CALCULUS
Antidifferentiation problems
OLD2

0560-1. Find all antiderivatives in x of
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$$-2x^3 + x^2 + 5.$$

0560-2. Find all antiderivatives in t of
OLD2

$$\left(-2\sqrt[4]{t} + 7\sqrt[6]{t}\right) t^3.$$

0560-3. Find all antiderivatives in t of
OLD2

$$\frac{\sqrt[3]{t} + 8\sqrt[7]{t}}{\sqrt[5]{t}}.$$

0560-4. Find all antiderivatives in v of
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$$\frac{4e^v - \cos v}{3}.$$

0560-5. Find the unique $f(x)$ such that
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$$f'(x) = -5x^4 - 9x^2 + 2 \quad \text{and} \quad f(0) = 4.$$

0560-6. Find the unique $f(x)$ such that
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$$f'(x) = \frac{3x^2 + 4}{x\sqrt[6]{x}} \quad \text{and} \quad f(1) = 0.$$

0560-7. Find the unique $h(t)$ such that
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$$h'(t) = 2\sin t - 7\cos t \quad \text{and} \quad h(0) = -4.$$

0560-8. Find the unique $p(t)$ such that
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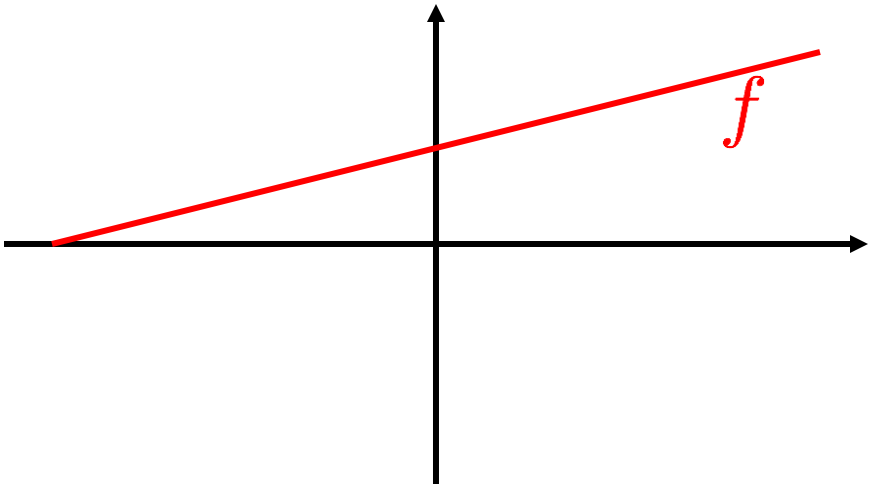
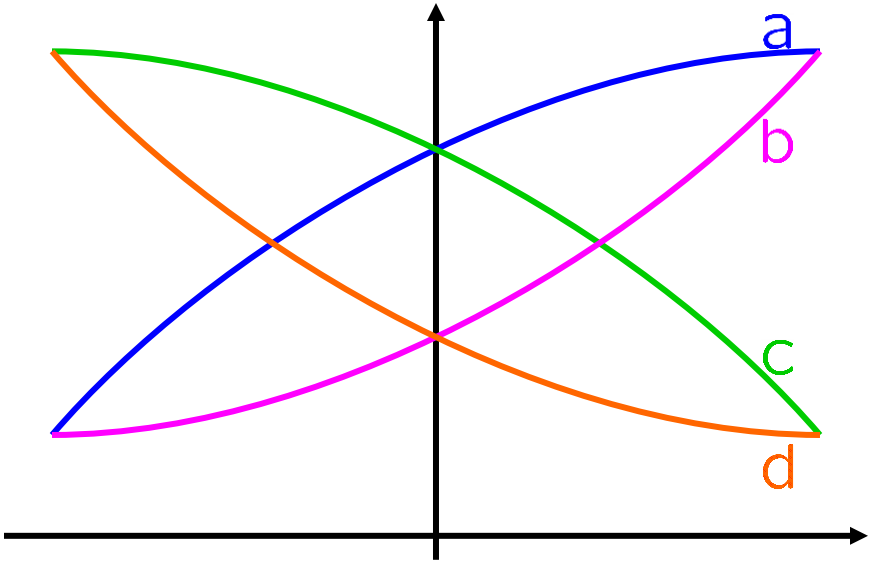
$$p''(t) = -e^t + 12t^3,\ p'(0) = 3 \text{ and } p(0) = 1.$$

0560-9. The graph of f is shown below.

