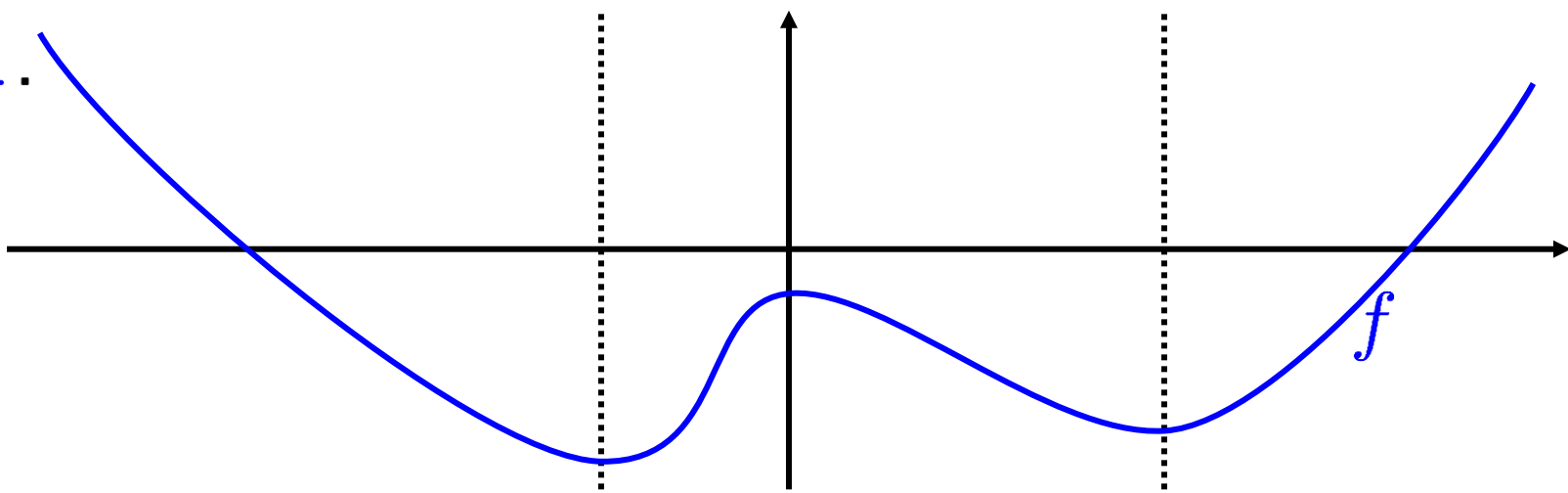


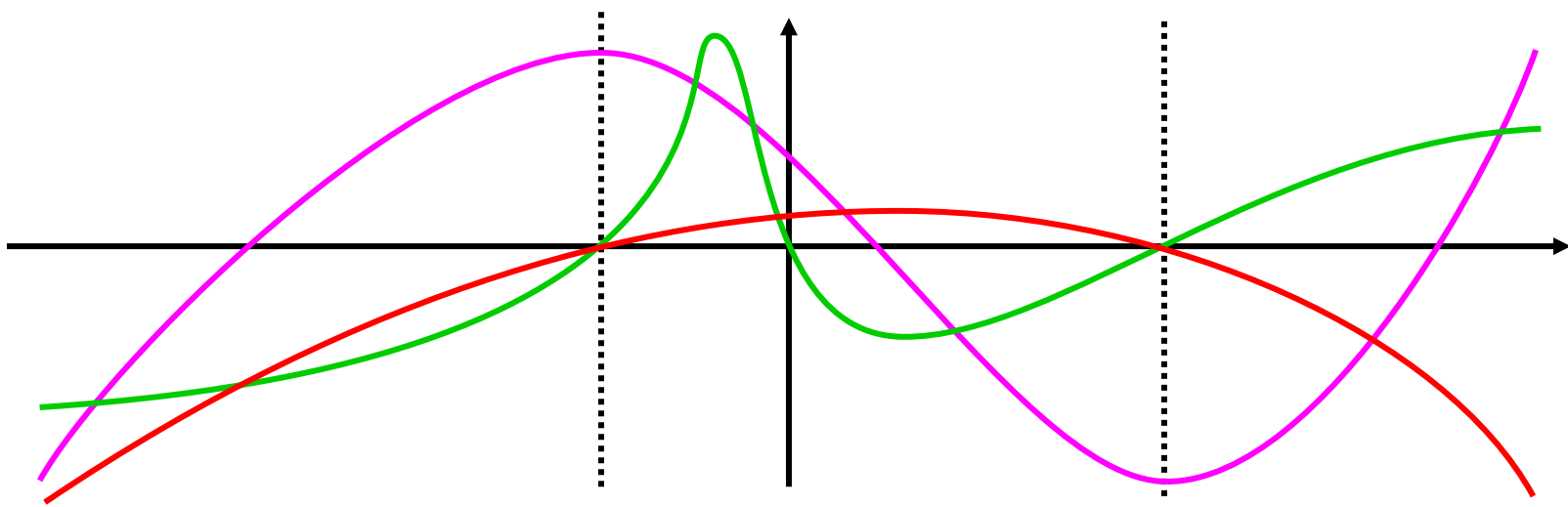
CALCULUS

The derivative of a function is a function

