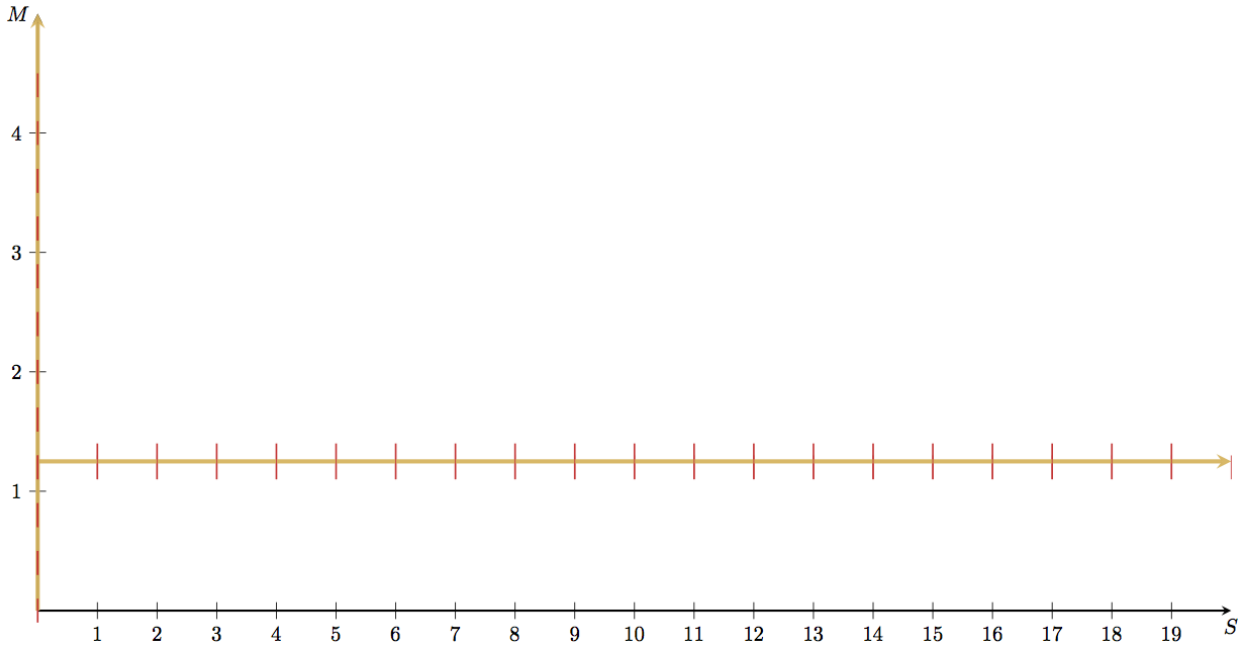
1.4.5 Quiz Part 2: Creating a Phase Plane

You should have found two lines where $\frac{dS}{dt} = 0$. These lines represent portions of the phase plane on which S is unchanging and are called **nullclines**.

Here the sardine population is not changing over time, so the arrows indicating population change will point either directly towards or away from the S-axis.

- Draw short segments perpendicular to the S axis along these lines. (We'll indicate the direction with arrows later.)



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The next questions will guide you through sketching arrows indicating population change over the entire quadrant of the phase plane. The process continues to rely on the key fact, rephrased here in terms of nullclines.

Key Fact: Because the system of differential equations is continuous, $\frac{dS}{dt}$ can only change from negative to negative or positive to negative if we cross a $\frac{dS}{dt} = 0$ nullcline. The same is true for $\frac{dM}{dt}$.

Question 4

2/2 points (graded)

Enter your answers as numerical values.

Find values of M and S for which $\frac{dM}{dt} = -0.2M + 0.03SM$ is equal to 0.

M=

0 ✔**Answer:** 0

0

S=

6.66667 ✔**Answer:** 20/3

6.66667

Explanation

Since

$$\frac{dM}{dt} = -0.2M + 0.03SM = M(-0.2 + .03S),$$

$\frac{dM}{dt} = 0$ when $M = 0$ or $S = 20/3$.

Submit You have used 1 of 4 attempts

Answers are displayed within the problem

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