$$f(x) = \frac{8x+2}{4x-5}$$

Fill out the table, rounding to two places past the decimal.

x	$f(x)$
2	6
5	2.8
10	2.34
100	2.03
1000	2.003
10000	
$\downarrow$	$\downarrow$
∞	2

As $x \to \infty$, $\frac{8x+2}{4x-5} \to 2$

limit of $\frac{8x+2}{4x-5}$ as $x \to \infty$

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

$C(x) = 15{,}000 + 6x$

fixed cost — marginal cost

C = cost

x = # of units

Average Cost to produce 100 units?

$\frac{15{,}600}{100} = \$156$

$$\text{Ave cost} = \frac{C(x)}{x} = \frac{15000+6x}{x}$$

$$\frac{a \pm b}{c} = \frac{a}{c} \pm \frac{b}{c}$$

$$= \frac{15000}{x} + \frac{6x}{x}$$

$$\lim_{x \to \infty} \frac{C(x)}{x} = 6$$

$$= \frac{15000}{x} + 6$$

As we make more and more units, our ave. cost gets closer and closer to 6.

Rules for limits

1. c is a constant: $\lim_{x\to\infty} c = c$
2. $\lim_{x\to\infty} cx^n = \infty$ $n = 1, 2, 3, 4, \ldots$
3. $\lim_{x\to\infty} c\frac{1}{x^n} = 0$ $n = 1, 2, 3, 4, \ldots$

④ $P(x)$, $Q(x)$ are polynomials

For $\lim_{x \to \infty} \frac{P(x)}{Q(x)}$, all but the highest power terms of $P(x)$ and $Q(x)$ can be ignored.

$$\lim_{x\to\infty} \frac{2x^2+5x-1}{3x^2+7x-2} = \lim_{x\to\infty} \frac{2x^2}{3x^2} = \lim_{x\to\infty} \frac{2}{3} = \frac{2}{3}$$

$$\lim_{x\to\infty} \frac{2x+1}{x^2-5x+3} = \lim_{x\to\infty} \frac{2x}{x^2} = \lim_{x\to\infty} \frac{2}{x} = 0$$

this

Turn In: Sec. 11.1 43, 45, 47, 49, 51 like

81/86, 82/87

8th Ed

9th Ed

except change $x \to -\infty$ to $x \to \infty$

$P(x) = -0.02x^2 + 45.3x - 8300$

$P(x) = -\frac{1}{2}x^2 + 12x - 40$