

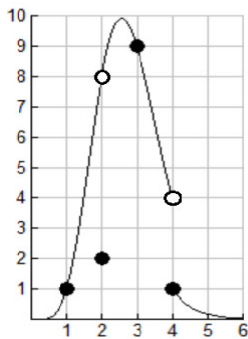
LET'S PLAY CALC-PARDY!!

<http://www.magicnet.net/~itms/jeopardy/index.htm>

Ghostbusters	Road Trip		FTC	Aunty Derivative
Q \$100	Q \$100		Q \$100	Q \$100
Q \$200	Q \$200		Q \$200	Q \$200
Q \$300	Q \$300		Q \$300	Q \$300
Q \$400	Q \$400		Q \$400	Q \$400
Q \$500	Q \$500		Q \$500	Q \$500

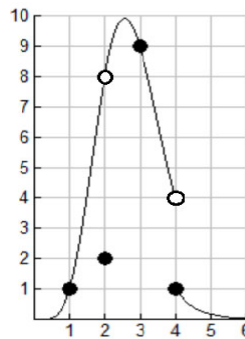
Final Jeopardy

\$100 Answer from Ghostbusters



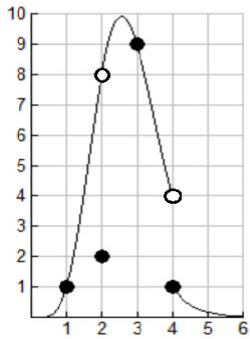
At $x = 2$
there is a
removable
discontinuity

\$200 Answer from Ghostbusters



$$\lim_{x \rightarrow 2} f(x) = 8$$

\$300 Answer from Ghostbusters



$$\lim_{x \rightarrow 4^+} f(x) = 1$$

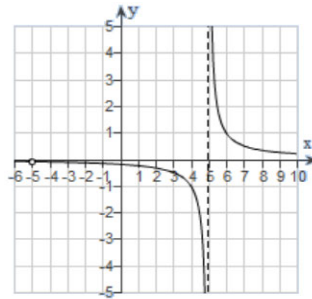
FYI:

$$\lim_{x \rightarrow 4^+} f(x) = 1$$

$$\lim_{x \rightarrow 4^-} f(x) = 4$$

$$\lim_{x \rightarrow 4} f(x) = \text{DNE}$$

\$400 Answer from Ghostbusters



$$\lim_{x \rightarrow 5^-} \frac{x+5}{x^2-25}$$

$$= \lim_{x \rightarrow 5^-} \frac{1}{x-5}$$

$$= -\infty$$



\$500 Answer from Ghostbusters

$$\lim_{x \rightarrow 0} \frac{1 - 0 - 1}{x^3 + 7x^2} \stackrel{LH}{=} \lim_{x \rightarrow 0} \frac{1 - 1}{3x^2 + 14x} \stackrel{LH}{=} \lim_{x \rightarrow 0} \frac{1 + 0}{6x + 14} = \frac{1+0}{0+14} = \frac{1}{14}$$

$$\sin 0 = 0$$

$$\cos 0 = 1$$

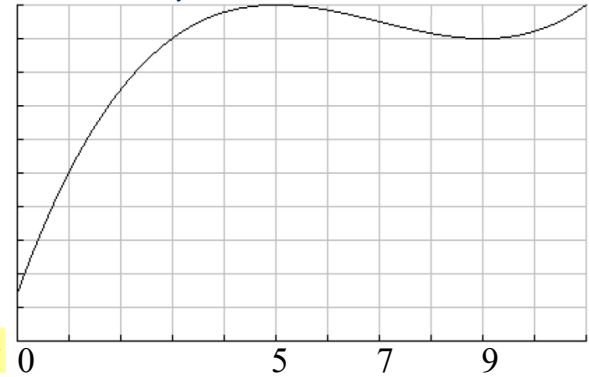
$$e^0 = 1$$



\$100 Answer from Road Trip

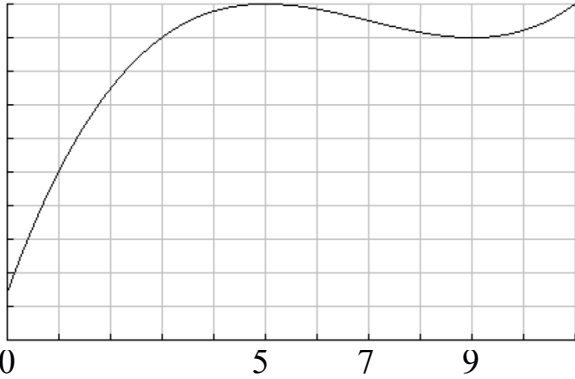
Thomas' distance **away** from Sir Hatt after t min is shown.

