MAT 107 Test # 1 Review G.Buthusiem NAME:_____

Write an equation in standard form for the following.

1. The line through (3, 4), parallel to $y = -\frac{2}{3}x + 1$

Use ordinary division of polynomials to find the quotient and remainder when the first polynomial is divided by the second.

2. $x^4 + 3x^3 - 4x^2 + 3x + -5, x^2 + 1$

Use synthetic division to find the quotient and remainder when the first polynomial is divided by the second.

3. $x^4 - 5, x - 3$

Use the remainder theorem to find the function value.

4. $f(x) = 4x^3 - 7x^2 - 2x + 8$; find f(3).

Use the factor theorem to decide whether or not the second polynomial is a factor of the first.

5. $5x^4 + 19x^3 - 4x^2 + x + 4; x + 4$

Factor the polynomial completely, given that the binomial is a factor.

6. $x - 4, x^3 + 8x^2 - 12x - 144$

Determine whether the given number is a zero of the polynomial function.

7. $P(x) = 7x^3 - 3x^2 + x + 219; -3$

Use the rational zero theorem to find all possible rational zeros for the polynomial function.

8. $P(x) = 2x^3 + 8x^2 + 7x - 8$

Describe the behavior of the function's graph at its x–intercepts.

9. $f(x) = (x - 1)^2(x + 8)$

Determine whether $y \to \infty$ or $y \to -\infty$ as $x \to -\infty$ and $x \to \infty$.

10. $y = -3x^4 - 4x^2 - 1$

Sketch the graph of the polynomial function.

11. $f(x) = (2x - 1)(x + 1)(x + 2)$

Solve the inequality. Give answer in interval notation.

12. $(x + 3)(x - 2)(x - 3) < 0$

For the given function, find all asymptotes of the type indicated (if there are any).

13. $f(x) = \frac{(x - 5)(x + 2)}{x^2 - 9}$, vertical

14. $f(x) = \frac{9x^2 - 3x - 8}{5x^2 - 7x + 8}$, horizontal

Sketch the graph of the function.

15. $f(x) = \dfrac{x + 1}{x^2 + x - 20}$

Find the vertical asymptotes, if any, of the graph of the rational function.

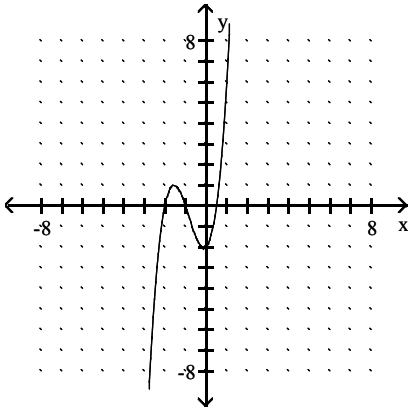
16. $f(x) = \dfrac{x - 4}{x(x - 4)}$

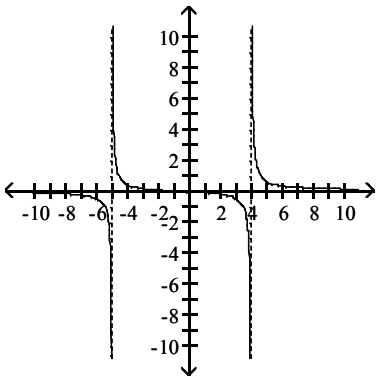
Write the form of the partial fraction decomposition of the rational expression. It is not necessary to solve for the constants.

17. $\dfrac{3x - 1}{(x + 5)(x + 7)^2}$

Write the partial fraction decomposition of the rational expression.

18. $\dfrac{6x^2 - 10x + 26}{(x - 2)(x^2 + 6)}$

1. $2x + 3y = 18$
2. $x^2 + 3x - 5$
3. $x^3 + 3x^2 + 9x + 27; 76$
4. 47
5. Yes
6. $(x - 4)(x + 6)(x + 6)$
7. Yes
8. $\pm 1, \pm \frac{1}{2}, \pm 2, \pm 4, \pm 8$
9. Does not cross at (1, 0) , crosses at (–8, 0)
10. $y \to -\infty$ as $x \to -\infty$; $y \to -\infty$ as $x \to \infty$
11. 

12. $(-\infty, -3) \cup (2, 3)$
13. $x = 3, x = -3$
14. $y = \frac{9}{5}$
15. 

16. $x = 0$
17. $\frac{A}{x + 5} + \frac{B}{x + 7} + \frac{C}{(x + 7)^2}$
18. $\frac{3}{x - 2} + \frac{3x - 4}{x^2 + 6}$