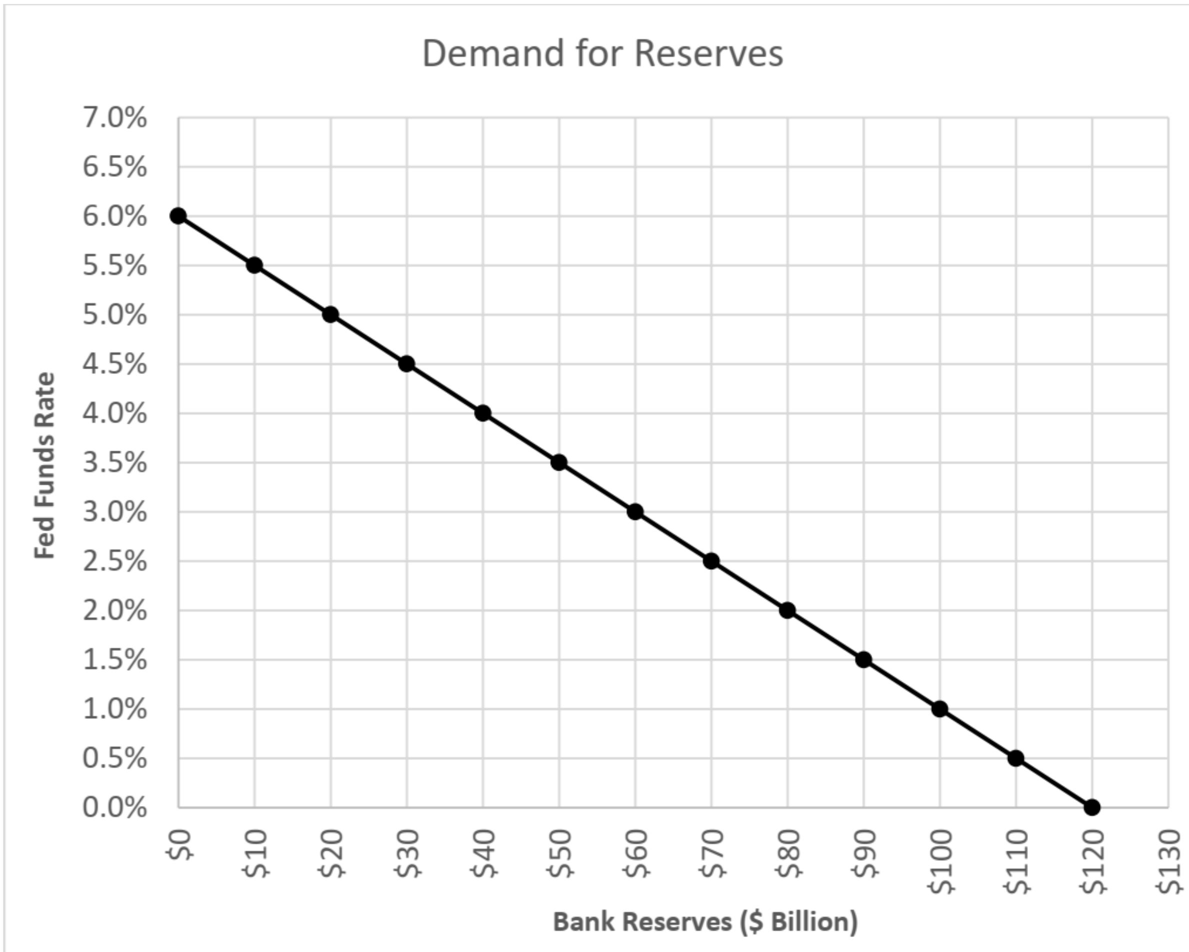
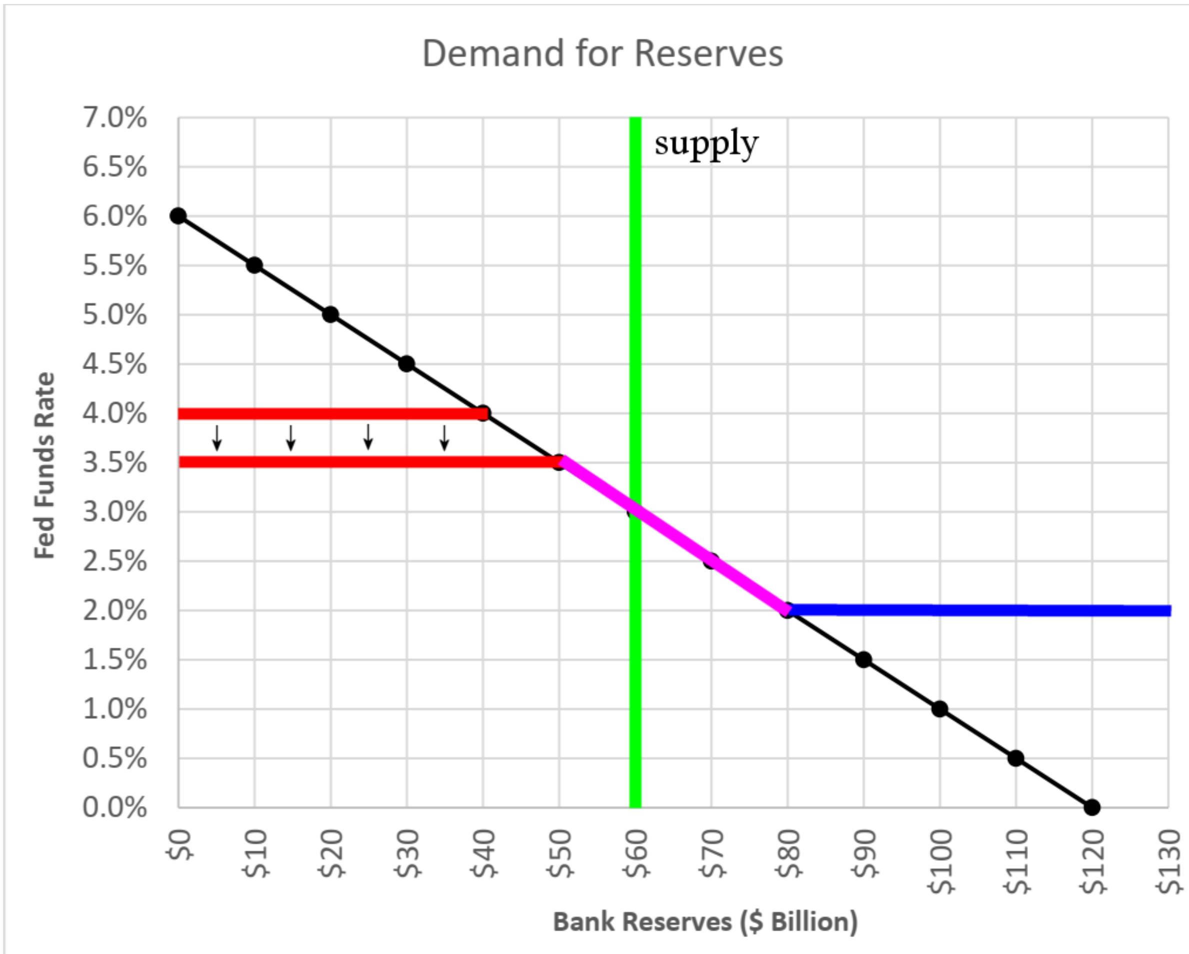
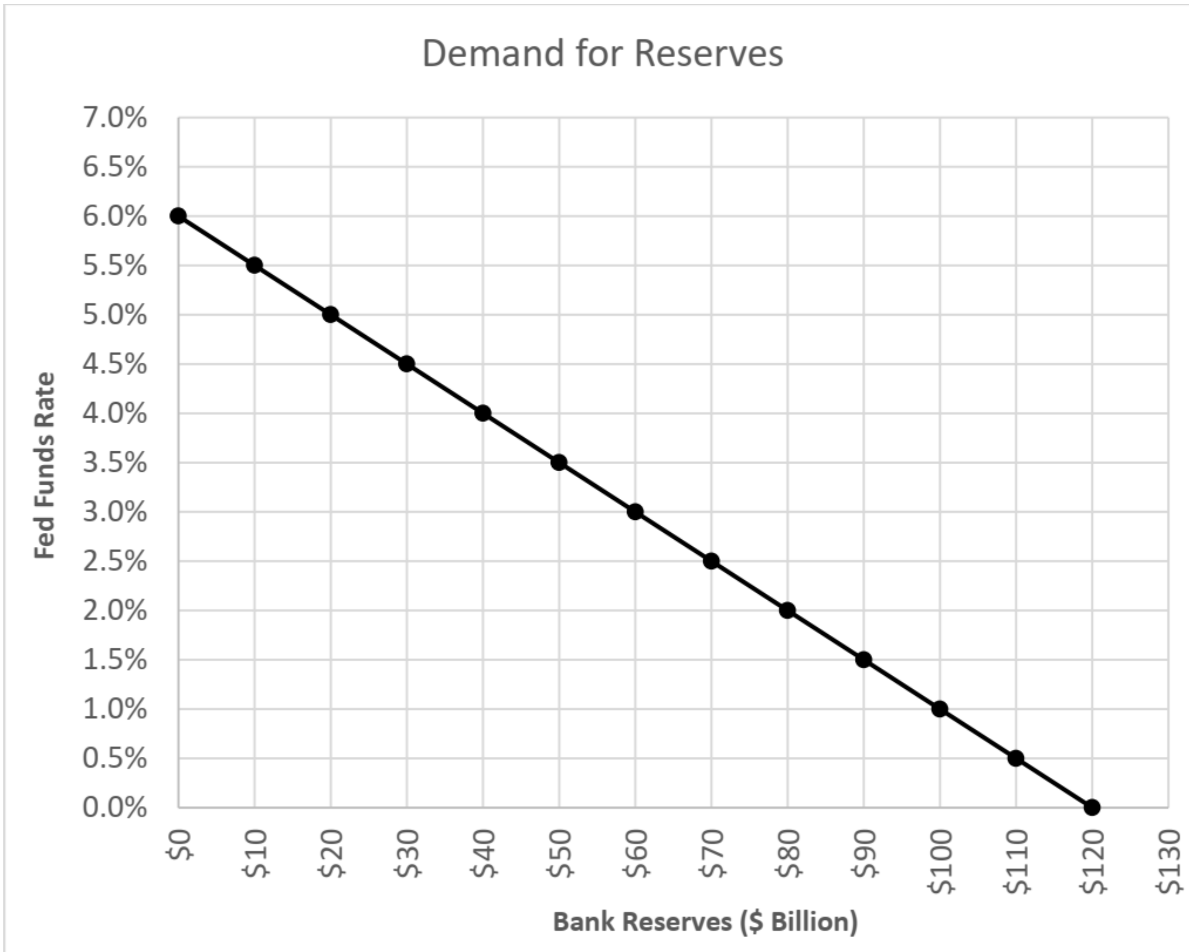
Problem 1. Consider the (partial) demand for reserves function as shown below. The discount rate is 4.0 percent and interest on reserves is 2.0 percent. Suppose that the supply of reserves is \$60 billion. If the Fed reduces the discount rate to 3.50 percent, what will the equilibrium fed funds rate be?



