Calculus
Chapter 1

Name Key **Hour**_____

Day 1 on Power Rules/Factoring/Rational Expressions/Zeros/End Behavior

Simplify:

EXPONENTS PRACTICE

1. $3 \cdot 4^3$ 192
2. $4x^3 \cdot 2x^3$ $8x^6$
3. $x^5 \cdot x^3$ x^8
4. $2x^3 \cdot 2x^2$ $4x^5$
5. $\frac{6^5}{6^3}$ 36
6. $\frac{x^4}{x^7}$ $\frac{1}{x^3}$
7. 8^0 1
8. $-(9x)^0$ -1
9. $(y^4)^3$ y^{12}
10. $(x^2y)^4$ x^8y^4
11. $\frac{6x^7}{2x^4}$ $3x^3$
12. $\frac{8x^5}{4x^2}$ $2x^3$
13. $(2cd^4)^2(cd)^5$ $4c^7d^{13}$
14. $(2fg^4)^4(fg)^6$ $16f^{10}g^{22}$
15. $\frac{x^5y^6}{xy^2}$ x^4y^4
16. $\frac{x^2y^5}{xy^4}$ xy
17. $\left(\frac{4x^5y}{16xy^4}\right)^3$ $\frac{x^{12}}{64y^9}$
18. $\left(\frac{5x^3y}{20xy^5}\right)^4$ $\frac{x^8}{256y^{16}}$
19. y^{-7} $\frac{1}{y^7}$
20. 7^{-2} $\frac{1}{49}$
21. $\frac{1}{x^{-5}}$ x^5
22. $\frac{1}{2^{-4}}$ 16
23. $x^5 \cdot x^{-1}$ x^4
24. x^{-6} $\frac{1}{x^6}$
25. $x^9 \cdot x^{-7}$ x^2
26. $(j^{-13})(j^4)(j^6)$ $\frac{1}{j^3}$
27. $\frac{x^{-1}}{x^{-8}}$ x^7
28. $\frac{52x^6}{13x^{-7}}$ $4x^{13}$
29. $f^{-3}(f^2)(f^{-3})$ $\frac{1}{f^4}$
30. $\frac{x^{-4}}{x^{-9}}$ x^5
31. $\frac{24x^6}{12x^{-8}}$ $2x^{14}$
32. $\frac{3x^2y^{-3}}{12x^6y^3}$ $\frac{1}{4x^4y^6}$
33. $(2x^3y^{-3})^{-2}$ $\frac{y^6}{4x^6}$
34. $\frac{2x^4y^{-4}}{8x^7y^3}$ $\frac{1}{4x^3y^7}$
35. $(4x^4y^{-4})^3$ $\frac{64x^{12}}{y^{12}}$
36. $5x^2y(2x^4y^{-3})$ $\frac{10x^6}{y^2}$
37. $\left(\frac{-7a^2b^3c^0}{3a^3b^4c^3}\right)^{-4}$ $\frac{81a^4b^4c^{12}}{2401}$
38. $\left(\frac{-2a^3b^2c^0}{3a^2b^3c^7}\right)^{-2}$ $\frac{9b^2c^{14}}{4a^2}$

Solve each equation by factoring.

1) $n^2 = -18 - 9n$

$n^2 + 9n + 18 = 0$

$(n+6)(n+3) = 0$

$n = -6, -3$

2) $8r^2 + 3r + 2 = 7r^2$

$n = -2, -1$

3) $7v^2 - 42 = -35v$

$n = -6, 1$

4) $10n^2 - 35 = 65n$

$n = -\frac{1}{2}, 7$

Simplify each expression.

1) $\frac{6}{x-1} - \frac{5x}{4}$ $\frac{24-5x^2+5x}{4(x-1)}$

2) $\frac{3}{x+7} + \frac{4}{x-8}$ $\frac{7x+4}{(x+7)(x-8)}$

3) $\frac{5}{n+5} + \frac{4n}{2n+6}$ $\frac{2n^2+15n+15}{(n+3)(n+5)}$

4) $\frac{3}{x+6} + \frac{7}{x-2}$ $\frac{10x+36}{(x+6)(x-2)}$

5) $\frac{\frac{a}{25} - \frac{a}{5}}{a}$ $\frac{-4}{25}$

6) $\frac{x^2-16}{9-x} \cdot \frac{x^2+x-90}{x^2+14x+40}$ $-(x+4)$

7) $\frac{2b^2-12b}{b+5} \div \frac{b-6}{b+5}$ $2b$

8) $\frac{1}{5p^2} \div \frac{9p-36}{5p^3-35p^2}$ $\frac{p-7}{9(p-4)}$

Simplify each and state the excluded values. State any horizontal/vertical asymptotes and x & y intercepts.

9) $\frac{p+4}{p^2+6p+8}$ $(p+2)(p+4)$ $\frac{1}{p+2}$ $p \neq -2$, $p \neq -4$

VA: $x=-2$ HA: $y=0$
xint: None yint: $\frac{1}{2}$

10) $\frac{3a}{15a-15}$ $15(a-1)$ $= \frac{3}{5(a-1)}$ $a \neq 1$

VA: $x=1$ HA: $y=0$
xint: none yint: $-\frac{3}{5}$

11) $\frac{2a^2+10a}{3a^2+15a} = \frac{2a(a+5)}{3a(a+5)} = \frac{2}{3}$ $x \neq 0$, $x \neq -5$

VA: None HA: $y=2/3$ xint: None yint: $2/3$

12) $\frac{p^2-3p-10}{p^2+p-2} = \frac{(p-5)(p+2)}{(p+2)(p-1)} = \frac{p-5}{p-1}$ $p \neq -2, 1$

VA: $x=1$ HA: $y=1$ xint: $p=5$ yint: $y=5$

13) $\frac{x^2+x-6}{x^2+8x+15} = \frac{(x+3)(x-2)}{(x+5)(x+3)} = \frac{x-2}{x+5}$ $x \neq -5$, $x \neq -3$

V.A: $x=-5$ HA: $y=1$ xint: $x=2$ yint: $-\frac{2}{5}$

14) $\frac{a^2+5a+4}{a^2+9a+20} = \frac{(a+4)(a+1)}{(a+5)(a+4)} = \frac{a+1}{a+5}$ $a \neq -5, -4$

VA: $a \neq -5$ HA: $y=1$ xint: $a=-1$ yint: $\frac{1}{5}$