Exam 2 Review Name: _____

Please show all your work to get full credit.

1. Classify each of the polynomials listed below as a factor, multiple, of the polynomial $20(2x-1)^5(3+x)^2$, or neither.
   a. $60(2x-1)^6(3+x)^5(3+5x)^4$

   b. $2x-1$

   c. $(x+3)^6$

   d. $5(2x-1)^2(3+x)^2$

2. Factor the following completely.
   a. $pq-p^2q^2$

   b. $x(u+v)-y(u+v)$

   c. $ax-ay+bz+az-by+bx$

   d. $5t^4-4t^3-t^2$

   e. x^3+64

   f. $16x^4-81y^6$

   g. x^2+3x-4

h. $3x^2 + 8x - 3$

i. $x^2 - 9$

j. $3x^2 - 11x + 6$

3. Perform the operations below and simply your answer so that all fractions are written in the lowest terms and do not leave any negative exponents or radicals in the denominator. (Rationalize the denominators, if there any radicals in the denominator)

a. $\frac{a^3 b}{c^3 d^6} - \frac{3c^5 b^5}{a^2 d^3}$

b. $\frac{x+1}{5x} - \frac{3-x}{5x}$

c. $\frac{x}{x^2+5x-6} - \frac{3x+5}{x^2-1}$

d. $3\frac{1}{2} \times 2\frac{2}{3}$

e. $\frac{5}{12}\times\frac{14}{15}$

f. $\frac{100}{-8}\times\frac{12}{30}\times\frac{-35}{21}$

g. $\frac{x^2-9}{x^2+3x-4}\times\frac{x^3+64}{3x^2+8x-3}$

h. $(a^2)^3$

i. $(a^{-2})^3$

j. $(a^{-2}b^3)^{-2}$

k. $\left(\frac{2y^3}{3x^2}\right)^4$

l. $(-3a^3b^{-2}c)^3(b^6c^{-4})^2$

m. $\left(\frac{4x^{-2}y^9}{12x^{-3}y^5}\right)^{-2}$

n. $\sqrt{a}\sqrt{a}$

o. $\frac{\sqrt[3]{a^2b}}{\sqrt[3]{a}}$

p. $\sqrt{125x^5}$

q. $\sqrt{40a^2b^6}$

r. $\left(3\sqrt{a^5b^3}\right)\left(\sqrt{40a^2b^6}\right)$

s. $\left(3-2\sqrt{3}\right)\left(3+2\sqrt{3}\right)$

t. $\frac{3+2\sqrt{5}}{2-4\sqrt{5}}$

u. $3\frac{1}{2} \div 2$

v. $\frac{x^2+2x+1}{1-x^2} \div \frac{5x^2+4x-1}{5x^2-6x+1}$

4. Use the division algorithms to perform the following divisions. Write your final answer in the form Quotient + $\frac{\text{Remainder}}{\text{Divisor}}$.

   a. $862 \div 21$

   b. $(8x^2 + 6x + 2) \div (2x + 1)$

5. Answer true or false and justify your answer.

   a. $4 \div \frac{1}{2} = \frac{4}{1} \div \frac{1}{2} = \frac{4\times2}{1\times2} \div \frac{1}{2} = \frac{8}{2} \div \frac{1}{2} = \frac{8\div1}{2\div2} = 8$

   b. $\frac{a}{b} \div \frac{c}{d} = \frac{a\div c}{b\div d}$

   c. $14 \div 0=0$

   d. $0 \div 14 = 0$

6. Fill in the blanks or find the value of the ? below.

a. $(2x+3)(\square x^2+\square x+\square)=6x^3+17x^2+14x+3$

b. $(\square x^2+\square x+\square)\div(2x+1)=5x-1+\frac{7}{2x+1}$

In other words find a polynomial that gives a quotient of $5x-1$ and a remainder of 7 after divided by the polynomial $2x+1$.

c. $\left(\frac{\square x^{\square}}{x^{-3}y^5}\right)^{-1}=\frac{y^5}{3x^6}$

d. $\sqrt[3]{\square}\sqrt[3]{x}=x^3$

e. $\frac{2\sqrt{\square}+3}{\sqrt{2}+1}=\sqrt{2}+1$

7. Give us the polynomial whose factors are given by $(2x+3)(4-x)$

8. $\frac{3x}{2x-1}+\frac{\square x-1}{x-2}=\frac{11x^2-12x+1}{(2x-1)(x-2)}$