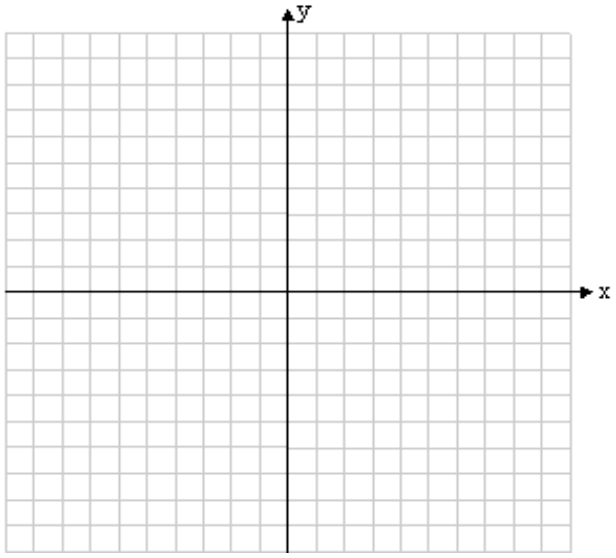
Name: _____ Date: _____

Calculus AB: Summer Packet Review

Directions: Answer the following questions and show all necessary work needed to arrive at the answer.

1. Let $g(x) = -\sqrt{x-3}+2$

Determine what transformations have taken place from the graph $f(x) = \sqrt{x}$ to create $g(x)$ and list these transformations next to the graph. Then draw a sketch of the graph of $g(x)$ on the coordinate plane.



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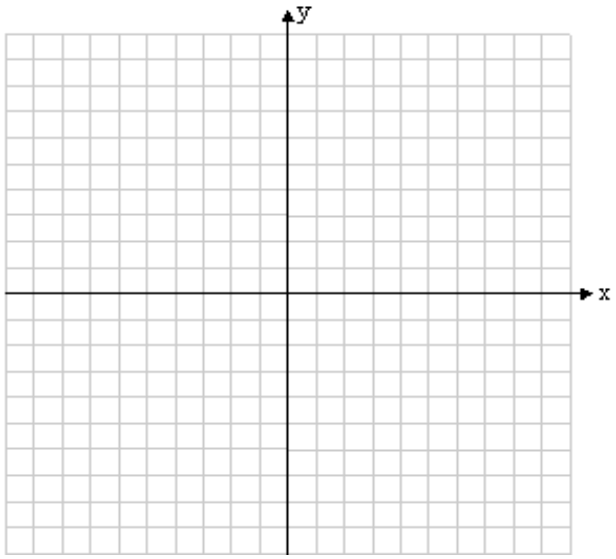
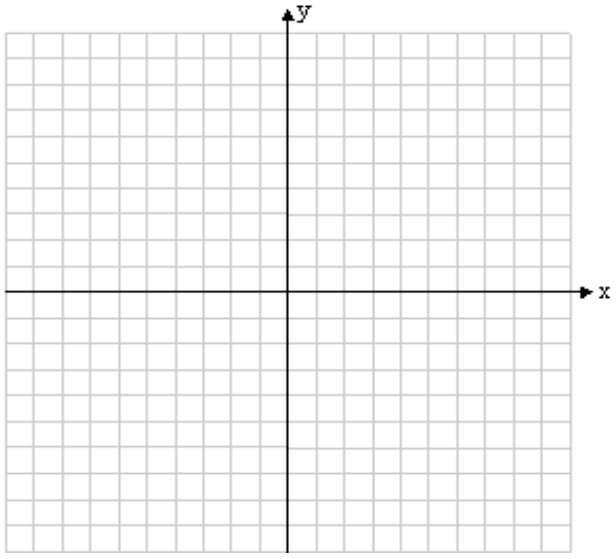
2. Let $g(x) = -(x+2)^2 - 3$

Determine what transformations have taken place from the graph $f(x) = x^2$ to create $g(x)$ and list these transformations next to the graph. Then draw a sketch of the graph of $g(x)$ on the coordinate plane.



