**M1551 TEST 1 Preview sheet.**

*When a number is underlined, it means you should be prepared to do similar problems with any number in place of the underlined number.*

**Inequalities**

1. Express “the distance from *x* to *a*” as a mathematical function.
2. Solve the inequality |5*x* – 7| > 10.
3. Graph the functions y = |5*x* – 7| and *y* = 10, and use your picture to solve problem 1) graphically.

**Linear functions and equations**

1. Write the equation of the line through (1, 3) and (22, 65) in the form *y* = *mx* + *b*.
2. Find the number *a* so that the “line through (5, 3) and (*a*, *a*)” has *y*-intercept (0, -1).
3. Find both the slope and intercept of the line in problem 3 as a function of *a*.
4. Let *f* be a function and let *p* and *q* be numbers. Find both the slope and intercept of the “line through (*p*, *q*) and (*a*, *f*(*a*))” as a function of *a*, *p* and *q*.

**Average rate of change**

1. A particle moves along a number line so that its position at time *t* is *f*(*t*). What is its “average velocity of the particle on the interval from time *a* to time *b*”?
2. A *nasty pigeon* knocks a stone off a windowsill of the Empire State Building. Its height at *t* seconds after falling is 400 - 16 *t*2 feet above the street. a) At what time does it hit the street? b) What is its average velocity during the first second of falling? The last? c) What is its average velocity during the last *h*-second period of falling (*i.e.*, during the interval from *b*-*h* to *b*, where *b* is the time of hitting the street).
3. Let *n* be a positive integer. Express “the average rate of change of *f*(*x*) = *xn* during the interval from *a* to *b*” as a polynomial with variables *a* and *b*.

**Limits**

1. Write out in words the intuitive meaning of lim*x* ⟶ *a* *g*(*x*) = *B*.
2. Write out in words the intuitive meaning of lim*x* ⟶ *∞* *g*(*x*) = *B*.
3. In terms of |*x* – a| and |*g*(*x*) – *B*|, what is the meaning of lim*x* ⟶ *a* *g*(*x*) = *B*.
4. In terms of *x* and |*g*(*x*) – *B*|, what is the meaning of lim*x* ⟶ *∞* *g*(*x*) = *B*.
5. Find lim*x* ⟶ 2(*x*2 – 4)/ (*x* – 2).
6. Find lim*x* ⟶ 3(*x*2 – 4)/ (*x* – 2).
7. Find lim*x* ⟶ 3(*x*2 – 9)/ (*x* – 2).
8. Find lim*x* ⟶ 3(*x*2 – 9)/ (*x* – 3).
9. Find lim*x* ⟶ 2(*x*2 – 9)/ (*x* – 2).
10. Find lim*x* ⟶ 2(*x3* – 8)/ (*x* – 2).
11. Find lim*x* ⟶ 2(*x* – 2)/ (*x* – 2).