

Revision

MA135

2015-16

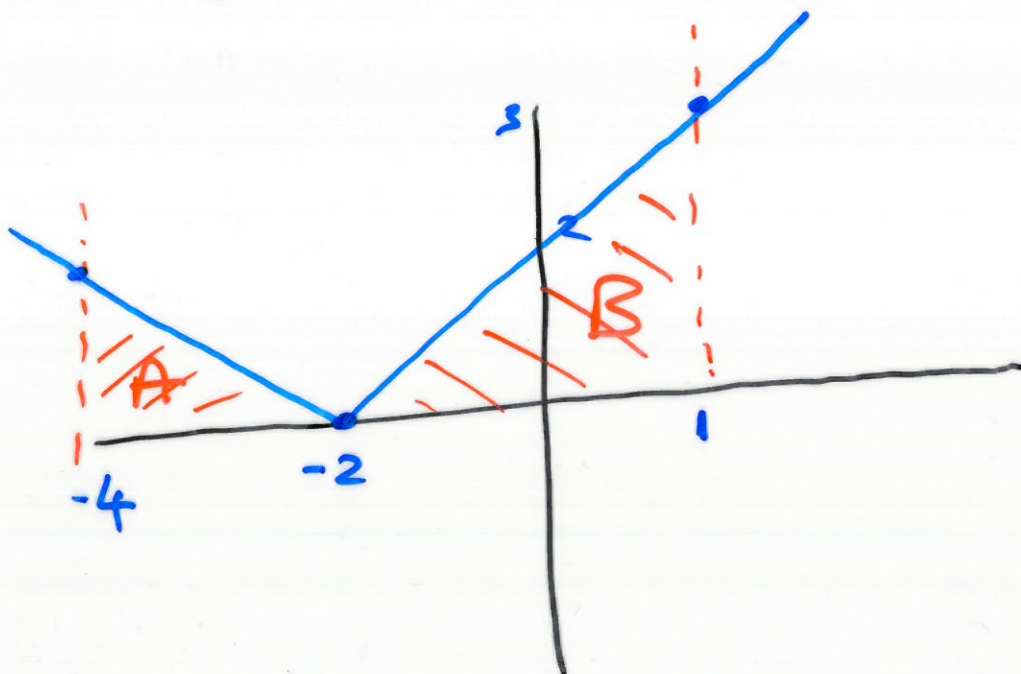
Exam

Q1 a)

Evaluate $I = \int_{-4}^1 |x+2| dx$

Solⁿ

$$f(x) = |x+2|$$



$$I = \text{area of A} + \text{area of B}$$

$$= \frac{1}{2} 2 \cdot 2 + \frac{1}{2} 3 \cdot 3$$

$$= 2 + \frac{9}{2} = \frac{13}{2}$$

16) The rate of flow of water into an initially empty tank is $100 - 3t$ gallons per minute at time t minutes. How much water flows into the tank during the interval from $t=10$ to $t=20$ minutes?