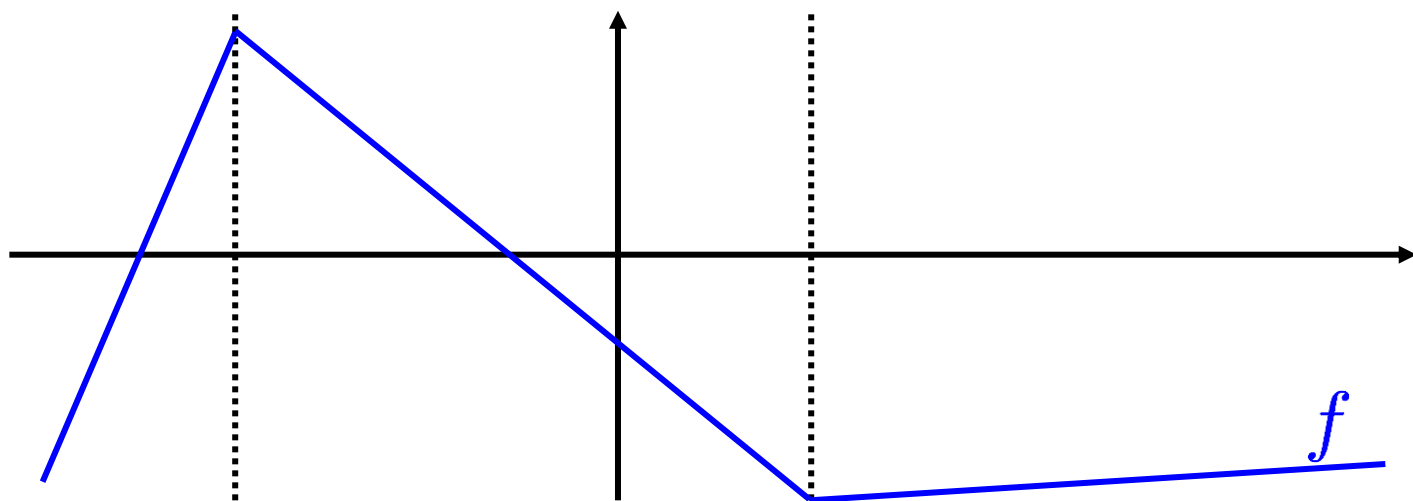
NEW



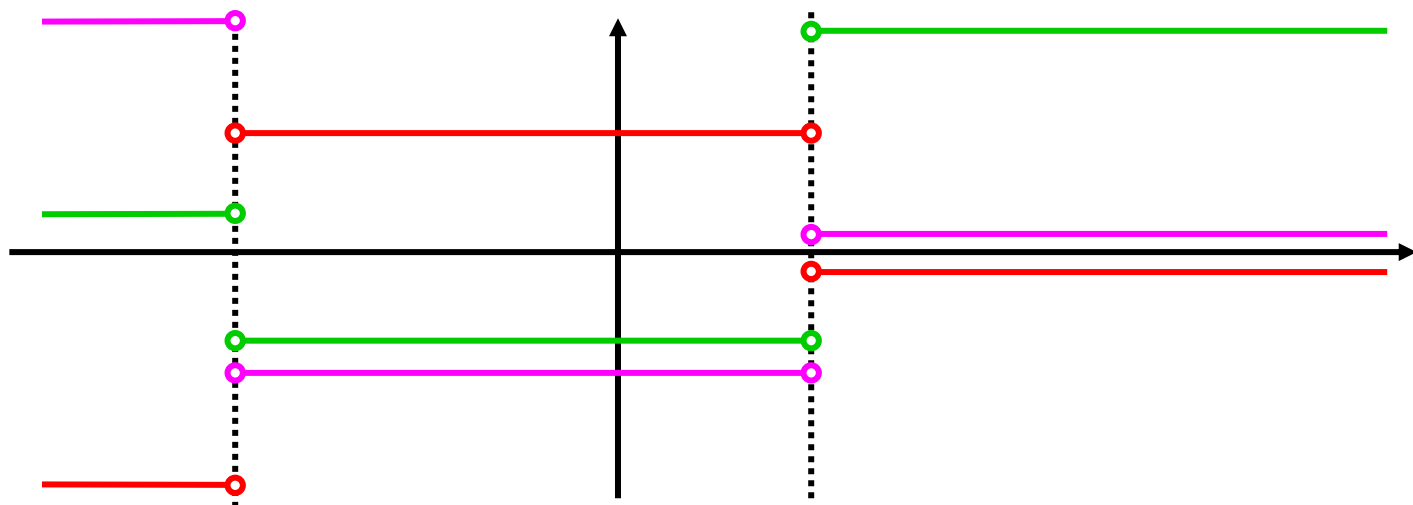
The graph of f is shown above.
Which of the following is the graph of f' ?



