Your Name: ________________________________

On this exam, you may use a calculator, but no books/notes are allowed.

1 (15) _______
2 (15) _______
3 (15) _______
4 (15) _______
5 (15) _______
6 (15) _______
7 (15) _______
8 (15) _______
9 (15) _______
10 (15) _______
Total (150) _______
1. Find
\[ \int_{e^2}^{e} \frac{1}{x(\ln(x))^2} \, dx \]
- a) $-1/2$
- b) $1/2$ Correct answer.
- c) $1/4$
- d) 1

2. Find the average value of the function $f(x) = x^4$ in the interval $[-1, 5]$.
- a) $3126/5$
- b) 127
- c) 46
- d) $521/5$ Correct answer.
3. Evaluate the Riemann sum for \( n = 6 \) with right end points to evaluate the area under \( f(x) = e^x/x^2 \) from \( x = 1 \) to \( x = 4 \).

- a) 6.80
- b) 15.21
- c) 7.06 Correct answer.
- d) 8.65

4. Evaluate \( \int_{1}^{5} x\sqrt{x-1} \, dx \).

- a) 20.24
- b) 18.13 Correct answer.
- c) 18.5
- d) 28.74
5. The sales of a company in the first $t$ years are given by $S(t) = t\sqrt{0.2t^2 + 4}$ (in millions). Determine the average sales in the first 5 years of operation.

- a) 3.77 Correct answer.
- b) 4.02
- c) 17.65
- d) 18.86.

6. The demand function for a product is

$$D(x) = -0.01x^2 - 0.2x + 23$$

If the market price is set at $8, find the consumer’s surplus.

- a) 265
- b) 315
- c) 270 Correct answer.
- d) 170.
7. Find the area enclosed by the curves $y = \sqrt{x}$ and $y = x^5$.
   
   - a) $\frac{5}{12}$
   - b) $\frac{1}{2}$ Correct answer.
   - c) $\frac{7}{12}$
   - d) $\frac{4(-8 + \sqrt{2})}{3}$.

8. Find the area of the region enclosed by the curves $y = \sqrt{x}$, $y = x - 2$.
   
   - a) $5$
   - b) $\frac{16}{3}$ Correct answer.
   - c) $\frac{17}{3}$
   - d) $2 + \frac{4\sqrt{2}}{3}$
9. Compute \[ \int_{0}^{2} \frac{x}{x^2 + 1} \, dx \]

- a) \( \frac{25}{4} \)
- b) \( \frac{\ln(5)}{2} \) Correct answer.
- c) \( 1 + \ln(1 + x^2) \)
- d) \( \frac{13}{6} \)

10. A winning lottery ticket pays either 20 annual installments of $50000 each or a lump sum payment of $500000. If the prevailing compounded interest rate is 8%, which one would you choose?

- a) the lump sum payment right answer.
- b) the annuity plan
- c) they are of equal present value.

**Bonus: 10 points, only for a complete solution!**
For what value of the interest rate the two options are equivalent, i.e. they are worth the same?
11. **Bonus: 10 points, only for a complete solution!**
    Glenda sold her house for a down payment of $10000 and a monthly payment of $925 for the next 30 years. What is the current value of her house?