Calculus 12
1-4 Questions

1. State the slopes of the given linear functions.

a) $y = 4x$

b) $y = 3x - 5$

c) $f(x) = \frac{1}{3}x - 2$

d) $f(x) = 2 - 3x$

e) $f(x) = \frac{1}{2}(1 - x)$

f) $x + 2y = 3$

2. Find an equation of the line that passes through the points $(-3,5)$ and $(4,-5)$.

3. A linear function is given by $y = 16 + 3x$. How does y change

a) if x increases by 4?

b) if x decreases by 2?

4. A car travels at a constant speed and covers 140 km in 4 h. If s represents distance travelled (in kilometers) and t represents time elapsed (in hours), express s as a function of t and draw its graph. What does the slope of the line represent?

5. The point $P(1,3)$ lies on the curve $y = 2x + x^2$.

a) If Q is the point $(x, 2x + x^2)$, find the slope of the secant line PQ for the following values of x:

i) 2	ii) 1.5	iii) 1.1	iv) 1.01	v) 1.001
vi) 0	vii) 0.5	viii) 0.9	ix) 0.99	x) 0.999

b) Using the results of part (a), guess the value of the slope of the tangent line to the curve at $P(1,3)$.

c) Using the slope from part (b), find the equation of the tangent line to the curve at $P(1,3)$.

d) Sketch the curve, two of the secant lines, and the tangent line.

6. The point $P\left(1, \frac{1}{4}\right)$ lies on the curve $y = \frac{1}{4}x^3$.

a) If Q is the point $\left(x, \frac{1}{4}x^3\right)$, find the slope of the secant line PQ for the following values of x:

i) 2	ii) 1.5	iii) 1.1	iv) 1.01	v) 1.001
vi) 0	vii) 0.5	viii) 0.9	ix) 0.99	x) 0.999

b) Using the results of part (a), guess the value of the slope of the tangent line to the curve at $P\left(1,\frac{1}{4}\right)$.

c) Using the slope prom part (b), find the equation of the tangent line to the curve at $P\left(1,\frac{1}{4}\right)$.

d) Sketch the curve, two of the secant lines, and the tangent line.