3. Let $g(x)=(x-4)^3-3$

Determine what transformations have taken place from the graph $f(x)=x^3$ to create $g(x)$ and list these transformations next to the graph. Then draw a sketch of the graph of $g(x)$ on the coordinate plane.



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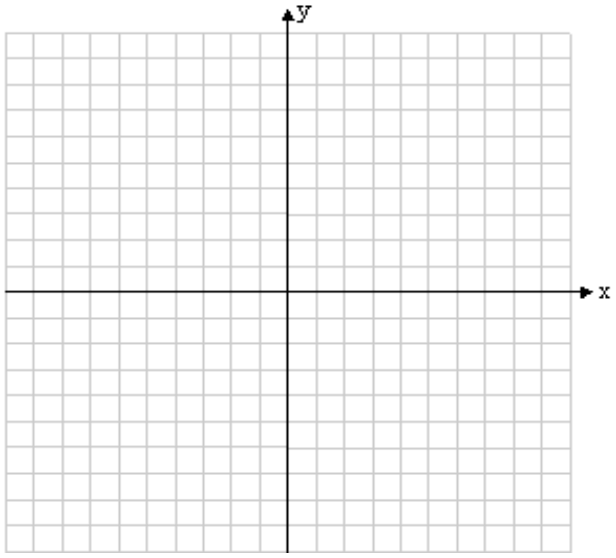
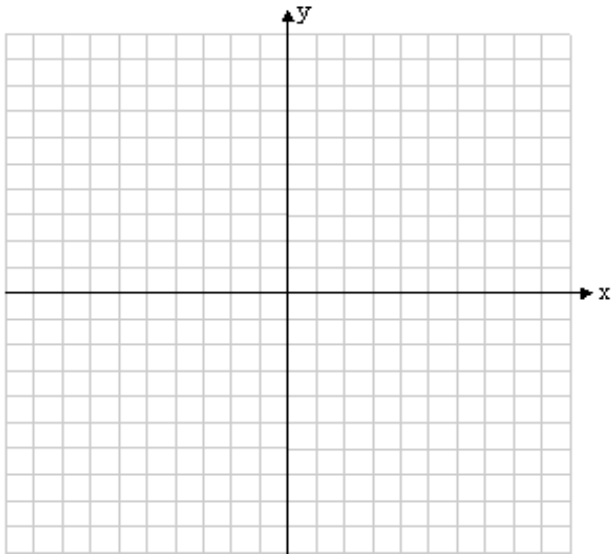
4. Let $g(x)=\ln(x+4)+2$

Determine what transformations have taken place from the graph $f(x)=\ln x$ to create $g(x)$ and list these transformations next to the graph. Then draw a sketch of the graph of $g(x)$ on the coordinate plane.



5. Let $g(x) = -e^{(x-3)} - 5$

Determine what transformations have taken place from the graph $f(x) = e^x$ to create $g(x)$ and list these transformations next to the graph. Then draw a sketch of the graph of $g(x)$ on the coordinate plane.



Directions: Answer questions 6 – 11 and show all necessary work needed to arrive at the answer.

6. Solve: $2x^2 + 4x - 30 = 0$

7. Solve: $8x^2 + 2x = 3$

8. Solve: $2x^4 - 18x^2 = 0$

9. Solve: $4x^3 - 22x^2 = 12x$

10. Factor: $2x^5 + 16x^2$

11. Factor: $3x^4 - 81x$

Directions: Answer the following questions 12 - 23. You need to be acutely aware of the unit circle or the special reference triangles.

12. Evaluate: $\sin\left(\frac{\pi}{2}\right)$ **13.** Evaluate: $\cos\left(\frac{\pi}{6}\right)$ **14.** Evaluate: $\tan\left(\frac{\pi}{4}\right)$

15. Evaluate: $\sin\left(\frac{3\pi}{2}\right)$ **16.** Evaluate: $\cos\left(\frac{\pi}{3}\right)$ **17.** Evaluate: $\tan(0)$

18. Evaluate: $\csc\left(\frac{3\pi}{4}\right)$ **19.** Evaluate: $\sec\left(\frac{\pi}{6}\right)$ **20.** Evaluate: $\cot\left(\frac{\pi}{2}\right)$

21. Evaluate: $\csc\left(\frac{5\pi}{6}\right)$ **22.** Evaluate: $\sec\left(\frac{7\pi}{6}\right)$ **23.** Evaluate: $\cot\left(\frac{7\pi}{4}\right)$

Directions: Answer the following questions 24 – 32 concerning limits and show all necessary work needed to arrive at the answer.