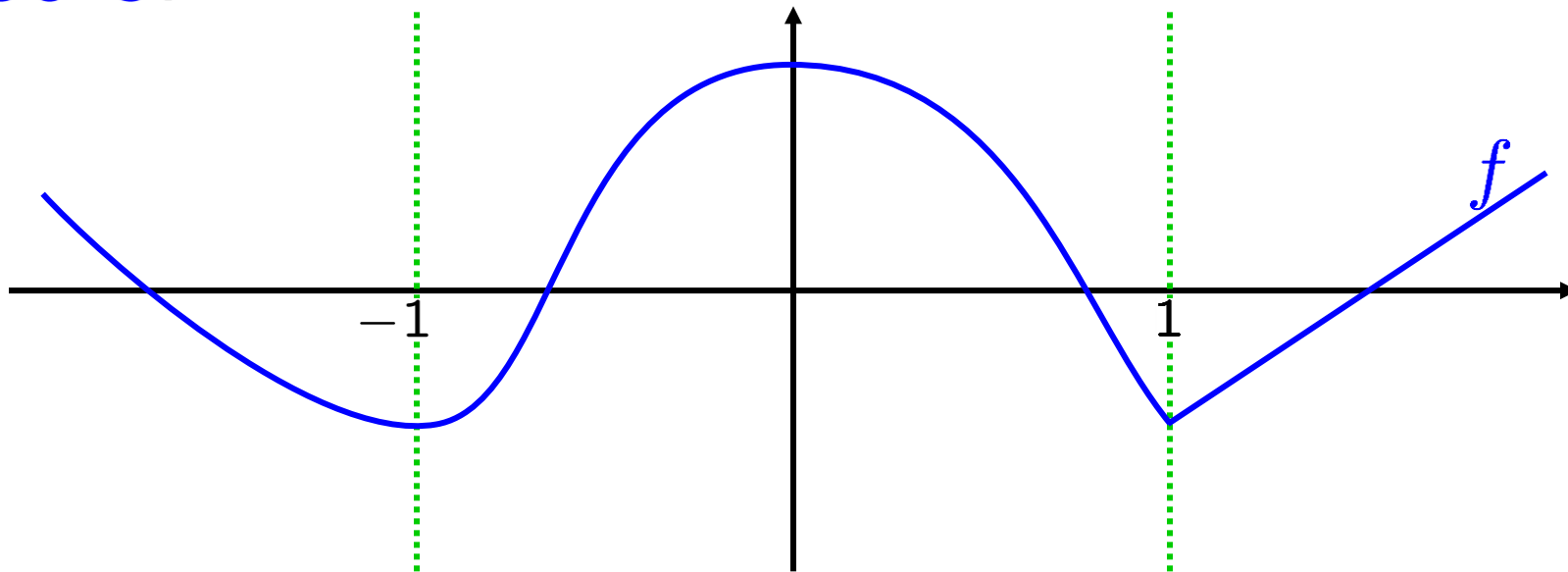
Choose red, green or purple.



The graph of f is shown above.
Which of the following is the graph of f' ?