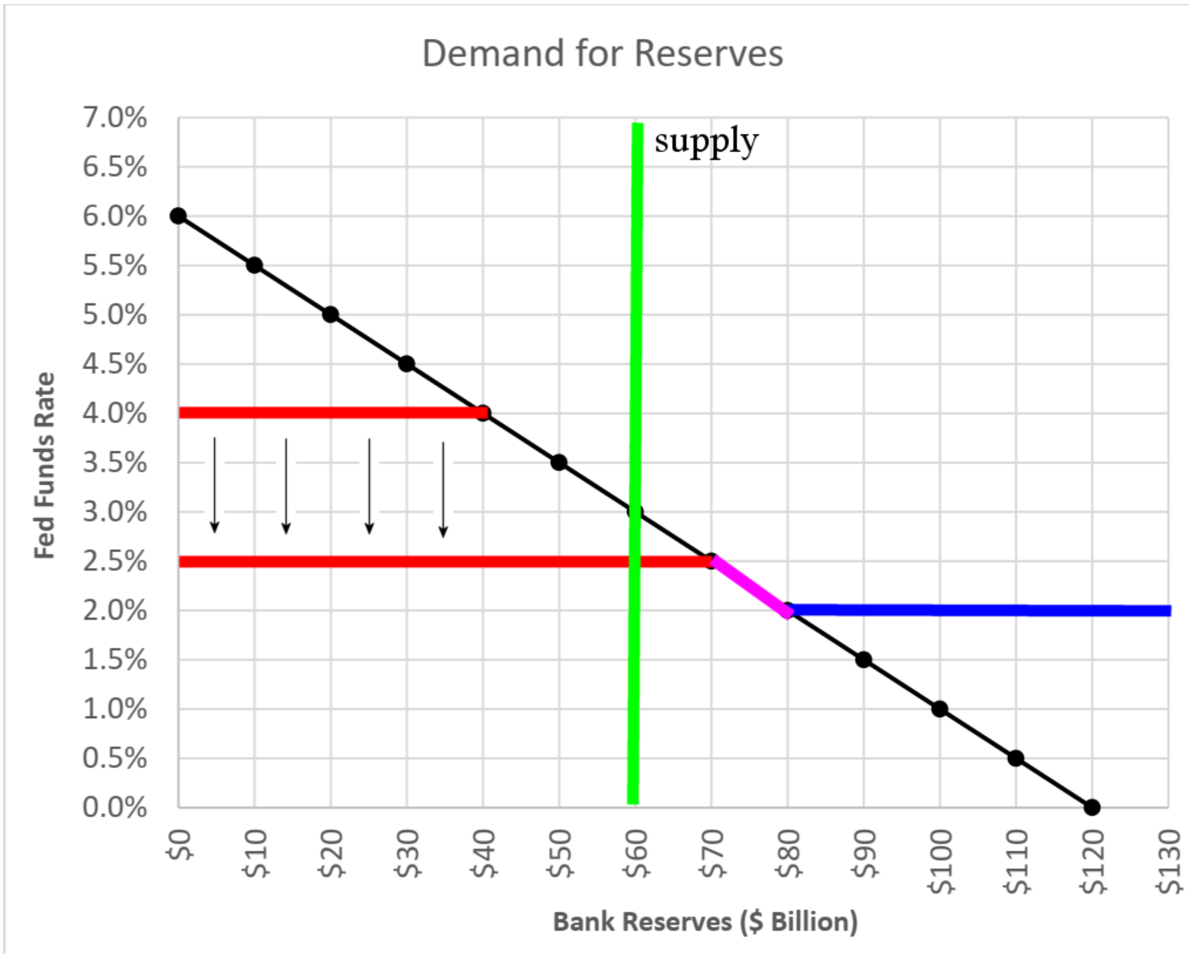
Answer 1. Draw the reserve supply vertically at \$60. The initial intersection is at 3%. When the discount rate (the red segment) is reduced from 4.0% to 3.5%, the intersection is unaffected and therefore remains at 3.0%.



