ALGEBRA PROBLEM SESSION #7 - PRACTICE PROBLEMS

Factoring Special Forms

1. Explain why a perfect square trinomial cannot have a negative last term.

2. If you have the choice of factoring a polynomial as the difference of two squares or as the difference of two cubes, which do you do first? Why?

3. Explain what is meant by the statement: 2 is a double solution of the equation $x^2 - 4x + 4 = 0$. Be specific and justify your answer.

4. Factor:
   (a) $16x^2 - 9$ (b) $81y^4 - 256$ (c) $16x^2 - 40xy + 25y^2$ (d) $x^2 - 9xy + 81y^2$
   (e) $x^2 - 12x + 36 - y^2$ (f) $x^2 + 16x + 64 - x^4$ (g) $27y^3 + 1$ (h) $x^3y^3 + 64$
   (i) $125x^6 - y^6$

5. A park is being built within a square lot but will not take up the entire lot. The entire lot is 6x units by 6x units. The park will be 4 units by 4 units. Find the area that is remaining in the square lot upon completion of the park.

6. Find the error in this proof that 2 = 1:

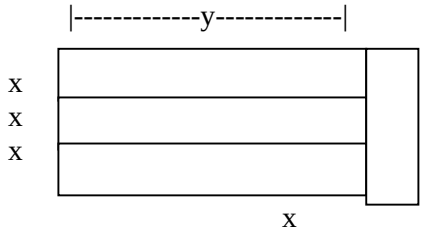
$$x = y$$
$$x^2 = xy$$
$$x^2 - y^2 = xy - y^2$$
$$(x + y)(x - y) = y(x - y)$$
$$\frac{(x+y)(x-y)}{(x-y)} = \frac{y(x-y)}{x-y}$$
$$x + y = y$$
$$y + y = y$$
$$2y = y$$
$$\frac{2y}{y} = \frac{y}{y}$$
$$1 = 1$$

General Factoring

1. Factor: (a) $3x^4 + 27x^2$ (b) $x^3 + 2x^6 - 32$ (c) $5y^3 - 45y^2 + 70y$ (d) $6y^2 - 66$ (e) $y + 27y^4$
   (f) $x^4 + x^2 + 1$. (Hint: Add and subtract x^2.)

2. True or False: (a) The trinomial $x^2 - 4x - 4$ is a prime polynomial. (b) $x^2 + 36 = (x + 6)(x + 6)$

2. Find the area of the region given:



Applications of Polynomial Equations

1. Find a quadratic equation with the given roots. (a) 3, 5 (b) -2, 6 (c) $\frac{1}{2}, \frac{1}{3}$

2. Solve:
   (a) $16n^2 = 24n - 8$ (b) $8r^2 + 16r = 24$ (c) $9y^2 - 18y + 9 = 0$ (d) $15 - 2x = x^2$
   (e) $2x(x + 3) = -5x - 15$ (f) $(x - 1)(x + 4) = 14$ (g) $x^3 - 2x^2 - x + 2 = 0$

3. If $f(x) = 5x^2 - 11x + 6$ and $f(c) = 4$, find all values of c.

Selected problems were taken from Blitzer Algebra For College Students

4. A rectangular park has length 3 yards greater than the width. The area of the park is 180 square yards. Find the length and width.

5. If the product of a number decreased by 6 and increased by 2 is 20, find all possible solutions.

6. Each side of square is lengthened by 2 inches. The area of this new larger square is 36 square inches. Find the length of the side of the original square.

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