Soln

$$\text{Required Volume of water} = \int_{10}^{20} 100 - 3t \, dt$$

$$= 100t - \frac{3t^2}{2} \Big|_{10}^{20}$$

$$= 2000 - 600 - (1000 - 150)$$

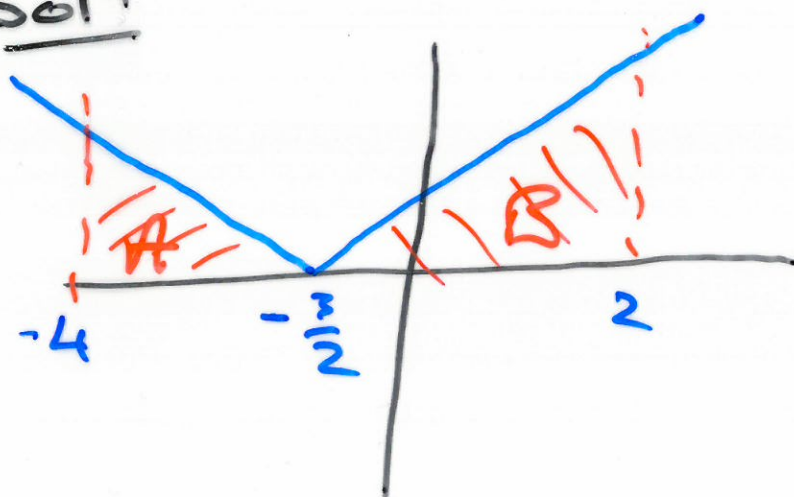
$$= 550 \text{ gallons.}$$

MA 121 Exam 2005

Q4 (a) Evaluate

$$I = \int_{-4}^2 |2x+3| dx$$

Soln



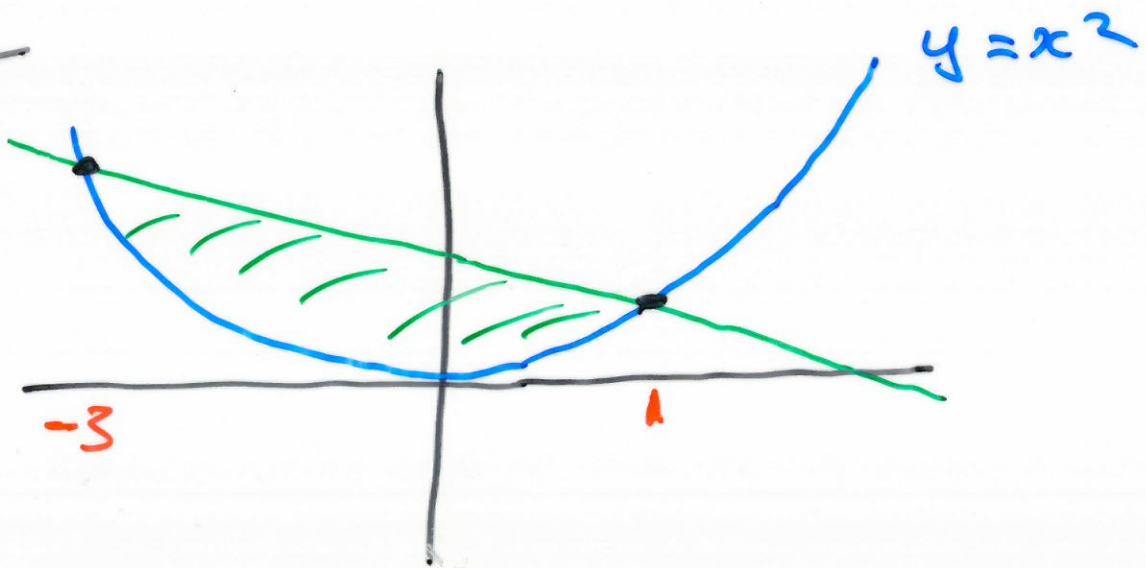
$I = \text{area of A} + \text{area of B}$

$$= \frac{1}{2} \left(\frac{5}{2} \right) 5 + \frac{1}{2} \left(\frac{7}{2} \right) 7$$

$$= \frac{25}{4} + \frac{49}{4} = \frac{74}{4} = \frac{37}{2}$$

Q46) Calculate the area of the finite region bounded by the curves $y = x^2$ and $y = 3 - 2x$.

Soln



intersection points occur when

$$x^2 = 3 - 2x$$

$$x^2 + 2x - 3 = 0$$

$$(x + 3)(x - 1) = 0$$

$$\text{Area} = \int_{-3}^1 3 - 2x - x^2 \, dx$$

$$= 3x - x^2 - \frac{1}{3}x^3 \Big|_{-3}^1$$

$$= 3(-3) - (-3)^2 - \frac{1}{3}(-3)^3 = 3 + 1 + \frac{1}{3}$$

= etc.

Q4 c) On the moon the acceleration due to gravity is $1.6 \, \text{m/s}^2$. A rock is dropped into a crevasse and falls 80m before hitting the bottom. How long does the rock take to fall? How fast is it travelling when it hits bottom?

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