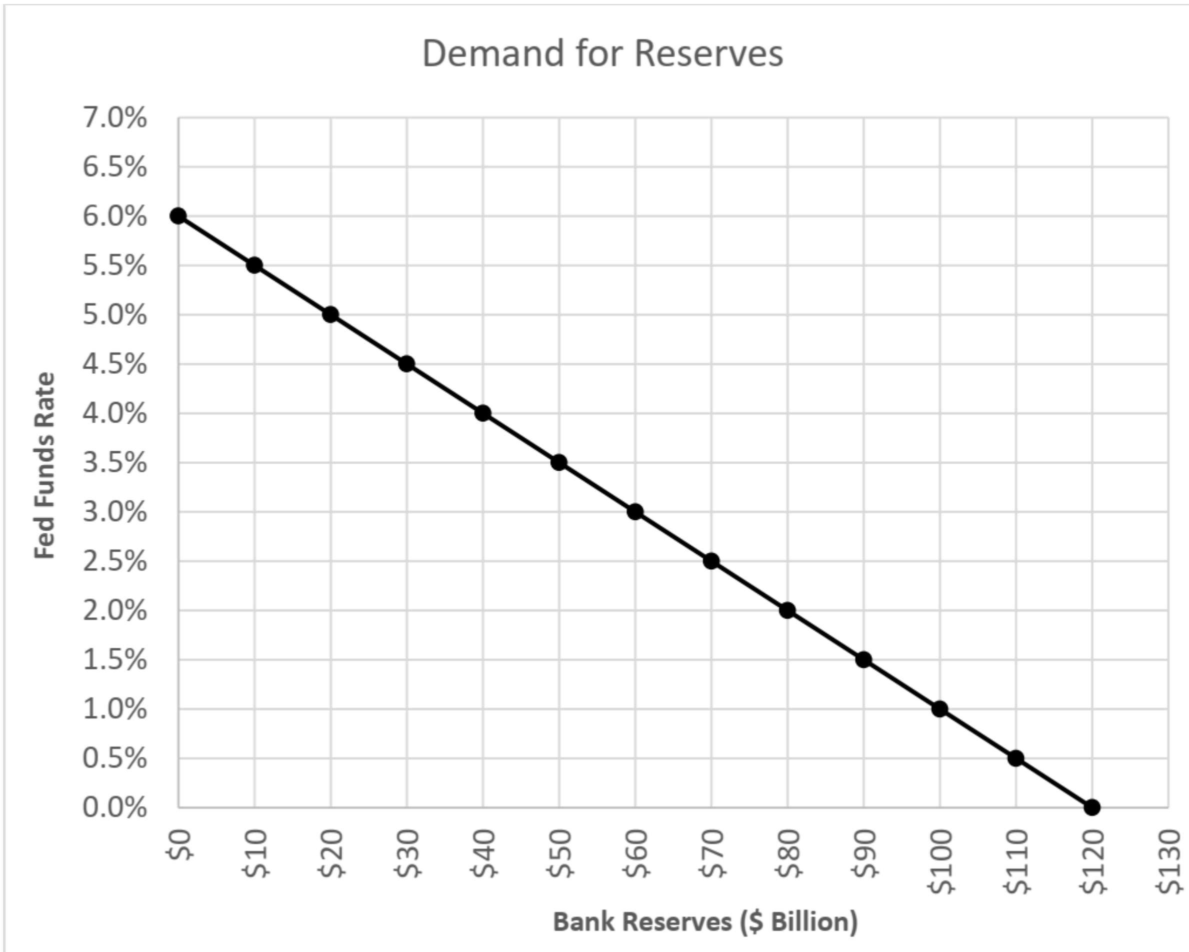
Problem 2. Consider the (partial) demand for reserves function as shown below. The discount rate is 4.0 percent and interest on reserves is 2.0 percent. Suppose that the supply of reserves is $60 billion. Suppose the Fed reduces the discount rate to 2.50 percent. What is the fed funds rate?



