1. (GT 3.5 - E) (CI) For each of the following angles, determine the value of the sine, cosine, and tangent ratios.

(Cirrito 8.2.3, p261)

a.	$\frac{\pi}{3}$	b.	$\frac{5\pi}{4}$	C.	$\frac{3\pi}{2}$
d.	$\frac{11\pi}{6}$	e.	$\frac{7\pi}{6}$	f.	$-\frac{3\pi}{4}$

2. **(C5.1 - N) (CI)** Recall that the definition of the "derivative" function for a function f(x) is $\lim_{h \to 0} \frac{f(x+h)-f(x)}{h}$. This is often referred to as the "First Principle of Calculus," or 'first principles' for

short. Using this formula determine the "derivative" (aka the slope/gradient function) of the following functions. Show all of your algebra (that is, do not use any short-cuts) *(Cirrito 8.2.3, p261)*

- a. $f(x) = 3x^2 + x 5$
- b. $g(x) = -x^2 10x + 7$
- c. $h(x) = 4x^2 7$
- 3. (F2.8 R) (CA) Given the following function: $f(x) = \frac{3x-2}{2x+3}$ (*Cirrito 8.2.3, p261*)
 - a. Determine the asymptotes of f(x).
 - b. Determine the intercepts of f(x).
 - c. Consider the function $g(x) = -x^2 + 4x 1$. Determine the solution to f(x) = g(x)
 - d. Hence determine when f(x) < g(x).
- 4. (NA1.2 N) (CA) In mathematics we use the capital Greek letter sigma, Σ , to deonte a sum. Find each of the following sums:

(Cirrito 8.1.3, p.249)

a.
$$\sum_{k=1}^{100} k$$

b.
$$\sum_{k=1}^{100} (2k+1)$$

c.
$$\sum_{k=1}^{51} (3k+5)$$

(NA1.2 - E) (CA) An arithmetic series has a first term of -4 and a common difference of 1. A geometric series has a first term of 8 and a common ratio of 0.5. After how many terms does the sum of the arithmetic series exceed the sum of the geometric series? (*Cirrito 8.2.3, p261*)

6. (NA1.2 - N) (CI) Mr. S. would like to solve the equation $\log_4(x + 1) + \log_{\frac{1}{16}}(x + 1) = 1$. (Cirrito 7.4, p244)

- a. Explain why he cannot start by using the 'addition rule' of logarithms.
- b. Re-express $\log_{\frac{1}{2}}(x+1)$ in terms of log base 4 (i.e. $\log_4(??)$)
- c. Hence or otherwise, solve the equation $\log_4(x + 1) + \log_{\frac{1}{4}}(x + 1) = 1$.
- (SP4.7 E) (CA) Given the following table for a discrete random variable, X, (say the number of times this week that Mohamed is late to Math class) (Cirrito C16.1, p533)

x	1	2	3
P(X = x)	0.2	1 - <i>k</i>	

- a. Determine P(X = 3). Express your answer in terms of k.
- b. What range of values can k take?
- c. Find, in terms of *k*, the mean of the distribution.
- d. Now suppose that k = 0.35. Find the mean and variance of the distribution.
- e. Now suppose that k = 0.35. Determine $P(X = 3 | X \ge 2)$
- (SP4.6 E) (CA) A bag consists of 6 white cubes and 10 black cubes. Cubes are withdrawn one at a time, with replacement. Use a tree diagram to help find the probability that after 4 draws (*Cirrito 16.3.4, p544*)
 - a. all the cubes are black;
 - b. there are 3 black cubes;
 - c. there are two black cubes;
 - d. there is one black cube;
 - e. there are no black cubes.
 - f. What observations or connections do you make about this entire process?