Factoring
Pre-Calculus RH

1. What is the value of x^2 if $x = \sqrt{15^2 - 12^2}$?
   a) $\sqrt{3}$ b) 3   c) 9   d) 81   e) 81^2

2. Let a be a nonzero constant. If $2x^2 - 4 = a$, then $x^2 - 2 =$
   a) ½   b) $\frac{a}{2}$ c) $\frac{2}{a}$ d) 2   e) $2a$

From math competitions,

3. Suppose that b and c are constants and $(x + 2)(x + b) = x^2 + cx + 6$. What is c?
   a) -5   b) -3   c) -1   d) 3   e) 5

4. Suppose that 1998 is written as a product of two positive integers whose difference is as small as possible. What is the difference?
   a) 8   b) 15   c) 17   d) 47   e) 93

5. Suppose that a and b are integers such that $x^2 - x - 1$ is a factor of $ax^3 + bx^2 + 1$. What is b?
   a) -2   b) -1   c) 0   d) 1   e) 2

6. The product of four positive integers $a, b, c,$ and d is 8!, and they satisfy the equations
$$ab + a + b = 524$$
$$bc + b + c = 146$$
$$cd + c + d = 104$$
   What is $a - d$?
   a) 4   b) 6   c) 8   d) 10   e) 12

7. What is the smallest possible sum of two positive integers whose product is 999,996?

Practice

Factor each completely.

1.401 $121x^2 - 1$ **1.501** $25x^2 - 9$

1.601 $8x^2 y - 24xy$ **1.701** $2x^2 - 14x + 24$

1.801 $4x^2 - 36$ **1.901** $7a^2 - 28a + 28$

1.011 $x^4 - 81$ **1.111** $x^4 - 5x^2 + 4$

1.211 $a^2 - 6ab + 9b^2$ **1.311** $30 - 25c + 5c^2$

Practice: Factoring.

1.021 Factor completely: $16x^2 - 38x - 5$.

1.121 The perimeter of a rectangle is 16cm, and the area of the same rectangle is 8cm². What is the diagonal length of the rectangle? (See section **5.3**).

1.221 The difference between the squares of two numbers is 80. If the sum of the two numbers is 16, what is their positive difference?

1.321 Factor completely: $256x^8 - 1$.

1.421 Solve for x: $\dfrac{2x^2 - 5x - 12}{2x + 3} = 9$.

1.521 Two circles are internally tangent at A, with diameter AB intersecting the smaller circle at C. The shaded region has an area of 9π cm², and BC = 4cm. What is the sum of the radii of the two circles?
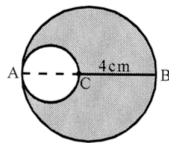
1.621 The diagonal length of a rectangle is $\sqrt{46}$, and its area is 9cm². Find its perimeter. (See section **5.3**).

1.721 The sum of two positive numbers is 6, and the sum of their squares is 22. What is the sum of their reciprocals? Express your answer as a common fraction.

1.821 What is the complete prime factorization of $2^{20} - 1$?

1.921 For positive integers a and b, $(a + \sqrt{b})^2 = 9 + 4\sqrt{5}$, what is $(a + \sqrt{b})^3$? (See section **1.7**).