MATH 111i WORKSHEET 3

Name:_____

Work in groups to answer as many problems as you can. Ask questions if you get stuck.

1. Factor out the greatest common factor of each of the following polynomials.

   (a) $5a - 20$

   Answer:_____

   (b) $30x^3 + 15x^4$

   Answer:_____

   (c) $-2x^3 + 16x$

   Answer:_____

   (d) $-3b + 12$

   Answer:_____

   (e) $12x^3 + 18x$

   Answer:_____

   (f) $6y^4 - 15y^3$

   Answer:_____

   (g) $2x^4 + 4x^3 - 14x^2$

   Answer:_____

   (h) $y(y-6) + 9(y-6)$

   Answer:_____

   (i) $(z+2)^2 - 5(z+2)$

   Answer:_____

2. Factor each expression.

   (a) $x^2 + 2x - 3$

   Answer:_____

   (b) $x^2 + 2x - 15$

   Answer:_____

   (c) $y^2 - 8y + 15$

   Answer:_____

   (d) $2x^2 - 5x - 7$

   Answer:_____

   (e) $5x^2 - 7x - 6$

   Answer:_____

   (f) $9x^2 - 36x - 45$

   Answer:_____

(g) $x^2 - 6x + 5$

Answer:_____

(h) $x^2 - 14x + 48$

Answer:_____

(i) $z^2 + 6z - 16$

Answer:_____

(j) $3x^2 - 16x + 5$

Answer:_____

(k) $2x^2 + 7x - 4$

Answer:_____

(l) $8x^2 + 10x + 3$

Answer:_____

3. Using the formula $A^2 - B^2 = (A + B)(A - B)$ to factor the following.

(a) $x^2 - 36$

Answer:_____

(b) $9a^2 - 16$

Answer:_____

(c) $49 - 4y^2$

Answer:_____

(d) $(x + 3)^2 - 4$

Answer:_____

(e) $(a + b)^2 - (a - b)^2$

Answer:_____

(f) $y^2 - 100$

Answer:_____

(g) $4x^2 - 25$

Answer:_____

(h) $4t^2 - 9s^2$

Answer:_____

(i) $4(2x + 1)^2 - 9$

Answer:_____

(j) $\left(1 + \frac{1}{x}\right)^2 - \left(1 - \frac{1}{x}\right)^2$

Answer:_____

Cont.

4. Factor each of the following perfect squares.

   (a) $x^2 + 12x + 36$

   Answer:_____

   (b) $t^2 - 6t + 9$

   Answer:_____

   (c) $16z^2 - 24z + 9$

   Answer:_____

   (d) $4w^2 + 4wy + y^2$

   Answer:_____

   (e) $y^2 + 10y + 25$

   Answer:_____

   (f) $t^2 - 10t + 25$

   Answer:_____

   (g) $25u^2 - 10u + 1$

   Answer:_____

   (h) $r^2 - 6rs + 9s^2$

   Answer:_____

5. Factor the following polynomials by grouping.

   (a) $x^3 + 4x^2 + x + 4$

   Answer:_____

   (b) $2r^3 + r^2 - 6r - 3$

   Answer:_____

   (c) $x^3 + x^2 + x + 1$

   Answer:_____

   (d) $y^3 - 3y^2 - 4y + 12$

   Answer:_____

   (e) $2t^3 + 4t^2 + t + 2$

   Answer:_____

   (f) $3x^3 - x^2 + 6x - 2$

   Answer:_____

Cont.

(g) $-9u^3 - 3u^2 + 3u + 1$

Answer:_____

(h) $x^5 + x^4 + x + 1$

Answer:_____

(i) $y^3 - y^2 + y - 1$

Answer:_____

(j) $3s^3 + 5s^2 - 6s - 10$

Answer:_____

6. Simplify the rational expression.

(a) $\dfrac{12x}{6x^2}$

Answer:_____

(b) $\dfrac{5y^2}{10y + y^2}$

Answer:_____

(c) $\dfrac{3(x+2)(x-1)}{6(x-1)^2}$

Answer:_____

(d) $\dfrac{x-2}{x^2-4}$

Answer:_____

(e) $\dfrac{x^2+6x+8}{x^2+5x+4}$

Answer:_____

(f) $\dfrac{y^2+y}{y^2-1}$

Answer:_____

(g) $\dfrac{81x^3}{18x}$

Answer:_____

(h) $\dfrac{14t^2-t}{7t}$

Answer:_____

(i) $\dfrac{4(x^2-1)}{12(x-2)(x-1)}$

Answer:_____

(j) $\dfrac{x^2-x-2}{x^2-1}$

Answer:_____

Cont.

