QUIZ 1 Math 157

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Section

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$\frac{23}{30}$ = $\frac{11.5}{15}$

1.

Suppose the demand equation for the version A of cell phones and the version B of cell phones

are respectively

$\frac{p}{20}+\frac{x}{500}=1$ $\quad \frac{p}{20} = 1-\frac{x}{500} \quad p=(1-\frac{x}{500})\times 20.$

$\frac{p}{10}+\frac{x}{1000}=1$ $\quad p=(1-\frac{x}{1000})\times 10$

(a) Sketch the above demand curves.

(b) Which graph has greater slope.

(c) Interpret (b).

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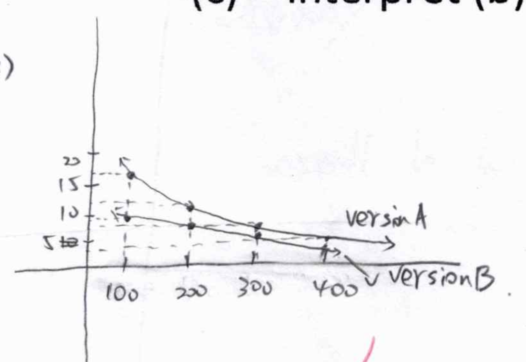
(a)



(b) Version B. has greater slope

(c) Version B is more stable than version A. When version A got 500 products, the price will get zero.

?

2.

You are the manager of a firm. You are considering production of a new product, so you ask the accounting department for cost estimates and the sales department for sales estimate. After you receive the data, you must decide whether to go ahead with production of the new product. Analyze the given data (find a break-even quantity) and then decide what you would do in each case. Include the profit function.

(a) C(x) =100x+6000 ; R(x)=250x; no more than 400 can be sold.

(b) C(x) =1000x+5000 ; R(x)=900x ; no more than 400 can be sold.

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(a) $100x+6000=250x$

$6000=150x$

$x=40$

$P(x)=250\times400-100\cdot400+6000$

$=54000$

(b) $1000x+5000=900x$

$100x=-5000$

$x=-50$

$P(x)=900\times400-1000\times400-5000$

$=-45000$

∴ (a) will be better, It can have profit after sales 40 of product, when It sales 400, it can earn \$54000.

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3.Complete the table by computing *f(x)* at the given value of *x*. Use these results to estimate the indicated limit (if it exists)

$$f(x) = \frac{|x-1|}{x-1}, \lim_{x \to 1} f(x)$$

x	0.9	0.99	0.999	1.001	1.01	1.1
$f(x)$	-1	-1	-1	1	1	1

$\lim_{x \to 1} f(x) = \frac{|x-1|}{x-1}$

It is not exist,

$\lim_{x \to 1^+} f(x) = \frac{|x-1|}{x-1} = 1$

$\lim_{x \to 1^-} f(x) = \frac{|x-1|}{x-1} = -1$

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4. Find the following limits, if they exist. State if the limit is ∞ *or* $-\infty$.

a) $\lim_{x \to 4} \frac{x}{4+x}$

$= \lim_{x \to 4} \frac{x}{4+x}$

$= \frac{1}{2}$

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b) $\lim_{x \to 1} \frac{x-1}{x^3+x^2-2x}$.

$= \lim_{x \to 1} \frac{\cancel{x-1}}{x\cancel{(x-1)}(x+2)}$

$= \lim_{x \to 1} \frac{1}{x(x+2)}$

$= \frac{1}{3}$

Type equation here.

c) $\lim_{h \to 2} \frac{h}{(h-2)}$.

? $\pm\infty$

$\therefore$ It is not exist.

d) $\lim_{x \to 0} \frac{\sqrt{x^2+4}-2}{x^2}$

$= \lim_{x \to 0} \frac{(\sqrt{x^2+4}-2)(\sqrt{x^2+4}+2)}{x^2(\sqrt{x^2+4}+2)}$

$= \lim_{x \to 0} \frac{\cancel{x^2}+\cancel{4}-\cancel{4}}{\cancel{x^2}(\sqrt{x^2+4}+2)}$

$= \lim_{x \to 0} \frac{1}{\sqrt{x^2+4}+2}$

$= \frac{1}{4}$

e) $\lim_{x\to\infty} \frac{8x^4-5x^3+x-2}{1-4x^4-x^2}$

$= \lim_{x\to\infty} \frac{8x^4-5x^3+x-2}{-4x^4-x^2+1}$ ∞ $-\infty$

$= -2$

f) $\lim_{x\to-\infty} \frac{\sqrt{x^2+4x}}{4x+1}$ ∞ $-\infty$

$= \lim_{x\to-\infty} \frac{\sqrt{(x+2)^2-4}}{4x+1}$

$= \lim_{x\to-\infty} \frac{x+2-2}{4x+1}$

$= \lim_{x\to-\infty} \frac{x}{4x+1}$

$= \frac{1}{4}$

5. **Use the Intermediate Value theorem to show that $x^4 + 5x^3 + 5x - 1 = 0$ has at least one solution in the interval (-6,-5) and approximate it correct to one decimal place.**

$f(6) = 185$?

$f(-5) = -2$

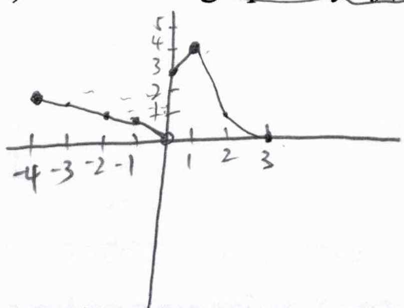
$f(-5.5) = 54.6875$

$\therefore$ It is 5.3.

0

6. Let $f(x) = \begin{cases} \sqrt{-x} & if\ -4 \le x < 0 \\ 3 + x, & if\ 0 \le x \le 1 \\ (x-3)^2 & if\ 1 < x \le 3 \end{cases}$

a) Sketch the graph of $y=f(x)$



b) Is f continuous at $x=0$? Justify your answer.

It is not continuous, It is different line.

$\lim_{x\to 0^+} (3+x)$ $\quad\quad$ $\lim_{x \to 0^-} \sqrt{-x}$

$= 3$ $\quad\quad$ $= \sqrt{0}$ $\quad$ No exist.

c) Is f continuous at $x=2$? Justify your answer.

It is continouns at $x=2$.

$\lim_{x\to 2^+} (x-3)^2$ $\quad\quad$ $\lim_{x \to 2^-} (x-3)^2$

$= 1$ $\quad\quad$ $= 1$ $\quad\quad$ $\therefore$ It is continouns

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