

# 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.

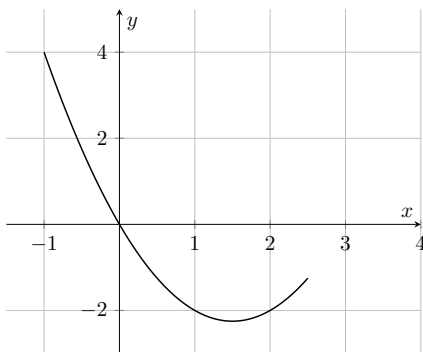
$$\frac{3x^3 + 10x^2 + 13x + 14}{x^2 + x + 2}$$

(d) Solve the following inequalities.

i.  $x^2 < 2x + 8$

ii.  $-4 < 5 - 3x \leq 17$

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



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

(b) For what values of  $x$  is  $f(x) = 1$ ?

(c) Estimate the domain and range of  $f$ .

## 3. Analytic geometry:

(a) Find the equation of the line with slope  $-3$  and that passes through 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  $\sin(\pi/6)$ .