(k) $\dfrac{x^2+x-12}{x^2-5x+6}$

Answer:_____

(l) $\dfrac{y^2-3y-18}{y^2+4y+3}$

Answer:_____

7. Perform the multiplication or division and simplify.

(a) $\dfrac{4x}{x^2-4}\cdot\dfrac{x+2}{16x}$

Answer:_____

(e) $\dfrac{x^2+2x-3}{x^2-2x-3}\cdot\dfrac{3-x}{3+x}$

Answer:_____

(b) $\dfrac{x^2-2x-15}{x^2-9}\cdot\dfrac{x+3}{x-5}$

Answer:_____

(f) $\dfrac{x^2-x-6}{x^2+2x}\cdot\dfrac{x^3+x^2}{x^2-2x-3}$

Answer:_____

(c) $\dfrac{t-3}{t^2+9}\cdot\dfrac{t+3}{t^2-9}$

Answer:_____

(g) $\dfrac{x+3}{4x^2-9}\div\dfrac{x^2+7x+12}{2x^2+7x-15}$

Answer:_____

(d) $\dfrac{x^2-25}{x^2-16}\cdot\dfrac{x+4}{x+5}$

Answer:_____

(h) $\dfrac{2x+1}{2x^2+x-15}\div\dfrac{6x^2-x-2}{x+3}$

Answer:_____

Cont.

(i) $\dfrac{2x^3+3x+1}{x^2+2x-15} \div \dfrac{x^2+6x+5}{2x^2-7x+3}$

Answer:_____

(j) $\dfrac{4y^2-9}{2y^2+9y-18} \div \dfrac{2y^2+y-3}{y^2+5y-6}$

Answer:_____

8. Perform the addition or subtraction and simplify.

(a) $2+\dfrac{x}{x+3}$

Answer:_____

(b) $\dfrac{1}{x+5}+\dfrac{2}{x-3}$

Answer:_____

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

Answer:_____

(d) $\dfrac{x}{(x+1)^2}+\dfrac{2}{x+1}$

Answer:_____

(e) $\dfrac{1}{x^2}+\dfrac{1}{x^2+x}$

Answer:_____

(f) $\dfrac{2x-1}{x+4}-1$

Answer:_____

(g) $\dfrac{1}{x+1}+\dfrac{1}{x-1}$

Answer:_____

(h) $\dfrac{x}{x-4}-\dfrac{3}{x+6}$

Answer:_____

Cont.

(i) $\dfrac{5}{2x-3} - \dfrac{3}{(2x-3)^2}$

Answer:_____

(j) $\dfrac{1}{x} + \dfrac{1}{x^2} + \dfrac{1}{x^3}$

Answer:_____

9. Rationalise the denominator.

(a) $\dfrac{1}{2-\sqrt{3}}$

Answer:_____

(b) $\dfrac{2}{\sqrt{2}+\sqrt{7}}$

Answer:_____

(c) $\dfrac{y}{\sqrt{3}+\sqrt{y}}$

Answer:_____

(d) $\dfrac{2}{3-\sqrt{5}}$

Answer:_____

(e) $\dfrac{1}{\sqrt{x}+1}$

Answer:_____

(f) $\dfrac{2(x-y)}{\sqrt{x}-\sqrt{y}}$

Answer:_____

Cont.

10. Perform long division to find the quotient and remainder.

(a) $\dfrac{x^2-6x-8}{x-4}$

Answer:_____

(b) $\dfrac{4x^3+2x^2-2x-3}{2x+1}$

Answer:_____

(c) $\dfrac{x^3-x^2-2x+6}{x-2}$

Answer:_____

(d) $\dfrac{x^3+3x^2+4x+3}{3x+6}$

Answer:_____

(e) $\dfrac{x^6+x^4+x^2+1}{x+1}$

Answer:_____

(f) $\dfrac{6x^3+2x^2+20x}{2x^2+5}$

Answer:_____

The End.