Thomas is stationary at $t = 5, 9$



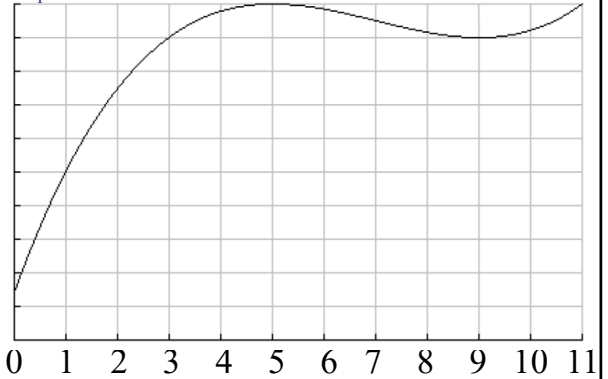
\$200 Answer from Road Trip

Thomas' distance **away** from Sir Hatt after t min is shown.
 At $t = 5$ Thomas moves **toward** Sir Hatt.



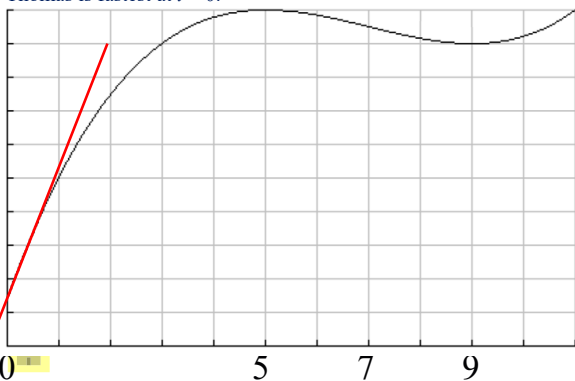
\$300 Answer from Road Trip

Thomas' distance **away** from Sir Hatt after t min is shown.
 Graph is CCU on $7 < t < 11$.