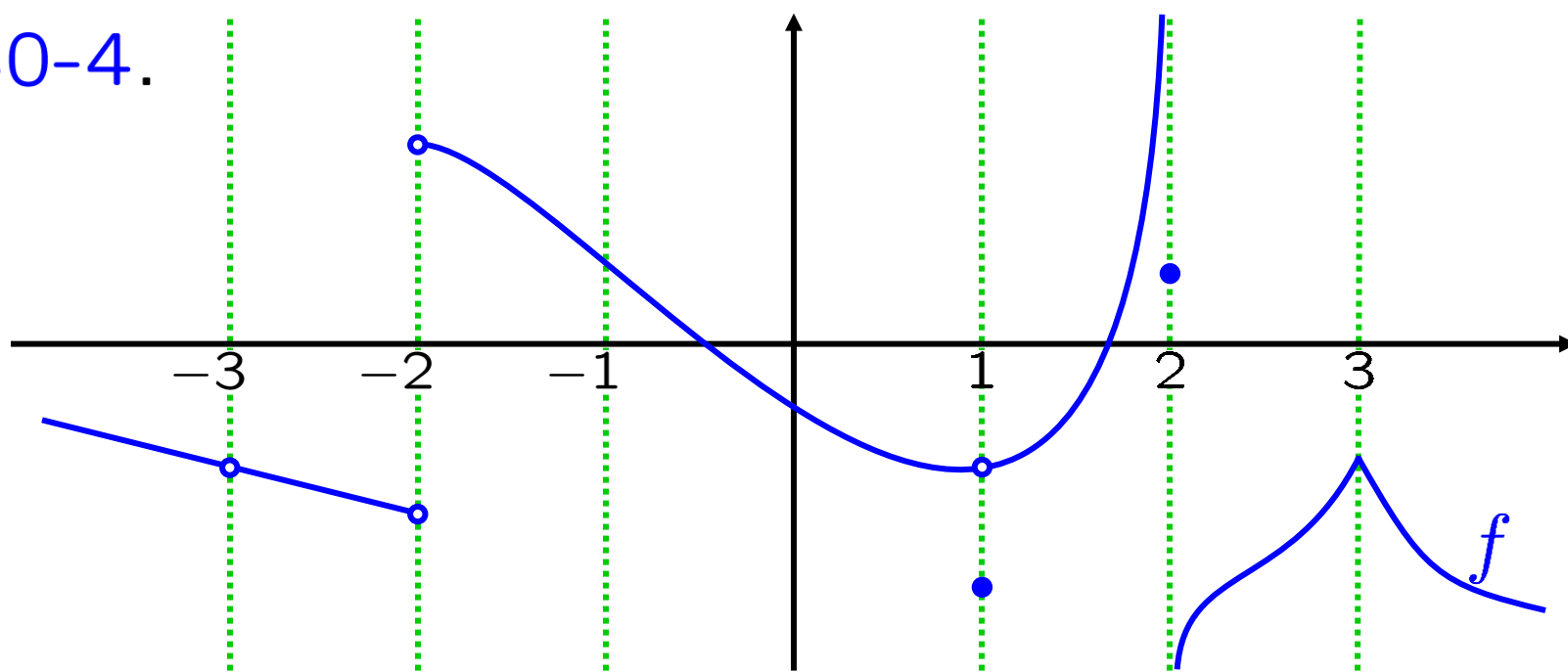
Choose **red**, **green** or **purple**.



The graph of f is shown above.

Freehand a sketch of the graph of f' .