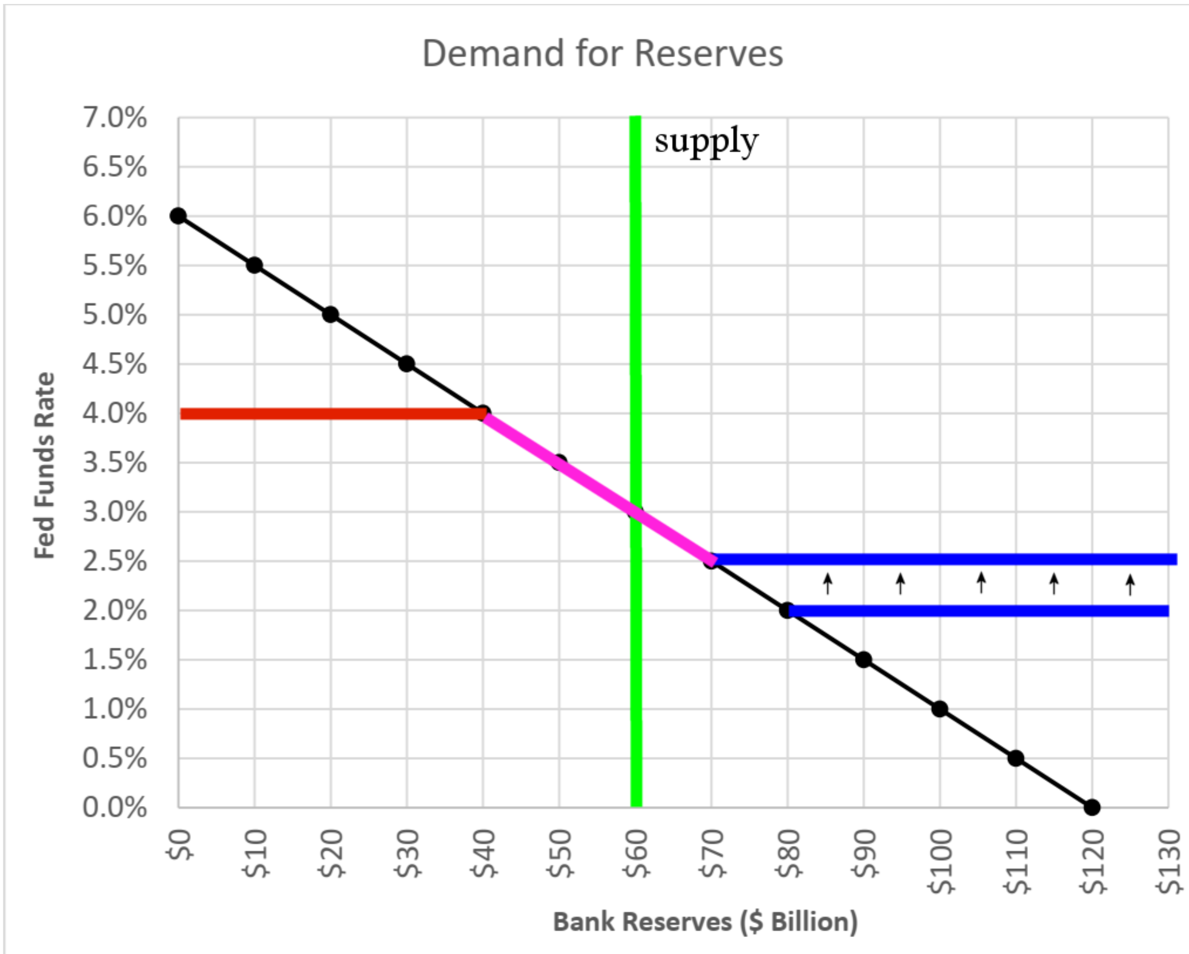
Answer 2. Drop the discount rate all the way to 2.5 percent and then the supply line intersects at the discount rate. So the fed funds rate is 2.5%.



