

MATH 103 EXAM #2 KEY (SUMMER 2011)

1a. $5u^{-8} = \frac{5}{u^8}$

1b. $(-2x^9)^5 = -32x^{45}$

1c. $3v^2(-5v^{-6})(-2v)^0 = 3v^2(-5v^{-6}) = -15v^2v^{-6} = -15v^{-4} = -\frac{15}{v^4}$

1d. $\frac{4a^5(a^{-1})^3}{(a^{-2})^{-4}} = \frac{4a^5a^{-3}}{a^8} = \frac{4a^2}{a^8} = \frac{4}{a^6}$

2. $(2z^2 + 3z - 1) + (4z^2 + 5z + 6) = 2z^2 + 3z - 1 + 4z^2 + 5z + 6 = 6z^2 + 8z + 5$

3. $(9y^2 - 11y + 5) - (4y^2 - 3y + 7) = 9y^2 - 11y + 5 - 4y^2 + 3y - 7 = 5y^2 - 8y - 2$

4a. $(4k + 3)(3k - 2) = 12k^2 - 8k + 9k - 6 = 12k^2 + k - 6$

4b. $(4n + 3m)^2 = (4n + 3m)(4n + 3m) = 16n^2 + 24mn + 9m^2$

4c. $[(m+p)+5][(m+p)-5] = (m+p)^2 - 5(m+p) + 5(m+p) - 5^2 = (m+p)(m+p) - 25 = m^2 + 2mp + p^2 - 25$

5. $\frac{2x^3 - 11x^2 + 25}{x - 5} = 2x^2 - x - 5$

6a. $8r(r^2 + 3)$

6b. $3yz^3(5y^2 + 9yz - 12z^2)$

6c. $2(x + 7)^3 - 3(x + 7)^2 = (x + 7)^2[2(x + 7) - 3] = (x + 7)^2(2x + 11)$

7. $20 + 5s + 12t + 3st = 5(4 + s) + 3t(4 + s) = (4 + s)(5 + 3t)$

8a. $r^2 - 2r - 35 = (r - 7)(r + 5)$

8b. $15p^2 + 24pq + 8q^2$ is prime

8c. $18c^2 - 98d^2 = 2(9c^2 - 49d^2) = 2[(3c)^2 - (7d)^2] = 2(3c - 7d)(3c + 7d)$

8d. $27y^3 + 8 = (3y)^3 + 2^3 = (3y + 2)[(3y)^2 - (3y)(2) + 2^2] = (3y + 2)(9y^2 - 6y + 4)$

8e. $x^4 - 625 = (x^2)^2 - 25^2 = (x^2 - 25)(x^2 + 25) = (x^2 - 5^2)(x^2 + 25) = (x - 5)(x + 5)(x^2 + 25)$

9a. $3x^2 + 10x + 3 = 0 \Rightarrow (3x + 1)(x + 3) = 0 \Rightarrow 3x + 1 = 0$ or $x + 3 = 0 \Rightarrow x = -1/3, -3$

9b. $6x^3 - 13x^2 - 5x = 0 \Rightarrow x(6x^2 - 13x - 5) = 0 \Rightarrow x(3x + 1)(2x - 5) = 0 \Rightarrow x = 0$ or $3x + 1 = 0$ or $2x - 5 = 0 \Rightarrow x = 0, -1/3, 5/2$