OLD2

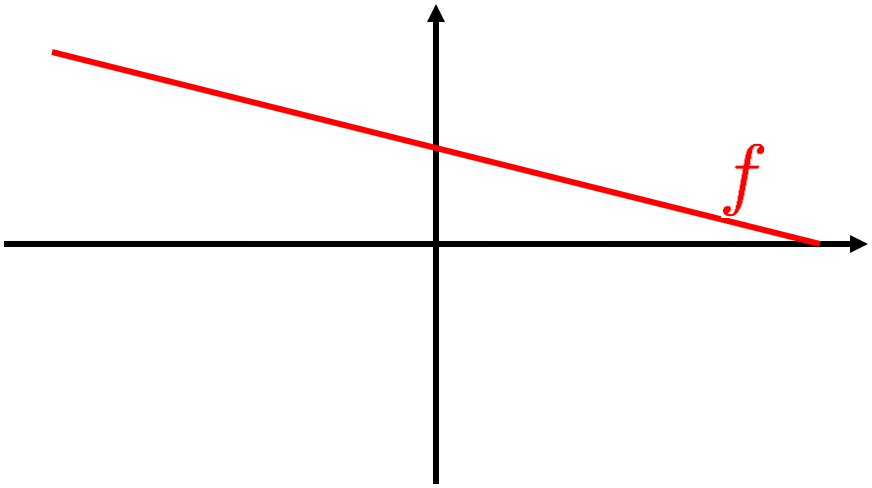


Which of the following could be the graph of an antiderivative of f?

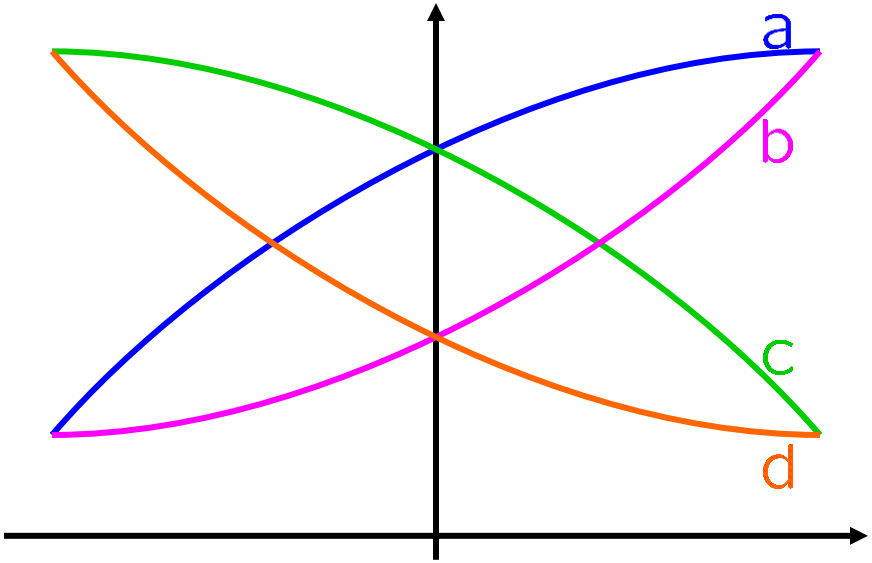


0560-10. The graph of f is shown below.

OLD2

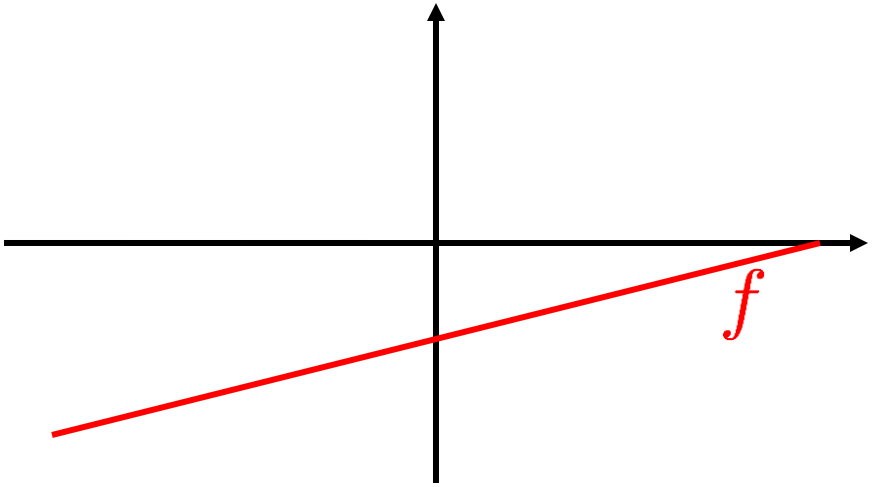


Which of the following could be the graph of an antiderivative of f?

