Polynomials and Factoring practice test

Math 10 **Polynomials and Factoring Practice Test** Name: _____

/50

1. Expand and simplify. [12]

a. $(x+8)(x+3)$

$= x^2 + 3x + 8x + 24$

$= x^2 + 11x + 24$

b. $(3a+10)(2a-1)$

$= 6a^2 - 3a + 20a - 10$

$= 6a^2 + 17a - 10$

c. $(m-12)^2$

$= (m-12)(m-12)$

$= m^2 - 12m - 12m + 144$

$= m^2 - 24m + 144$

d. $5(n+6)(n-2)$

$= (5n+30)(n-2)$

$= 5n^2 - 10n + 30n - 60$

$= 5n^2 + 20n - 60$

e. $(2y-5x)(y-9x)$

$= 2y^2 - 18xy - 5xy + 45x^2$

$= 2y^2 - 23xy + 45x^2$

f. $(2a+b)(a-9b+3)$

$= 2a^2 - 18ab + 6a + ab - 9b^2 + 3b$

$= 2a^2 - 17ab + 6a - 9b^2 + 3b$

2. Factor completely. [16]

a. $n^2 + 2n + 1$

$= n^2 + 1n + 1n + 1$

$= n(n+1) + 1(n+1)$

$= (n+1)(n+1)$

b. $x^2 - 5x - 24$

$= x^2 + 3x - 8x - 24$

$= x(x+3) - 8(x+3)$

$= (x+3)(x-8)$

c. $a^2 + 4a - 12$

$= a^2 + 6a - 2a - 12$

$= a(a+6) - 2(a+6)$

$= (a+6)(a-2)$

d. $3x^3 + 12x^2 - 15x$

$= 3x(x^2 + 4x - 5)$

$= 3x[x^2 + 5x - 1x - 5]$

$= 3x[x(x+5) - 1(x+5)]$

$= 3x(x+5)(x-1)$

e. $x^2 + 2xy - 8y^2$

$= x^2 + 4xy - 2xy - 8y^2$

$= x(x+4y) - 2y(x+4y)$

$= (x+4y)(x-2y)$

f. $y^2 - 36$

$= (y+6)(y-6)$

g. $49u^2 - 100v^2$

$= (7u + 10v)(7u - 10v)$

h. $3m^2 - 75$

$= 3(m^2 - 25)$

$= 3(m+5)(m-5)$

$m^4 + 5m^2 - 24$

$= m^4 + 8m^2 - 3m^2 - 24$

$= m^2(m^2+8) - 3(m^2+8)$

$= (m^2+8)(m^2-3)$

(or use substitution)

$M^2 + 5M - 24$

3. Determine the binomials that represent the length and width of the rectangle. Then determine the dimensions if x represents 10 cm. [4]

Area is
$x^2 + 7x - 8$

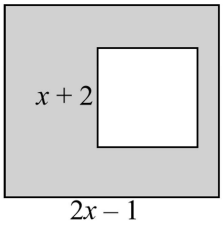
$A = (x+8)(x-1)$

length $= x+8$
width $= x-1$ (or vice versa)

$10+8=18$
$10-1=9$

The dimensions are 18 cm by 9 cm.

4. a) Find an algebraic expression for the area of the shaded region. Both shapes are squares. [2]

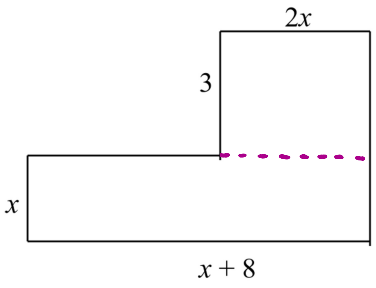


$(2x-1)^2 - (x+2)^2$
$= (2x-1)(2x-1) - (x+2)(x+2)$

~~b) Write the expression in factored form. [2]~~

$= 4x^2 - 4x + 1 - [x^2 + 4x + 4]$
$= 4x^2 - 4x + 1 - x^2 - 4x - 4$
$= 3x^2 - 8x - 3$

5. Write an algebraic expression to represent the area of the figure. Expand and simplify. [4]



$A = 3(2x) + x(x+8)$
$= 6x + x^2 + 8x$
$= x^2 + 14x$

6. Determine all values of b so that $x^2 + bx + 18$ can be factored. [3]

$18 = 1 \times 18 \rightarrow 1 + 18 = 19 \quad -1 + (-18) = -19$

$= 2 \times 9 \rightarrow 2 + 9 = 11 \quad -2 + (-9) = -11$

$= 3 \times 6 \rightarrow 3 + 6 = 9 \quad -3 + (-6) = -9$

$b = \pm 9, \pm 11, \pm 19$

7. Determine three values of c so that $x^2 - 14x + c$ can be factored. [3]

$-14 = -13 - 1 \rightarrow -13 \times -1 = 13$

$= -15 + 1 \rightarrow -15 \times 1 = -15$

$= -10 - 4 \rightarrow -10 \times -4 = 40$

$c = -15, 13, 40$

Communication

Criteria	never	sometimes	always
Proper use of operation symbols, equal signs, etc.	0	1	2
Solutions are clear and well organized.	0	1	2