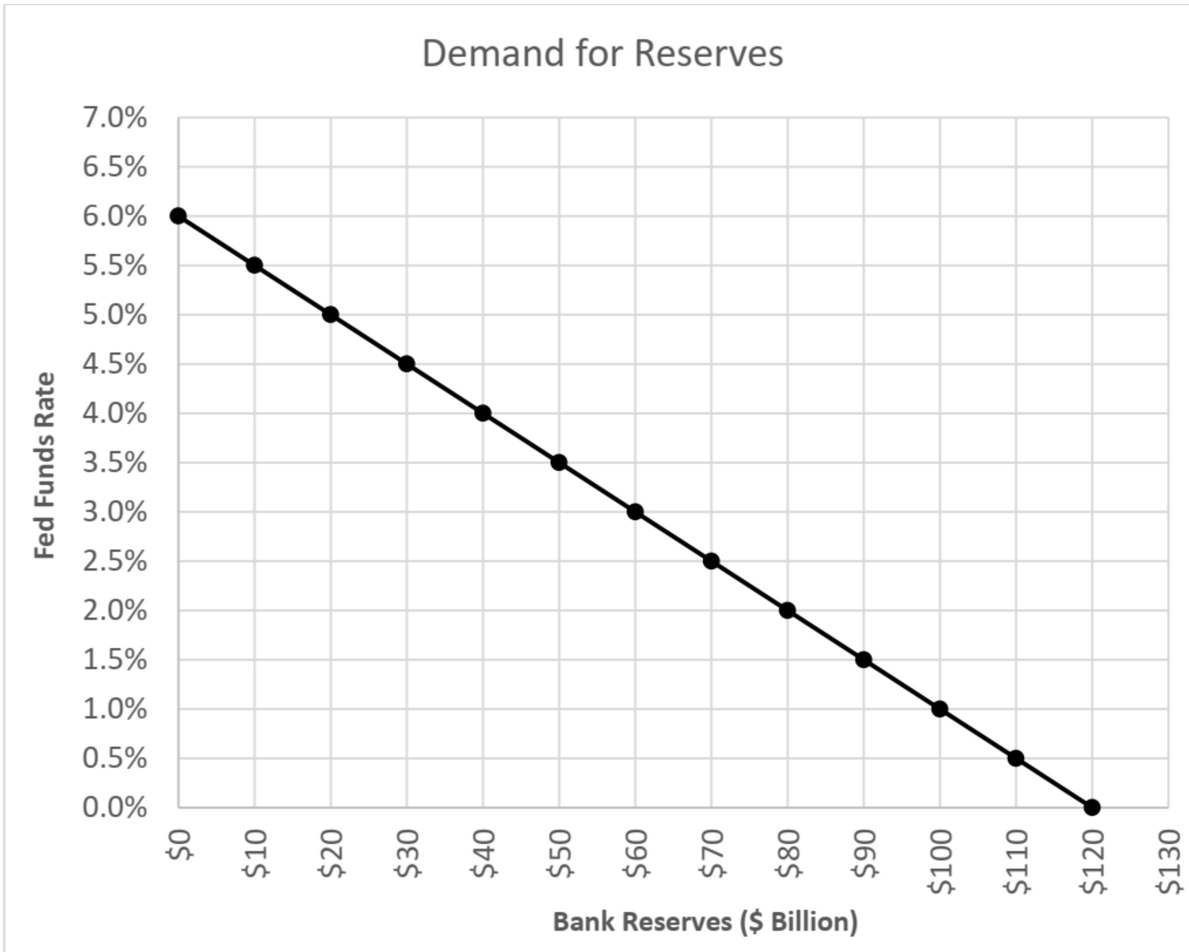
Problem 3. Consider the (partial) demand for reserves function as shown below. The discount rate is 4.0 percent and interest on reserves is 2.0 percent. Suppose that the supply of reserves is $60 billion. Suppose the Fed increases the interest rate on reserves up to 2.5 percent. What's the fed funds rate?



