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

$$ax^3 + bx^2 + 1 = (x^2 - x - 1)(ax - 1)$$

$$bx^2 = -x^2 - ax^2 = -2x^2 \rightarrow b = -2$$

$$0x = x - ax \rightarrow a = 1$$

$$|x| = \sqrt{x^2}$$

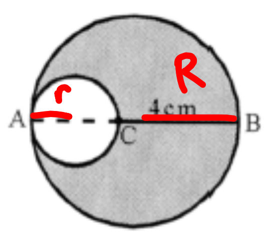
ex) $\sqrt{x^2 - 4x + 4} = \sqrt{(x-2)^2} = |x-2|$

$$\sqrt{x^6} = |x^3|$$

$$\frac{6\,(\sqrt[3]{4}+\sqrt[3]{2}+1)}{(\sqrt[3]{2}-1)(\sqrt[3]{4}+\sqrt[3]{2}+1)} \qquad \underline{(a-b)}(a^2+ab+b^2)$$

$$= \frac{6(\sqrt[3]{4}+\sqrt[3]{2}+1)}{2-1} = 6(\sqrt[3]{4}+\sqrt[3]{2}+1)$$

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?



$$\pi R^2 - \pi r^2 = 9\pi$$

$$R^2 - r^2 = 9$$

$$(R+r)\underline{(R-r)} = 9$$

$$2R - 2r = 4$$

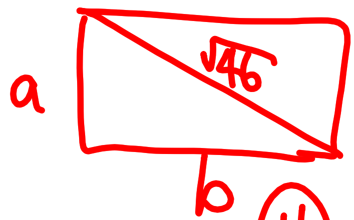
$$R - r = 2$$

$$R + r = ?$$

$$= \frac{9}{2}$$

1.621 The diagonal length of a rectangle is $\sqrt{46}$, and its area is 9cm^2. Find its perimeter. (See section **5.3**).

$A=9$



$a^2+b^2=46$

$ab=9$

$(a+b)^2 = a^2+2ab+b^2$

$= 46+18$

$= 64$

$16 = 2(a+b)$

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.

$a^2+b^2+2ab=36$

$(a+b)^2=(6)^2$

$a^2+b^2=22$

$2ab=14$

$\frac{1}{a}+\frac{1}{b}=\frac{a+b}{ab}$

$=\frac{6}{7}$

25)

$$\frac{2x^2+3x+1}{x^2+2x-15} \div \frac{x^2+6x+5}{2x^2-7x+3}$$

$(2x+1)(x+1)$ $\quad$ $(x+5)(x+1)$

$(x+5)(x-3)$ $\quad$ $(2x-1)(x-3)$ $\quad$ $x \neq \frac{1}{2}, 3$

$-1,$

$$\frac{(2x+1)\cancel{(x+1)}}{(x+5)\cancel{(x-3)}} \cdot \frac{(2x-1)\cancel{(x-3)}}{(x+5)\cancel{(x+1)}} = \frac{(2x+1)(2x-1)}{(x+5)^2}$$

$$\frac{\left(\frac{2}{x} - \frac{1}{y}\right) xy^2}{\left(\frac{1}{xy^2}\right) xy^2}$$

$$\frac{1y}{xy} + \frac{1}{xy} =$$