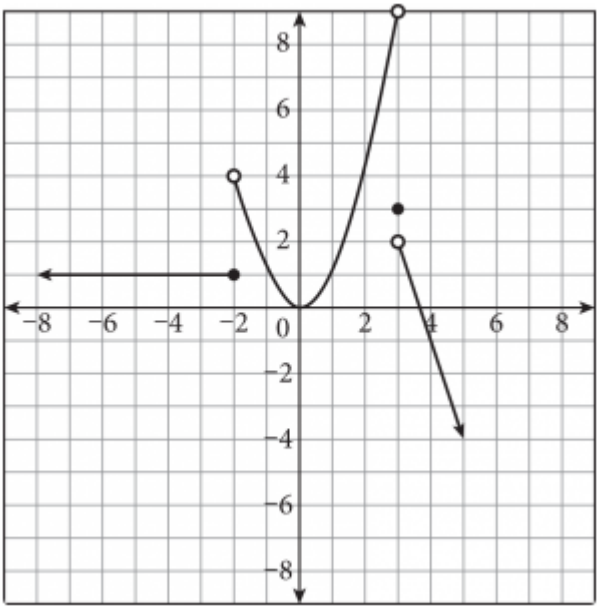
24. $\lim_{x\to 0} x^2 - 4x + 3$ **25.** $\lim_{x\to -3} x^2 - 4x + 3$ **26.** $\lim_{x\to 2} \frac{x^2-4}{x-2}$

27. $\lim_{x\to 0} \dfrac{3x^3+x^2-4x}{x}$ **28.** $\lim_{x\to 1} \dfrac{x-1}{3x^3+x^2-4x}$ **29.** $\lim_{x\to 0} 3-\dfrac{2}{x}$

30. $\lim_{x\to \infty} \dfrac{3x^2-4x}{x^2+4}$ **31.** $\lim_{x\to \infty} \dfrac{x^3-1}{x^2-1}$ **32.** $\lim_{x\to \infty} \dfrac{x^2-9}{x^4-3x^3+x^2}$

Directions: Answer the following questions 33 – 41 concerning limits based on the graph provided.

$$f(x)=\begin{cases} 1, & \text{if } x \le -2 \\ x^2, & \text{if } -2 < x < 3 \\ 3, & \text{if } x = 3 \\ -3x+11, & \text{if } x > 3 \end{cases}$$



33. $\lim_{x\to -2^-} f(x) =$

34. $\lim_{x\to -2^+} f(x) =$

35. $\lim_{x\to -2} f(x) =$

36. $\lim_{x\to -\infty} f(x) =$ **37.** $\lim_{x\to \infty} f(x) =$ **38.** $\lim_{x\to 3^-} f(x) =$

39. $\lim_{x\to -2^-} f(x) =$ **40.** $\lim_{x\to 3^+} f(x)$ **41.** $f(3)$

Directions: Answer questions 42 – 44 and show all necessary work needed to arrive at the answer.

42. Write the equation of the line in point slope form and slope intercept form that goes through the point $(2,-6)$ and is parallel to the line $3x-2y=8$.

43. Write the equation of the line in point slope form and slope intercept form that goes through the points $(4,-3)$ and $(-2,-5)$.

44. Write the equation of the line in point slope form and slope intercept form that goes through the point $(-3,-4)$ and is perpendicular to the line $3x-2y=4$.

Directions: Answer questions 45 – 47 concerning evaluating functions and show all necessary work needed to arrive at the answer.