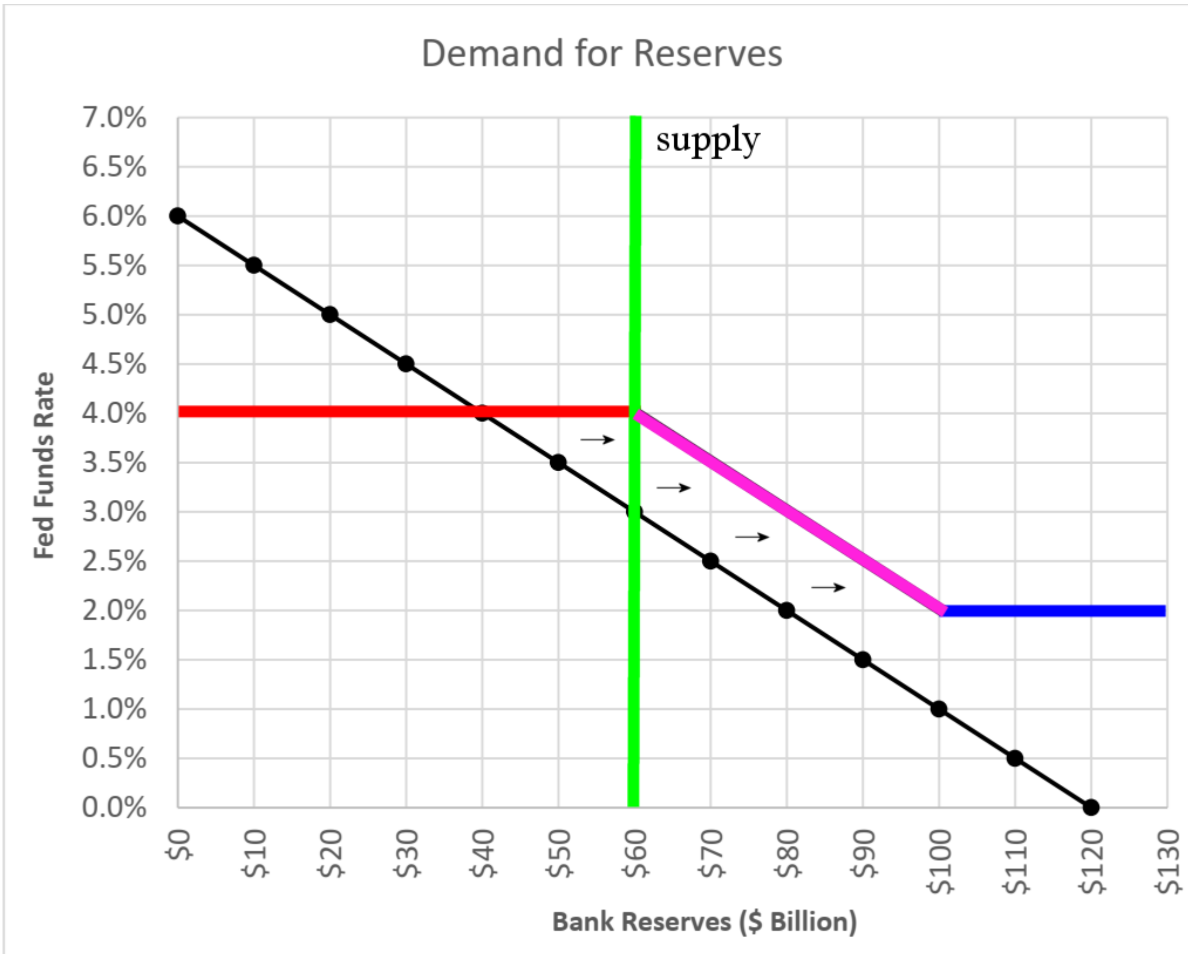
Answer 3. Move the IOR segment (the blue one) up to 2.5 percent. The intersection is still at 3%, however, so there's no change.