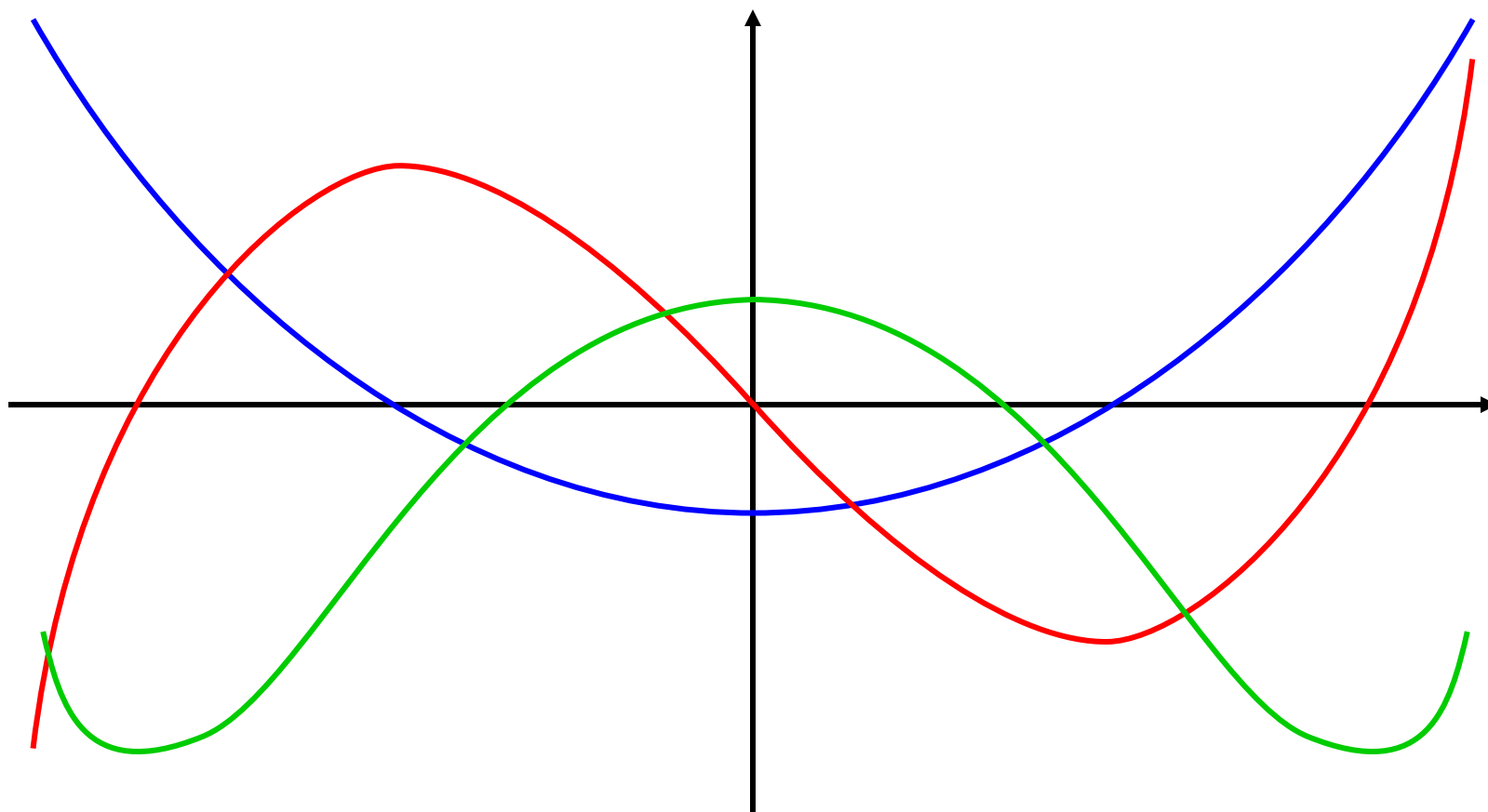
On your graph, indicate 1 and -1 on
the horizontal axis.



The graph of f is shown above.

- At **which** of the numbers $-3, -2, -1, 0, 1, 2, 3$ is f **not** defined?
- At **which** of the numbers $-3, -2, -1, 0, 1, 2, 3$ is f **not** continuous?
- At **which** of the numbers $-3, -2, -1, 0, 1, 2, 3$ is f **not** differentiable?

0280-5.
NEW



The graphs of f , f' and f'' are shown above.
Which is which?

State the color of f ,
the color of f' and the color of f'' .

0280-6. Let $f(t) = 2t^3 + 4t$.

a. What is the domain of f ?

b. Using the definition of the derivative, and using the cubic binomial formula

$$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3,$$

compute $f'(t)$.

c. What is the domain of the derivative f' ?

0280-7. NEW Let $f(z) = \frac{1 - 3z}{2 + 5z}$.

a. What is the domain of f ?

b. Using the definition of the derivative, compute $f'(z)$.

c. What is the domain of the derivative f' ?

0280-8. Let $g(x) = |x^2 - 2x + 1|$.

NEW

At which numbers is g not differentiable?

Hint: Determine the (maximal) intervals where $x^2 - 2x + 1$ is positive and negative.

Sketch the graph of $y = x^2 - 2x + 1$.

Sketch the graph of $y = g(x)$.

GENERAL RULE:

At numbers x where $x^2 - 2x + 1$ has a root of multiplicity one, g is not differentiable.

Everywhere else, g is differentiable.

0280-9. NEW Let $f(x) = |x^5 - 2x^4 + x^3|$.

At which numbers is f not differentiable?

Hint:

$y = x^5 - 2x^4 + x^3$ is hard to graph,
but you don't have to; just use the...

GENERAL RULE:

At numbers x where $x^5 - 2x^4 + x^3$ has a root of multiplicity one, f is not differentiable.

Everywhere else, f is differentiable.