Math 099 - Summer 2013 - Test 3

Instructor: **Dr. Francesco Strazzullo** Name KEY

Instructions. Only calculators are allowed on this examination. Each problem is worth 10 points. Always use the appropriate wording and units of measure in your answers (when applicable). **SHOW YOUR WORK NEATLY, PLEASE (no work, no credit).**

1. Perform the indicated operation by removing the parentheses and combining like terms.

$(9x - 8) - (-9x^2 - x)$

$9x - 8 - (-9x^2) - (-x) = 9x - 8 + 9x^2 + x = \boxed{9x^2 + 10x - 8}$

2. Evaluate the given polynomial at $x = 2$.

$-7x^2 - 4$

$-7(2)^2 - 4 = -7 \cdot 4 - 4 = -28 - 4 = \boxed{-32}$

NOT NEEDED

3. Multiply the polynomials using the distributive property and combine like terms.

$(x + 1)(-4x + 3)$

$x(-4x + 3) + 1 \cdot (-4x + 3) = -4x^2 + 3x - 4x + 3$

$= \boxed{-4x^2 - x + 3}$

4. Find the product of the binomial factors using the appropriate special product (difference of two squares, square of a binomial sum, or square of a binomial difference).

$(x + 6)^2$

SQUARE OF BINOMIAL SUM: $(x + a)^2 = x^2 + 2ax + a^2$

$x^2 + 2 \cdot 6 \cdot x + 6^2 = \boxed{x^2 + 12x + 36}$

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5. Write 4.421×10^{-6} in decimal form.

$0.000004421 \rightarrow 0.000004421$

6. Simplify the expression using the properties of exponents. (Note that the answer should contain only positive exponents and please be sure to expand any numerical portion of the answer.)

$\left(\frac{3a^3b^{-1}}{b^2}\right)^2$

$$\frac{(3a^3b^{-1})^2}{(b^2)^2} = \frac{3^2(a^3)^2(b^{-1})^2}{b^{2\cdot 2}} = \frac{9a^{3\cdot 2}b^{-1\cdot 2}}{b^4} = \frac{9a^6b^{-2}}{b^4}$$

$$= 9a^6b^{-2-4} = 9a^6b^{-6} = \frac{9a^6}{b^6}$$

7. Divide the polynomial in the numerator by the monomial in the denominator.

$\frac{4x^4 + 2x + 7}{x^2}$

$$\frac{4x^4}{x^2} + \frac{2x}{x^2} + \frac{7}{x^2} = 4x^{4-2} + 2x^{1-2} + \frac{7}{x^2} = 4x^2 + 2x^{-1} + \frac{7}{x^2}$$

$$= 4x^2 + \frac{2}{x} + \frac{7}{x^2}$$

8. Completely factor the expression by grouping. If the polynomial cannot be factored, write "Not factorable by grouping".

$8bq - 4tx + qt - 32bx$

$$8bq - 4tx + qt - 32bx = 8bq + qt - 4tx - 32bx$$

$$= q(8b + t) - 4x(t + 8b) = (8b + t)(q - 4x)$$

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9. Factor the trinomial. If the trinomial cannot be factored, write *not factorable*.

$x^2 - 10x + 24$

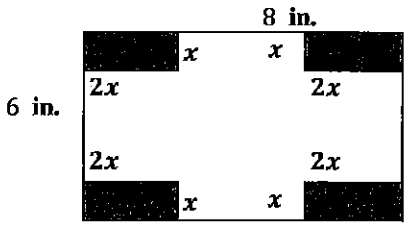
PRODUCT 24 < 6 , 12 ...
4 , 2 ...

SUM −10 ↓ −6
10 → −4

$(x-6)(x-4)$

CHECK
$x^2 - 4x - 6x + 24$ ✓

10. A 6 inches by 8 inches rectangle is given. A small rectangle, $2x$ inches by x inches, is cut out from each corner of the original rectangle.



Represent the area of the remaining portion of the rectangle in the form of a polynomial function $A(x)$.

ORIGINAL AREA = $6 \cdot 8 = 48$ in^2

EACH CORNER AREA = $2x \cdot x = 2x^2$ in^2

REMAINING AREA = ORIGINAL MINUS 4 CORNERS:

$A(x) = 48 - 4(2x^2)$

$A(x) = 48 - 8x^2$ in^2 (OR sq. in.)

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