45. If $f(x)=2x^2-5x+2$ find the value or simplify as much as possible:

a) $f(-3)$ **b)** $f(2)$ **c)** $f(t)$ **d)** $f(x+h)$ **e)** $f(-1+h)$

46. If $g(x)=x^3-x^2-2x-3$ find the value or simplify as much as possible:

a) $f(-3)$ **b)** $f(2)$ **c)** $f(t)$ **d)** $f(x+h)$ **e)** $f(-1+h)$

47. If $f(x)=\sqrt{9-x^2}$ find the value or simplify as much as possible:

a) $f(-3)$ **b)** $f(2)$ **c)** $f(t)$ **d)** $f(x+h)$ **e)** $f(-1+h)$

48. Determine what types of discontinuities exist in the function below and answer the questions concerning the function. Then draw a rough sketch graph of the function.

$$g(x)=\frac{x^2-25}{2x^2+7x-15}$$

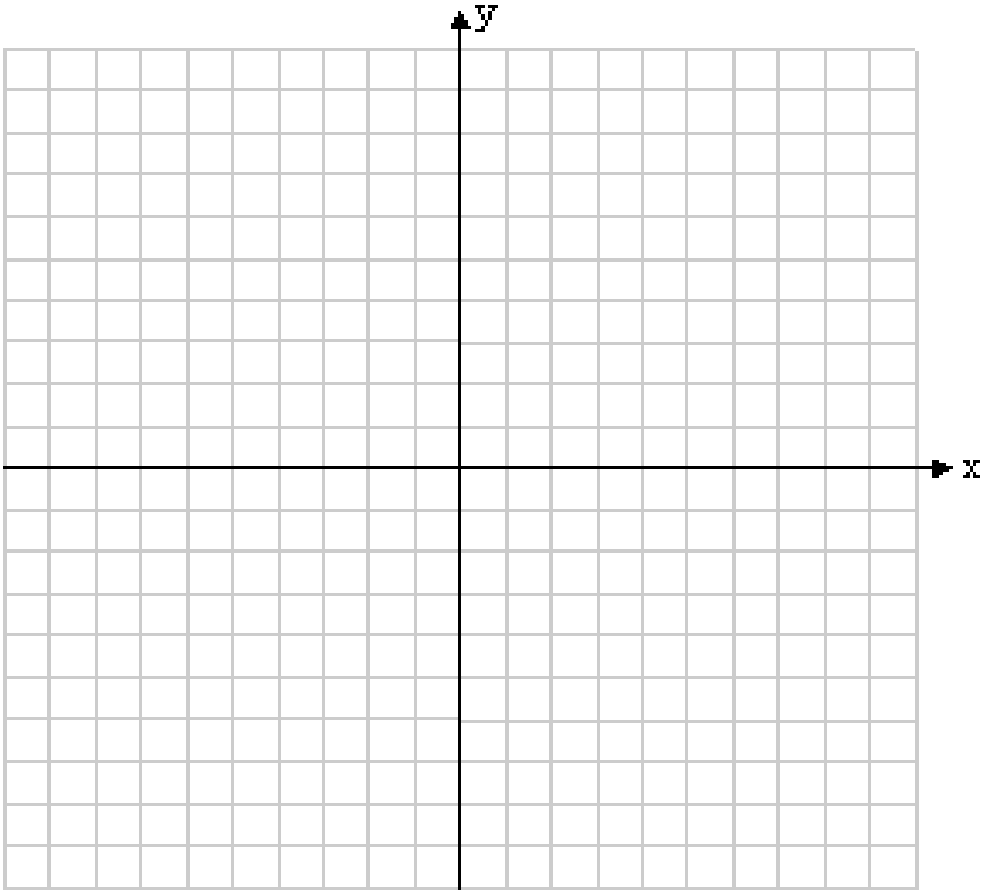
Hole(s): _____

Vertical Asymptote(s): _____

Horizontal Asymptote(s): _____

X Intercept(s): _____

Y Intercept: _____



49. What is the mathematical name for the average rate of change and what is the formula that is used to find the average rate of change?

50. Evaluate: e^0 **51. Evaluate:** $\ln 1$ **52. Evaluate:** $\ln e$

53. Express $\sqrt[3]{x^2}$ **using rational exponents.**

54. Express $\dfrac{4x^{-3}y^2}{6z^{-2}w^4}$ **using positive exponents.**

55. Write the Limit Definition of a derivative formula.