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Prelab 6
APPM4600

Python code to implement the formulas:

```
import numpy

def forward_difference(f, s, h):
    return (f(s+h) - f(s))/h

def centered_difference(f, s, h):
    return (f(s+h) - f(s-h))/(2*h)

h = 0.01*2.**(-numpy.arange(0, 10))

f = lambda x: numpy.cos(x)

s = numpy.pi/2

print(forward_difference(f, s, h))
print(centered_difference(f, s, h))
```

1. Both difference formulas approximate the derivative of f at $x = \frac{\pi}{2}$ as -1.
2. Both difference formulas have the same values and patterns of convergence, so they have the same order. Both are first order as the approximation values change by a constant factor.