Math 150 – Calculus I

Pre-course test

August 31, 2023; **Time: 50 minutes**

Your Name:

Your Student ID:

---

1. **Algebra:**

   (a) Evaluate the following expressions.

   i. 3^{-4}
            ii. $\frac{5^{23}}{5^{21}}$
            iii. $16^{-3/2}$

   (b) Factor the following expressions.

   i. $4x^2 - 25$
            ii. $x^3 - 3x^2 - 4x + 12$

   (c) Use polynomial long division to simplify the following rational expression.
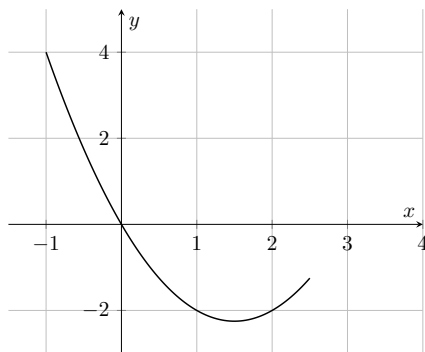
   $$\frac{3x^3 + 10x^2 + 13x + 14}{x^2 + x + 2}$$

   (d) Solve the following inequalities.

   i. $x^2 < 2x + 8$
            ii. $-4 < 5 - 3x \le 17$

2. **Functions:** The graph of a function is given below.

   (a) State the value of $f(1)$.

   (b) For what values of x is $f(x) > 0$?

   (c) Estimate the domain and range of f.

3. **Analytic geometry:**

   (a) Find the equation of the line with slope -3 and that passes throught the point $(2, -5)$.

   (b) Find the equation of a circle that has center $(-1, 4)$ and that passes through the point $(3, -2)$.

4. **Trigonometry:**

   (a) Convert 300 degrees to radians.

   (b) Convert $\pi/4$ radians to degrees.

   (c) Find the values of $\tan(\pi/3)$ and $\sin(\pi/6)$.