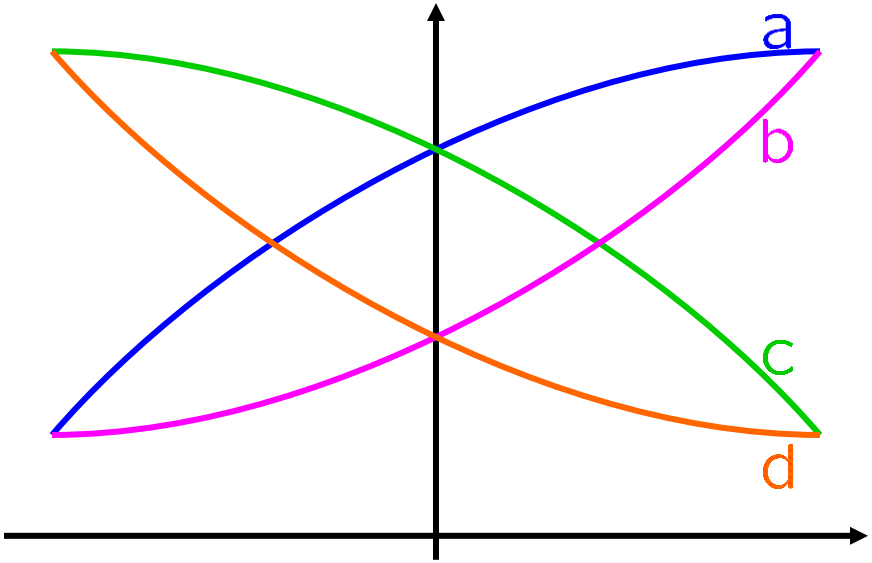


0560-11. The graph of f is shown below.

OLD2

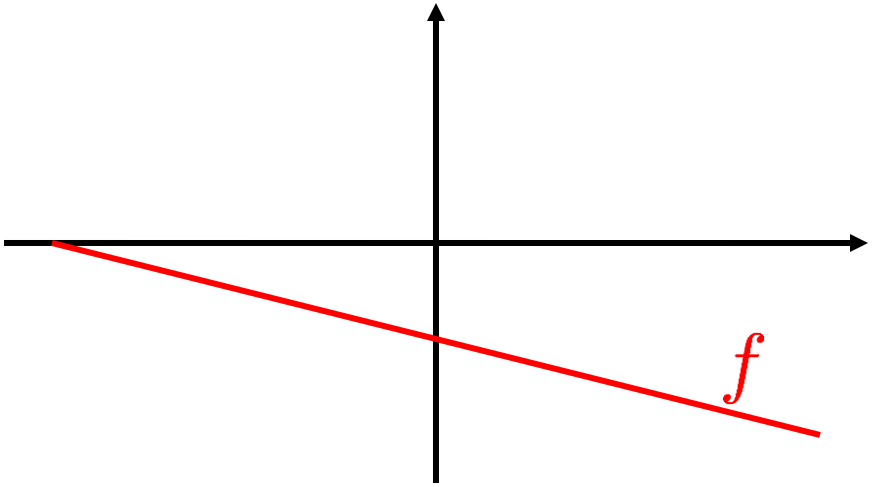


Which of the following could be the graph of an antiderivative of f?

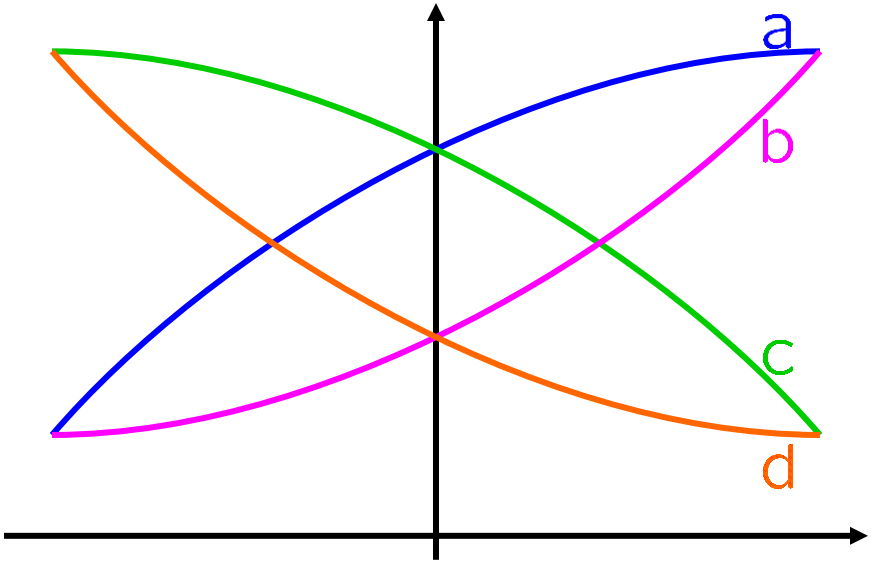


0560-12. The graph of f is shown below.

OLD2



Which of the following could be the graph of an antiderivative of f?



0560-13. A particle travels on a number line.
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Suppose
its acceleration at time t is $3t^2 + 2t - 6$,
its position at time 0 is 2
and its velocity at time 0 is -3.
Find an expression for its position at time t.

0560-14. We drop a heavy ball out of a window
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in a tall building. Its speed at the moment of impact with the ground is 160 feet per second. From what height was it dropped?