

# Math SL PROBLEM SET 34

## Section A (Skills/Concepts Consolidation)

1. **(SP5.6 - R) (CA)** Drug tests may be used by companies to screen potential employees. A given test for Mathitis is determined to be 98.2% accurate in the sense that it identifies a person as a user or non-user 98.2% of the time. Each job applicant takes this test twice. The tests are done at separate times and are designed to be independent of each other. What is the probability that:  
**(Oxford 3.5, p89)**
  - a. A non-user fails both tests?
  - b. A drug user is detected (i.e. s/he fails at least one test)
  - c. A drug user passes both tests
  
2. **(A1.1 - R) (CA)** The fourth and seventh terms of a geometric sequence are 18 and  $\frac{729}{8}$  respectively. **(Cirrito 8.2.2, p257)**
  - a. Is  $\frac{59049}{128}$  a term of this sequence? If so, which term is it?
  - b. If these terms were part of an infinite series, what would the sum of this infinite series be?
  
3. **(T3.4 - R,N) (CI)** Sketch a graph of the following trigonometric functions and label all extrema and intercepts and if necessary all asymptotes on two periods of a positive domain:  
**(Cirrito 16.3.2, p341)**
  - a. The function  $g(x) = -2\cos(3x) + 2$
  - b. The function  $h(x) = \tan\left(\frac{1}{2}\left(x - \frac{\pi}{3}\right)\right)$
  
4. **(C6.1 - N) (CA)** For the following functions, determine the value of  $f(2)$  as well as determining an expression for  $f(2 + h)$ , then use these values to determine the value of the difference quotient  $\frac{f(2+h)-f(2)}{(2+h)-(2)}$ : **(Cirrito 18.3, p592)**
  - a. The function  $f(x) = 2x + 5$ .
  - b. The function  $f(x) = x^2 - 3x$
  
5. **(A1.2, F2.6, F2.7 - R) (CA & CI)** Solve the following exponential equations. Present BOTH exact (hence CI) and approximate solutions (hence CA). **(Cirrito p226, Ex 7.22)**
  - a.  $2^{x+1} = 3^{x-1}$
  - b.  $6^{0.5x} = 4^{1-x}$

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## Section B (Skills/Concepts Practice)

6. **(T3.3 - E) (CI)** SKILL: Trig Identities. Given that the sine ratio of an angle is  $\frac{2}{5}$  (i.e.  $\sin(x) = \frac{2}{5}$ ) and that  $0^\circ \leq x \leq 90^\circ$ :
- Draw a right triangle and label all known information about the angle.
  - Determine the cosine and tangent ratios of the angle.
  - Use the information in the triangle to verify the identity  $\sin^2(x) + \cos^2(x) = 1$ .
7. **(T3.3 - E) (CI)** SKILL: Trig Identities. Given that the cosine ratio of an angle is  $-\frac{3}{7}$  (i.e.  $\cos(x) = -\frac{3}{7}$ ) and that  $90^\circ \leq x \leq 180^\circ$ :
- Draw a right triangle in the appropriate quadrant and label all known information about the angle.
  - Determine the sine and tangent ratios of the angle.
  - Use the information in the triangle to verify the identity  $\tan(x) = \frac{\sin(x)}{\cos(x)}$ .
8. **(T3.3 - E) (CI)** SKILL: Trig Identities. Given that  $\sin(x) = \frac{3}{4}$  and that  $0^\circ \leq x \leq 90^\circ$ , find the exact values of:
- a.  $\cos(x)$       b.  $\cos(2x)$       c.  $\sin(2x)$       d.  $\tan(2x)$       e.  $\cos\left(\frac{x}{2}\right)$
9. **(T3.5 - R) (CI)** SKILL: Linear Trigonometric Equations. Solve the following equations on the domain of  $-180^\circ \leq x \leq 180^\circ$ :
- a.  $2\cos(x) - 1 = 0$       b.  $2\sin(x) + \sqrt{3} = 0$       c.  $\frac{1}{\sqrt{3}}\tan(x) + 1 = 0$

## Section C (Skills/Concepts HW)

10. Trig Identities. Oxford, Ex 13E, p460, Q3,4,5,6
11. Linear Trig Equations. Cirrito, Ex 10.4, p359, Q1ad, 2bf, 3cf