5A Pre-Calc Alg. Review

1. $(3x+10)(x-2)$
$3x^2+4x-20$

2. $(7a+11b)(7a-11b)$
$49a^2-121b^2$

3. $(3x+5y)(3x-5y)$
$9x^2-25y^2$

4. $-x^2-3x+18$
$-1(x^2+3x-18)$
$-1(x+6)(x-3)$

5. $9x^2-25$
$(3x+5)(3x-5)$

6. $3x^2+7x+2$
$(3x+6)(3x+1)$
$(x+2)(3x+1)$

7. $-2x^3-4x^2$
$-2x^2(x+2)$

8. $-12a^3b+75ab^3$
$-3ab(4a^2-25b^2)$
$-3ab(2a+5b)(2a-5b)$

9. $4a^2-25b^2$
$(2a+5b)(2a-5b)$

10. $-18c^3+128c^2$
$-2c^2(9c-64)$

11. $242a^3-200a$
$2a(121a^2-100)$
$2a(11a+10)(11a-10)$

12. $3m^2+21m-54$ 162
~~$(3m+9)(3m-6)$~~
$3(m^2+7m-18)$
$3(m+9)(m-2)$

13. $-10x^2y^3z^2+45xy^5z^3$
$-5xy^3z^2(2x-9y^2z)$

14. $-3x^2y^6 + 21xy^4 - 30x^3y$

$-3xy(xy^5 - 7y^3 + 10x^2)$

15. $15a^7b^2 - 40a^2b - 5a^5b^4$

$5a^2b(3a^5b - 8 - a^3b^3)$

16. $\frac{1}{3\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{6}$

17. $\frac{6}{7+\sqrt{5}} \cdot \frac{7-\sqrt{5}}{7-\sqrt{5}} = \frac{42-6\sqrt{5}}{49-5}$

$= \frac{42-6\sqrt{5}}{44}$

$= \boxed{\frac{21-3\sqrt{5}}{22}}$

18. $\frac{3+\sqrt{5}}{2-\sqrt{3}} \cdot \frac{2+\sqrt{3}}{2+\sqrt{3}}$

$\frac{6+3\sqrt{3}+2\sqrt{5}+\sqrt{15}}{4-3}$

$= 6+3\sqrt{3}+2\sqrt{5}+\sqrt{15}$

19. $\frac{8}{6-5i} \cdot \frac{6+5i}{6+5i} = \frac{48+40i}{36+25} = \frac{48}{61} + \frac{40i}{61}$

20. $\frac{2i}{4-3i} \cdot \frac{4+3i}{4+3i} = \frac{8i+6i^2}{16+9} = \frac{-6+8i}{25} = \boxed{\frac{-6}{25} + \frac{8i}{25}}$

21. $\frac{5-2i}{4+3i} \cdot \frac{4-3i}{4-3i} = \frac{20-15i-8i+6i^2}{16+9} = \frac{14-23i}{25}$

22. $\frac{7}{5x} + \frac{8}{3x} = \frac{21}{15x} + \frac{40}{15x} = \frac{61}{15x}$

23. $\frac{4z}{5x^2y} \cdot \frac{3z}{3z} - \frac{2}{3zy} \cdot \frac{5x^2}{5x^2} = \boxed{\frac{12z^2}{15x^2yz} - \frac{10x^2}{15x^2yz}}$

$\frac{12z^2 - 10x^2}{15x^2yz}$

24. $\frac{x}{x-4} - \frac{6}{x+3} = \frac{x(x+3) - 6(x+4)}{(x-4)(x+3)} = \frac{x^2+3x-6x+24}{(x-4)(x+3)}$

$= \frac{x^2-3x+24}{x^2-x-12}$

25. $\frac{5}{6x^2} - \frac{x}{4x^2-12x}$

$2x(3x) \quad 4x(2x-6)$

$= \frac{5(2x-6) - x(3x)}{2x(3x)(2x-6)}$

$6x^2$

$= \frac{10x - 30 - 3x^2}{12x^3 - 36x^2} = \frac{-3x^2+10x-30}{12x^3-36x^2}$

26. $\frac{x+1}{x^2+4x+4} - \frac{2}{x^2-4}$

$(x+2)(x+2) \quad (x+2)(x-2)$

$= \frac{(x+1)(x-2) - 2(x+2)}{(x+2)(x+2)(x-2)}$

$= \frac{x^2-x-2-2x-4}{(x+2)^2(x-2)} = \frac{x^2-3x-6}{(x+2)^2(x-3)}$

27. $\frac{10x}{3x^2-3} - \frac{4}{x-1} + \frac{5}{6x}$ $\qquad 6x(3x^2-3)$ $\qquad 18x^3-18x$

$3(x^2-1)$

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

$-72x(x+1)$ $\qquad 1 \quad 3x^3-3x^2-3x+3$

$$= \frac{10x(6x) - 4(3)(x+1)(6x) + 5(3x^2-3)(x-1)}{3(x+1)(x-1)(6x)}$$

$$= \frac{60x^2 - 72x^2 - 72x + 315x^3 - 15x^2 - 15x + 15}{15x^3 - 27x^2 - 87x + 15}$$

$$18x^3 - 18$$

28. $\frac{1}{\frac{1}{x} + \frac{1}{y}} = \frac{1}{\frac{y+x}{xy}}$

$$= \frac{1}{1} \cdot \frac{xy}{y+x}$$

29. $\frac{\frac{x}{5} + 4}{8 + \frac{1}{x}} = \frac{\left(\frac{x+20}{5}\right)}{\left(\frac{8x+1}{x}\right)} \Rightarrow \frac{(x+20)}{5} \cdot \frac{x}{(8x+1)}$

$$= \frac{x^2+20x}{40x+5}$$

30. $\frac{\left(\frac{15}{2x}\right)}{\frac{6}{x} - \frac{1}{2}} = \frac{\left(\frac{15}{2x}\right)}{\left(\frac{12-x}{2x}\right)} \cdot \frac{2x}{(12-x)}$ $\qquad \frac{30x}{24x-2x^2} = \frac{15}{12-x}$