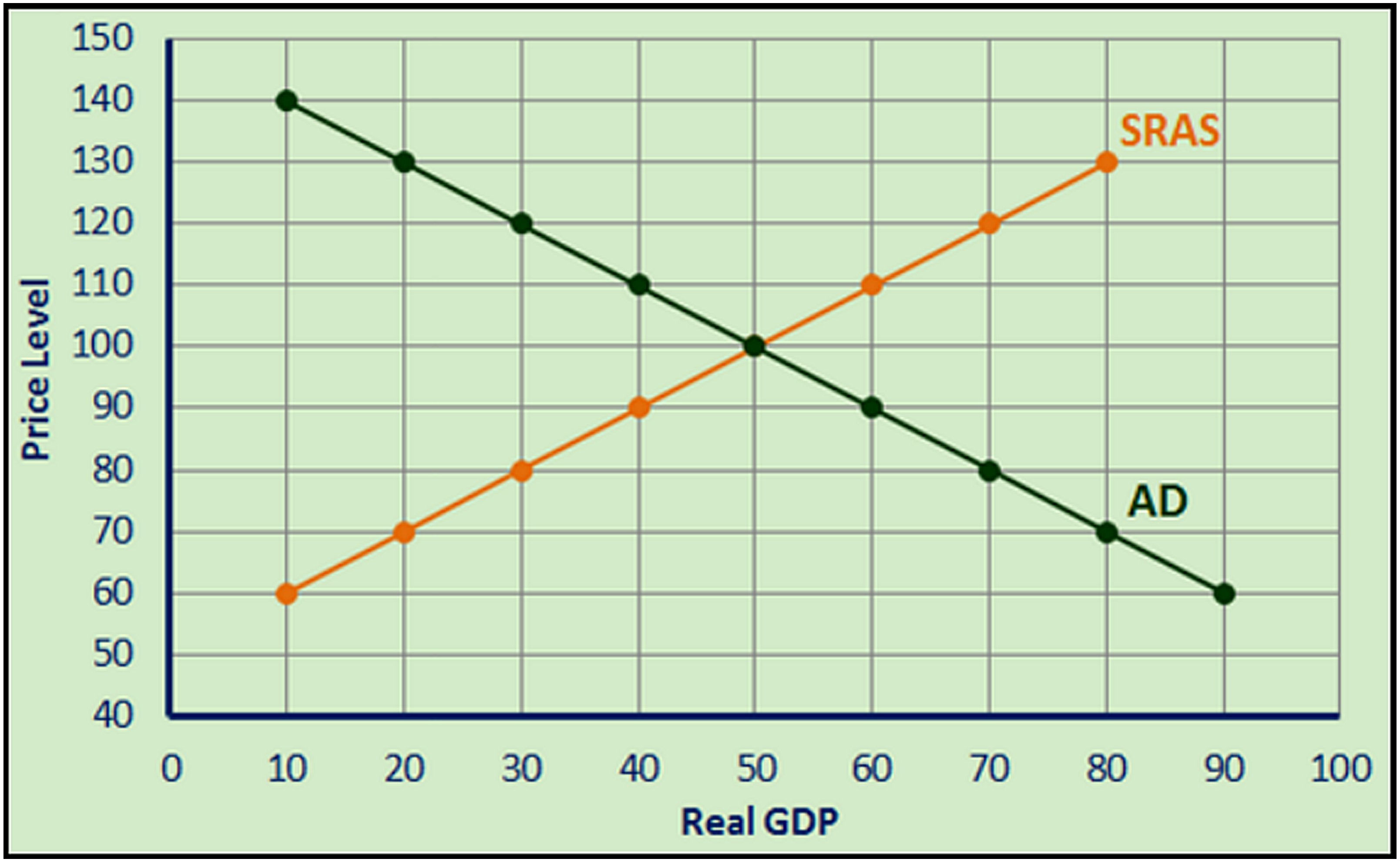
Problem 4. Consider the (partial) demand for reserves function as shown below. The discount rate is 4.0 percent and interest on reserves is 2.0 percent. Suppose that the supply of reserves is \$60 billion. Suppose the Fed increases the required reserve ratio so that the demand for reserves increases by \$20. What's the new federal funds rate?



Answer 4. Take the demand curve and shift the whole thing over to the right by \$20. The new intersection is at 4%.



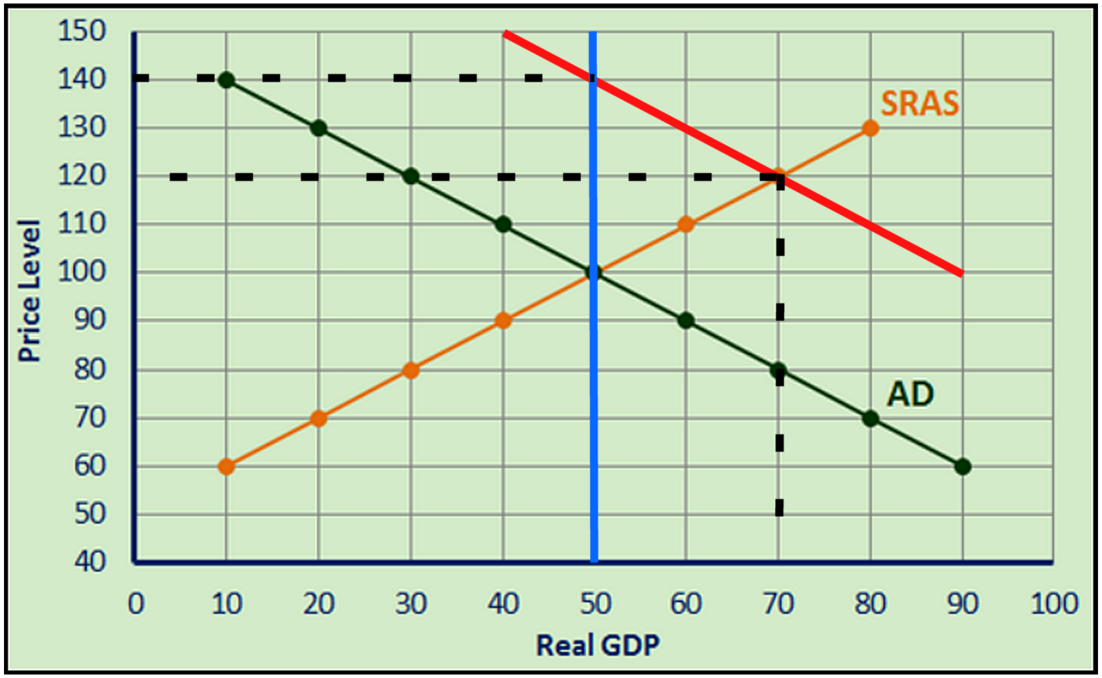
Problem 5. Currently $Y = 50$, $Y_p = 50$, and $P = 100$. The expenditure multiplier equals 5. All else the same, transfer payments TR increase by 10 units through deficit financing. Find the short-run and long-run equilibria.



