2. Determine the equation of the line passing through $(-3, 7)$ and $(-1, -5)$. Show all work. Express your answer in slope-intercept form.

Equation: _____ (3pts)

3. a. Find the radius of the circle that passes through the point $(3, 7)$ and has its center at $(-1, 4)$. Show all work.

Radius: _____ (1pt)

b. Find the equation of that circle. Express your answer in center-radius form.

Equation: _____ (2pts)

$2(x-4) < 3 - 5(2x+1)$

_____ (2pts)

7. Given $f(x) = 3x^2 - 6x + 4$ and $g(x) = x^2 - 3x - 10$, find $(f - g)(x)$ and state the domain of $(f - g)(x)$ in interval notation.

$(f - g)(x) = $ _____ (2pts)

Domain of $(f - g)(x)$: _____ (1pt)

x-axis, and shifted down 4 units.

_____ (3pts)

11. For the graph of $f(x) = -2x^2 - 24x - 64$, state the coordinates of the vertex.

_____ (2pts)

12. Find the EXACT zeros of $f(x) = x^2 - 4x - 41$ algebraically.

_____ (3pts)

13. Solve and write interval notation for the solution set: $|x+4| > 5$

_____ (3pts)

15. Find the exact solution(s): $\dfrac{2}{x+5} + \dfrac{1}{x-5} = \dfrac{16}{x^2-25}$

_____ (3pts)

16. Determine the leading term, the leading coefficient, and the degree of the polynomial. Then classify the polynomial function as constant, linear, quadratic, cubic, or quartic.

$$f(x) = 4x^3 - 7x^2 + \dfrac{2}{3}x - 6$$

Leading term: _____ (1pt)   Leading coefficient: _____ (1pt)

Degree of the polynomial: _____ (1pt)   Classify the function: _____ (1pt)

17. a. Graph the function using the given viewing window [-10, 10, -30, 20]. Determine all relative maxima and minima of the function. Round answers to two decimal places.

$$f(x) = 0.2x^3 - 0.2x^2 - 5x - 4$$

Maxima: _____ (1pt)

Minima: _____ (1pt)

b. Determine the interval(s) where $f(x)$ is increasing. Write your answer in interval notation.

Increasing: _____ (1pt)

19. The data in the following table shows healthcare costs in the U.S. between 1990 and 2013.

Year, x	Cost (per person), y
1990, 0	$1,947
1996, 6	$3,157
2002, 12	$4,330
2007, 17	$5,774
2013, 23	$7,114

a) Using your graphing calculator, find the R^2 value for each model. Round answers to 4 decimal places, and let x= 0 represent year 1990. **(2pts)**

   Linear: _____

   Quartic: _____

b) Based on the R^2 value, which function is the best fit? _____ (1pt)

c) Using your graphing calculator, find the leading term for each model. Round answers to 4 decimal places.

   Linear: _____   **(2pts)**

   Quartic: _____

d) Based on the end-behavior of each model, is the function you chose in part b) appropriate? Give a reason for your answer.

_____ (2pts)

a.   Domain in interval notation.   _____(1pt)

b.   Equation of the vertical asymptote: _____(1pt)

d.   Equation of the oblique asymptote: _____(1pt)

f. $y-$ intercept as an ordered pair: _____ (1pt)

22.   Find the critical values and solve the inequality. Give the solution in interval notation.

$$\frac{x-3}{x+2} \le 0$$

_____ (4pts)

25. Solve the logarithmic equations algebraically. Write solution(s) in exact form.

$$\log_3(x+5)+\log_3(x-5)=2$$

26. Jennifer recently graduated and landed a new job earning $34,000. Even though retirement is not in her immediate future, she remembers her math teacher stressing the benefits of investing over a long period of time. Jennifer decided to invest $3,400. Assuming that she earns 5% compounded quarterly, how much money will Jennifer have in her account upon her retirement 42 years later? $B = P\left(1+\dfrac{r}{n}\right)^{nt}$

29. Use two variables to solve this problem and show your work:

Kathy inherited $3,000 and invested it in two municipal bonds that pay 2% and 4% simple interest. The annual interest is $100. Find the amount invested at each rate.

Amount at 2%:_____

Amount at 4%:_____ (4pts)

$$\begin{bmatrix} 5 & \dfrac{x}{2} \\ 2y & -8 \end{bmatrix} = \begin{bmatrix} 5 & 3 \\ -2 & -8 \end{bmatrix}$$

$x =$ _____ (1pt)

$y =$ _____ (1pt)