Math 98 **Sample Exam 4 - Version B** Answers

To receive full credit, show all steps.

1. Simplify each of the following.

   (a) $(3x-7)^2 =$ $9x^2-42x+49$

   (b) $(2a^3-5b)(2a^3+5b) =$ $4a^6-25b^2$

   (c) $\dfrac{2x-7}{7-2x} =$ -1

   (d) $\dfrac{2x+6}{18x-2x^3} =$ $\dfrac{1}{x(3-x)}$

   (e) $\dfrac{6xy-2y-3x+1}{9x^2-1} =$ $\dfrac{2y-1}{3x+1}$

   (f) $\dfrac{3a-12}{3a+15}\cdot\dfrac{5a+20}{a^2-16} =$ $\dfrac{5}{a+5}$

   (g) $\dfrac{7x-13}{2x-5}-\dfrac{7-x}{2x-5} =$ 4

   (h) $-3^0-(-3)^0 =$ -2

   (i) $3^{-2}\cdot(3^{-3})^{-2} =$ 81

   (j) $(3^{-3}\cdot 3^1)^{-2} =$ 81

   (k) $2^5x^{-2}(-2x^{-2})^{-3} =$ $-4x^4$

   (l) $\dfrac{(-3ab)^3ab^{-3}}{-3b^{-3}a^2(3a^{-1}b)^2} =$ a^4b

   (m) $(a+b)(a^4-a^3b+a^2b^2-ab^3+b^4) =$ a^5+b^5

2. Factor completely each of the following:

   (a) $2bnxy-4anxy+12anx^2-6bnx^2 =$ $2nx(2a-b)(3x-y)$

   (b) $75bm^3-150am^3+24am^5-12bm^5 =$ $3m^3(2a-b)(2m-5)(2m+5)$

   (c) $240a^5p-160a^5q-15apx^4+10aqx^4 =$ $5a(2q-3p)(x^2+4a^2)(x-2a)(x+2a)$

3. Factor by grouping.

   (a) $4b+b^2-21 =$ $(b-3)(b+7)$

   (b) $14p^2-p-3 =$ $(2p-1)(7p+3)$

   (c) $14m+5m^2-3 =$ $(5m-1)(m+3)$

4. Solve each of the following equations. Make sure to check your solutions.

   (a) $\dfrac{3x-1}{5}-\dfrac{7-x}{3}=x-2$ -8

(b) $5(x-2)-(3-4x)=8(x-2)-(5-x)$ identity, all numbers are solution

(c) $5p^7=20p^6$ $0, 4$

(d) $5p^7=20p^5$ $-2, 0, 2$

(e) $(-1-2x)-(3x+5)(2x-1)=3(1-2x)(x-1)+7$ 0

(f) $m^2+55=16m$ $5, 11$

5. Solve each of the following inequalities. Graph the solution set.

(a) $\dfrac{2a+1}{5}-\dfrac{7-a}{2}>-a-9$ $a>-3$

(b) $\dfrac{5-y}{3}\geq -8$ $x\leq 29$

(c) $(3x-8)-(4x-5)>x-3$ $x<0$

6. Solve each of the following formulas.

(a) $P=5x-2y$ for x $x=\dfrac{P}{5}+\dfrac{2y}{5}$

(b) $P=5x-2y$ for y $x=\dfrac{5x}{2}-\dfrac{P}{2}$

(c) $V=\dfrac{\pi r^2 h}{3}$ for h. $h=\dfrac{3V}{\pi r^2}$

(d) $7a-3b=42$ for b. $b=\dfrac{7a}{3}-14$

7. Graph the straight lines $2x+y=5$ and $y=-x+1$ in the same coordinate system.

(a) Use your graph to find th coordinates of the point where the lines intersect. $(4, -3)$

(b) Use algebraic methods to check your solution for part a).

8. Word Problems.

(a) The population of a town has decreased by 10%. Now there are 7650 residents. Find the original population. 8500

(b) The difference between two numbers is 34, their sum is 20. Find these numbers. $-7,\ 27$

(c) Ann and Betty are roommates. The monthly rent is \$ 980. The amount paid by Ann is \$ 130 less than twice the amount paid by Betty. How much do they each pay for rent? \$ 370, 610

(d) The price of a TV is \$ 680. If this price was to be changed to \$ 442, what percent of a change does this represent? 35%

(e) One side of a rectangle is 5 ft shorter than twice the other side. Find the sides if the perimeter is 32 ft. 7 ft, 9 ft

(f) One side of a rectangle is 5 ft shorter than twice the other side. Find the sides if the area is 150 ft^2. 10 ft, 15 ft