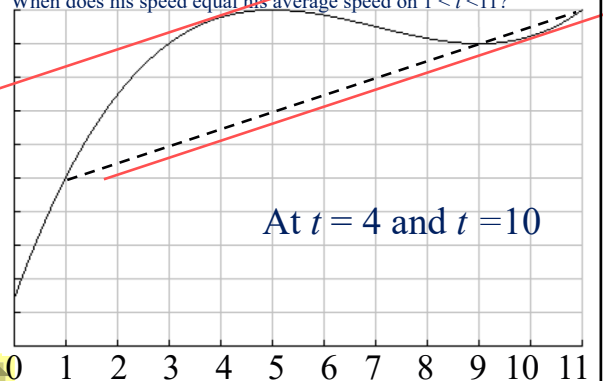
\$400 Answer from Road Trip

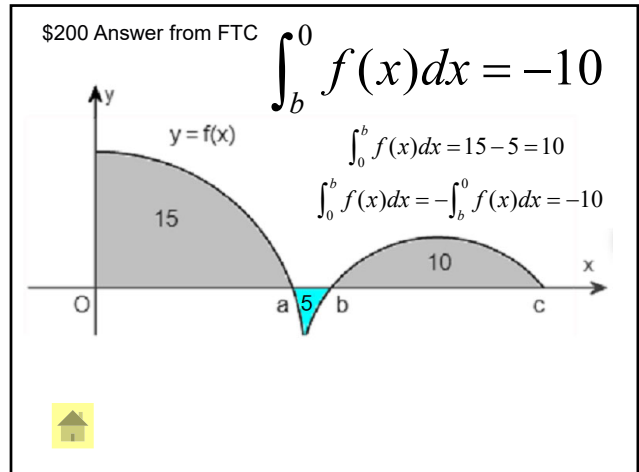
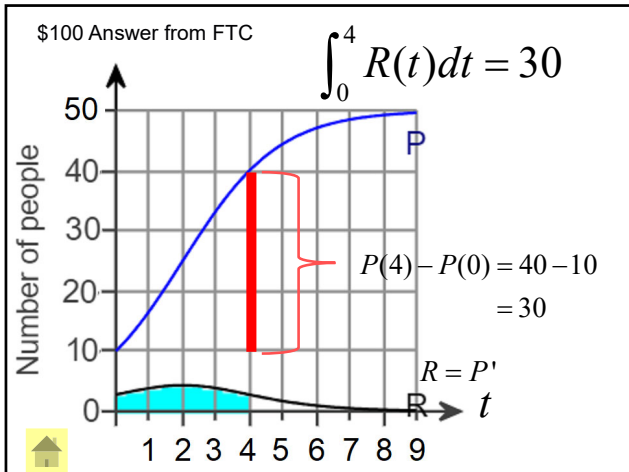
Thomas' distance **away** from Sir Hatt after t min is shown.
 Thomas is fastest at $t = 0$.



\$500 Answer from Road Trip

Thomas' distance **away** from Sir Hatt after t min is shown.
 When does his speed equal his average speed on $1 < t < 11$?





\$300 Answer from FTC

Time, t (years)	Profit, P (thousands of dollars)	Marginal Profit, P' (thousands of dollars per year)
0	-6	-48
1	-29	0
2	-10	36
3	39	60
4	106	72

$$\int_0^4 P'(t) dt = P(4) - P(0) = 106 - (-6) = 112$$

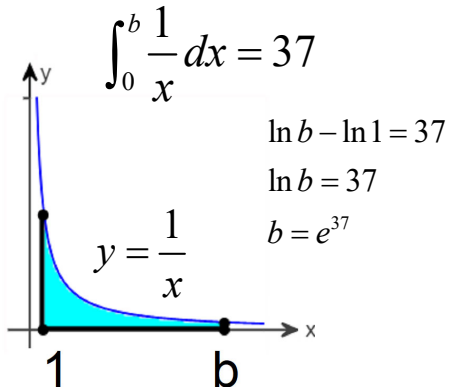
\$400 Answer from FTC

$$g(x) = \int_9^x \ln(\sin(e^{t^3})) dt$$

$$g'(x) = \ln(\sin(e^{x^3}))$$

\$500 Answer from FTC

What is the exact value of b ?



\$100 Answer from Aunty Derivative

$$\int \frac{1}{x-3} dx = \ln |x-3| + C$$



\$200 Answer from Aunty Derivative

$$\begin{aligned} \int \cos 4x dx &= \frac{1}{4} \int \cos 4x 4 dx \\ &= \frac{1}{4} \int \cos u du \\ &= \frac{1}{4} \sin u + C \\ &= \frac{1}{4} \sin 4x + C \end{aligned}$$



\$300 Answer from Aunty Derivative

$$\begin{aligned} s'(x) &= 8x^3 + 6 \sin x \\ \text{and } s'(0) &= 7 \\ s(x) &= 2x^4 - 6 \cos x + 13 \end{aligned}$$



\$400 Answer from Aunty Derivative

Let $u = 36t - 18t^2$ so that $du = (36 - 36t) dt$.

$$\int (1-t)e^{36t-18t^2} dt$$
$$= \frac{1}{36} e^{36t-18t^2} + C$$



\$500 Answer from Aunty Derivative

Exact value please

$$\int_0^{1000} e^{-2x} dx$$

$$\int e^{-2x} dx = -\frac{1}{2} \int e^{-2x} (-2) dx = -\frac{1}{2} e^{-2} + C$$

$$\int_0^{1000} e^{-2x} (-2) dx = -\frac{1}{2} e^{-2} \Big|_0^{1000} = -\frac{1}{2} e^{-2000} - \left(-\frac{1}{2} e^0\right)$$
$$= -\frac{1}{2} e^{-2000} + \frac{1}{2}$$