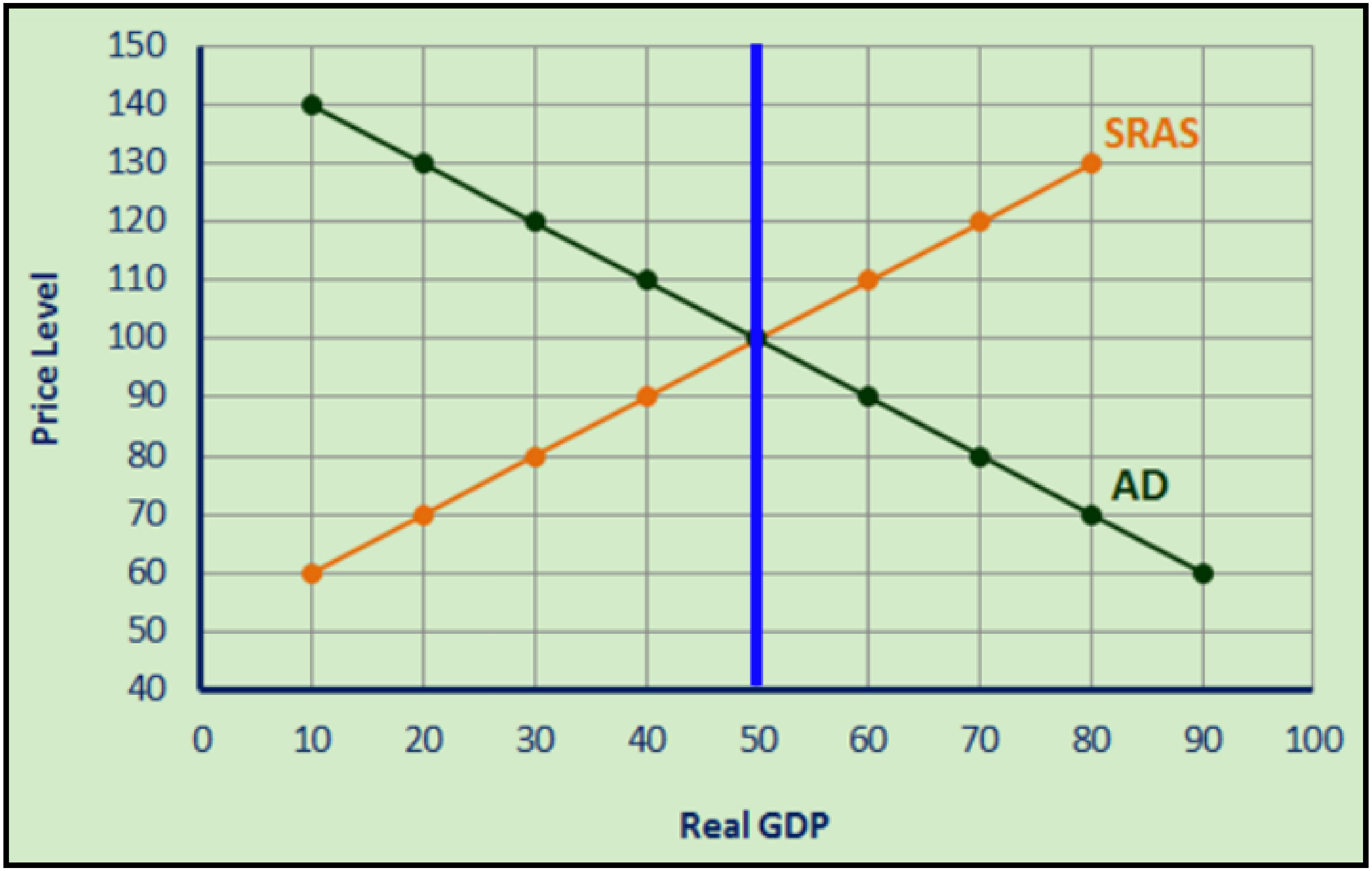
Answer 5. Since the expenditure multiplier is 5, it follows that

$$\frac{1}{1 - MPC} = 5 \implies MPC = 0.80.$$

So when transfer payments increase by 10 units, it means disposable income Y_d increases by 10 units and therefore consumption initially increases by $MPC \times \Delta Y_d = 8$ units. Then from the expenditure multiplier, the overall increase in consumption (and therefore AD) will be $8 \times 5 = 40$. So shift AD to the right by 40 units. The short-run equilibrium is then $(70, 120)$ and the long-run equilibrium is $(50, 140)$.



Problem 6. Suppose the expenditure multiplier equals 5. Show the effect of a decrease in taxes by 10 units in both the short run and long run.



Answer 6. First we should find out what MPC is.

$$\frac{1}{1 - MPC} = 5 \implies MPC = 0.80.$$

Because TX decreases by 10, it means that Y_d increases by 10. This means that consumption increases by $0.80 \times 10 = 8$. Now use the multiplier effect on this increase in consumption; AD will shift to the right by $8 \times 5 = 40$ and we get the same answer as above.

Two takeaways. First, an increase in transfers payments and a decrease in taxes have the same expansionary effect. (Symmetrically, a decrease in transfer payments and an increase in taxes have the same contractionary effect.) Second, changes in TX and TR need to first be converted in to changes in C because TX and TR are not part of $Y = C + I + G + NX$. Once we have the change in C, however, then we can start the multiplier process and shift AD accordingly.

On the other hand, if we are told that there is a direct change in C, I, G, or NX, then we can just multiply that change by the multiplier and be on our way.