_{h \rightarrow 0} \frac{\frac{1}{a+h-1} - \frac{1}{a-1}}{h} = \lim_{h \rightarrow 0} \frac{\frac{(a+h-1) - (a-1)}{(a+h-1)(a-1)}}{h} = \lim_{h \rightarrow 0} \frac{-h}{(a+h-1)(a-1)h}$

$$\lim_{h \rightarrow 0} \frac{-h}{(a+h-1)(a-1)} \cdot \frac{1}{h} = \lim_{h \rightarrow 0} \frac{-1}{(a+h-1)(a-1)} = \frac{-1}{(a-1)(a-1)} = \frac{-1}{(a-1)^2}$$



$$2.4 \quad 15) \lim_{h \rightarrow 0} \frac{f(0+h) - f(0)}{h} = \lim_{h \rightarrow 0} \frac{(2 - 2(0+h) - (0+h)^2) - (2)}{h}$$

$$2 - 2x - x^2$$

$$2 - 2(0) - (0)^2 = 2$$

$$\lim_{h \rightarrow 0} \frac{(2 - 2h - h^2) - (2)}{h}$$

$$\lim_{h \rightarrow 0} \frac{\cancel{h}(-2-h)}{\cancel{h}} = \lim_{h \rightarrow 0} -2-h = \boxed{-2}$$

$$\lim_{h \rightarrow 0} \frac{(2(0+h) + 2) - (2)}{h} = \lim_{h \rightarrow 0} \frac{2h + 2 - 2}{h} = \lim_{h \rightarrow 0} \frac{2h}{h}$$

$$\lim_{h \rightarrow 0} 2 = \boxed{2}$$

$$19) \lim_{h \rightarrow 0} \frac{(a+h)^2 + 2 - (a^2 + 2)}{h} = \lim_{h \rightarrow 0} \frac{a^2 + 2ah + h^2 + 2 - a^2 - 2}{h}$$

$$\lim_{h \rightarrow 0} \frac{\cancel{h}(2a+h)}{\cancel{h}} = \lim_{h \rightarrow 0} 2a+h = 2a$$

$$\begin{array}{l} \overbrace{(a+h)(a+h)} \\ \underbrace{\phantom{(a+h)(a+h)}} \\ a^2 + ah + ah + h^2 \\ a^2 + 2ah + h^2 \end{array}$$

$$29) \lim_{h \rightarrow 0} \frac{2 \cdot 4 \left( (a+h)^2 + 4(a+h) - 1 \right) - (a^2 + 4a - 1)}{h}$$

$$\lim_{h \rightarrow 0} \frac{(a^2 + 2ah + h^2 + 4a + 4h - 1) - (a^2 + 4a - 1)}{h}$$

$$\lim_{h \rightarrow 0} \frac{h(2a+h+4)}{h} = \lim_{h \rightarrow 0} 2a+h+4 = 2a+4$$

$$2a+4=0$$

$$2a=-4$$

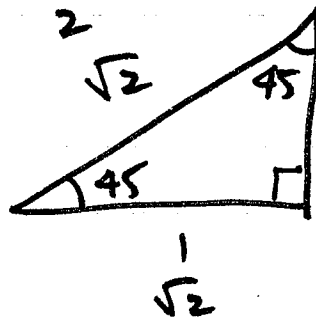
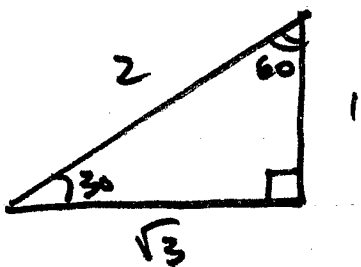
$$a=-2$$

$$\underline{x=-2}$$

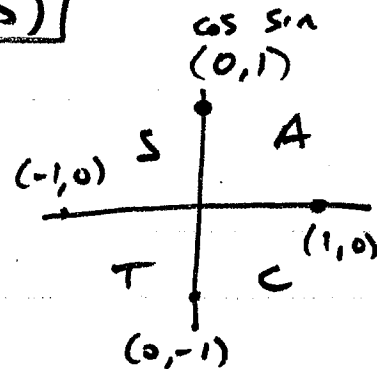
$$(-2)^2 + 4(-2) - 1$$

$$\boxed{(-2, -5)}$$

5)

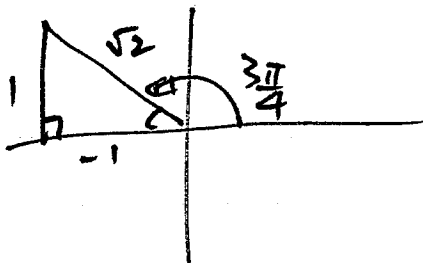


$$1 \sqrt{2}$$



$$(a) \frac{\cot \frac{3\pi}{4} - \cot \frac{\pi}{4}}{\frac{3\pi}{4} - \frac{\pi}{4}} = \frac{(-1) - 1}{\frac{3\pi}{4} - \frac{\pi}{4}} = \frac{-2}{\frac{2}{\pi}} = -\frac{2}{1} \cdot \frac{\pi}{2} = -\frac{4}{\pi}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta} = \frac{0}{1} = 0$$



$$2.4 \quad 27) \lim_{h \rightarrow 0} \frac{1.86(1+h)^2 - 1.86(1)}{h} = \lim_{h \rightarrow 0} \frac{1.86(1+2h+h^2) - 1.86}{h}$$

$$\lim_{h \rightarrow 0} \frac{1.86 + 3.72h + 1.86h^2 - 1.86}{h} = \lim_{h \rightarrow 0} \frac{K(3.72 + 1.86h)}{K}$$

3.72 m/s

$$y = -x \vee y = x$$

2.4

$$(3) f(x) = |x| : f(x) = x \quad x > 0 \quad f(x) = -x \quad \text{for } x < 0$$

$$(1) y = \frac{1}{x-1} \quad \text{at } x=2$$

$$(a) \lim_{h \rightarrow 0} \frac{\frac{1}{(2+h)-1} - \frac{1}{2-1}}{h}$$

$$\begin{aligned} \lim_{h \rightarrow 0} \frac{\frac{1}{1+h} - 1}{h} &= \lim_{h \rightarrow 0} \frac{1 - (1+h)}{h(1+h)} = \lim_{h \rightarrow 0} \frac{-h}{h(1+h)} = \lim_{h \rightarrow 0} \frac{-1}{1+h} \\ &= \lim_{h \rightarrow 0} \frac{-1}{1+h} = \boxed{-1} \end{aligned}$$

$$(b) m = -1, (2, 1) \quad (c) m = 1$$

$$y - 1 = -1(x - 2)$$

$$y - 1 = 1(x - 2)$$