Question 1

Determine whether the following integral is improper, and if so why that is.

$$\int_1^2 \frac{1}{2x-1}\,dx$$

1. Discontinuity at $x = 1$
2. Discontinuity at $x = 2$
3. Discontinuity at $x = 1/2$
4. Infinite interval of integration
5. The integral is not improper
6. none of the above

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6. none of the above

5. The integrand is defined and continuous on $[1, 2]$

Question 2

Determine whether the following integral is improper, and if so why that is.

$$\int_0^1 \frac{1}{2x-1}\,dx$$

1. Discontinuity at $x = 1$
2. Discontinuity at $x = 2$
3. Discontinuity at $x = 1/2$
4. Infinite interval of integration
5. The integral is not improper
6. none of the above

Question 2

Determine whether the following integral is improper, and if so why that is.

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1. Discontinuity at $x = 1$
2. Discontinuity at $x = 2$
3. Discontinuity at $x = 1/2$
4. Infinite interval of integration
5. The integral is not improper
6. none of the above

3. The integrand has an infinite discontinuity at $x = 1/2$ (Type II improper integral)

Question 3

Determine whether the following integral is improper, and if so why that is.

$$\int_{-\infty}^{\infty} \frac{\sin x}{1+x^2}\, dx$$

1. Discontinuity at $x = 1$
2. Discontinuity at $x = 2$
3. Discontinuity at $x = 1/2$
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2. Discontinuity at $x = 2$
3. Discontinuity at $x = 1/2$
4. Infinite interval of integration
5. The integral is not improper
6. none of the above

4. Infinite interval

Question 4

Determine whether the following integral is improper, and if so why that is.

$$\int_1^2 \ln(x-1)\,dx$$

1. Discontinuity at $x = 1$
2. Discontinuity at $x = 2$
3. Discontinuity at $x = 1/2$
4. Infinite interval of integration
5. The integral is not improper
6. none of the above

Question 4

Determine whether the following integral is improper, and if so why that is.

$$\int_1^2 \ln(x-1)\,dx$$

1. Discontinuity at $x = 1$
2. Discontinuity at $x = 2$
3. Discontinuity at $x = 1/2$
4. Infinite interval of integration
5. The integral is not improper
6. none of the above

1. Discontinuity at $x = 1$ (Type II improper integral)

Question 5

Evaluate the integral:

$$\int_{-\infty}^{0} \frac{1}{2x-5}\,dx$$

1. $\frac{1}{2}\ln 5$
2. $1+\frac{1}{2}\ln 5$
3. 0
4. Diverges to ∞
5. Diverges to $-\infty$
6. none of the above

Question 5

Evaluate the integral:

$$\int_{-\infty}^{0} \frac{1}{2x-5}\,dx$$

1. $\frac{1}{2}\ln 5$
2. $1+\frac{1}{2}\ln 5$
3. 0
4. Diverges to ∞
5. Diverges to $-\infty$
6. none of the above

5. Diverges to $-\infty$