Name: Newton, Isaac

Student ID: 8675309

Instructor: J. Brennan

Signature: _____

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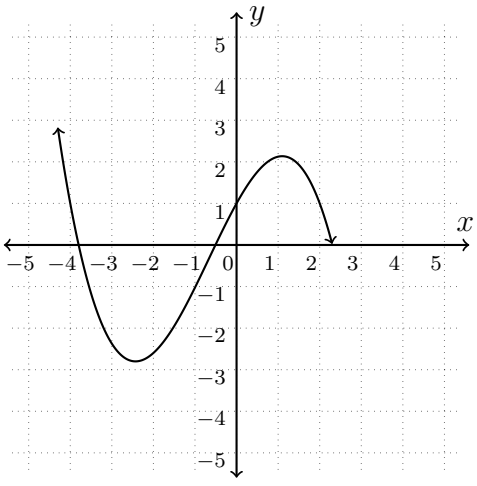
Instructions:

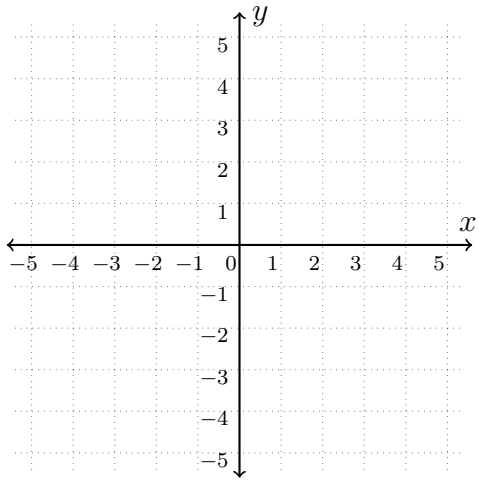
1. Any cover page materials, per your departmental standards.

(1) **(4 points)** What is the inverse of $\begin{bmatrix} -4 & 5 \\ -7 & 1 \end{bmatrix}$?

(2) **(4 points)** What is the derivative of $2x^3 - 7x^2 - 6x + 8$?

(3) **(4 points)** Sketch the derivative of the function $f(x)$.





(4) **(4 points)** A particle is moving along the curve $x^2 - 4y^2 = 0$. As the particle passes through the point $(4, 2)$, it's x-coordinate increases at a rate of 2cm/sec.

(a) How fast is the y-value of the particle changing at this instant?

(b) What is the distance of the particle to the origin at this instant?

(c) How fast is the distance from the particle to the origin changing at this instant?

(5) **(4 points)** Complete the piecewise function, and use that to evaluate the given limit.

$$|t-6| = \begin{cases} & \text{when } t \geq 6 \\ & \\ & \text{when } t < 6 \end{cases}$$

$$\lim_{t \to 6^-} \frac{5(t-6)}{|t-6|}$$

(6) **(4 points)** Evaluate the following limit.

$$\lim_{x \to 4} \frac{5x - 20}{x^2 - 7x + 12}$$

(7) **(4 points)** Consider the limit $\lim_{x\to 2} \dfrac{\sqrt{x^2+6}-\sqrt{4x+2}}{x-2}$.

(a) What is the conjugate of the numerator?

(b) Evaluate the limit.

(8) **(4 points)** Compute $\frac{dy}{dx}$ for $y = x^{x^3+3\cos(x)}$.

Name: Ramanujan, Srinivasa

Student ID: 8675310

Instructor: J. Brennan

Signature: _____

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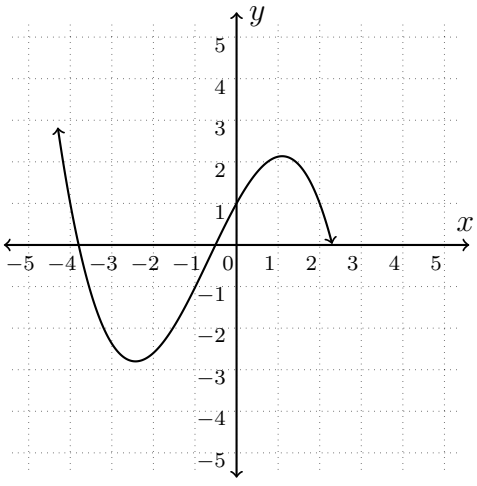
Instructions:

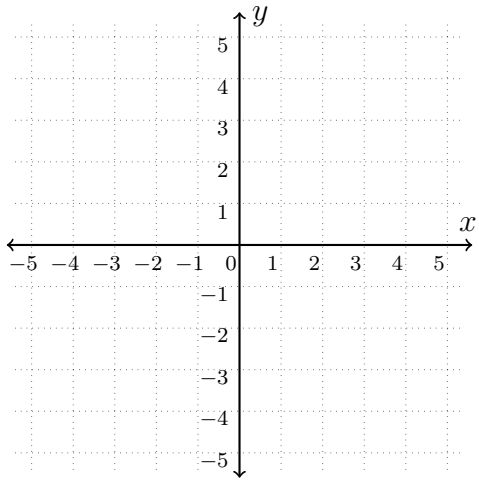
1. Any cover page materials, per your departmental standards.

(1) **(4 points)** What is the inverse of $\begin{bmatrix} -4 & 9 \\ -1 & 2 \end{bmatrix}$?

(2) **(4 points)** What is the derivative of $6x^3 - 8x^2 - 2x + 8$?

(3) **(4 points)** Sketch the derivative of the function $f(x)$.





(4) **(4 points)** A particle is moving along the curve $x^2+4y^2=13$. As the particle passes through the point $(3,-1)$, it's x-coordinate increases at a rate of 4cm/sec.

(a) How fast is the y-value of the particle changing at this instant?

(b) What is the distance of the particle to the origin at this instant?

(c) How fast is the distance from the particle to the origin changing at this instant?

(5) **(4 points)** Complete the piecewise function, and use that to evaluate the given limit.

$$|6-t| = \begin{cases} & \text{when } t \geq 6 \\ & \\ & \text{when } t < 6 \end{cases}$$

$$\lim_{t \to 6^+} \frac{2(t-6)}{|6-t|}$$

(6) **(4 points)** Evaluate the following limit.

$$\lim_{x \to 1} \frac{2x-2}{x^2+x-2}$$

(7) **(4 points)** Consider the limit $\lim_{x\to 1} \dfrac{\sqrt{x^2+5}-\sqrt{5x+1}}{x-1}$.

(a) What is the conjugate of the numerator?

(b) Evaluate the limit.

(8) **(4 points)** Compute $\frac{dy}{dx}$ for $y = x^{e^{2x}-2\sin(x)}$.

Name: Turing, Alan

Student ID: 8675311

Instructor: I. Crump

Signature: _____

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Instructions:

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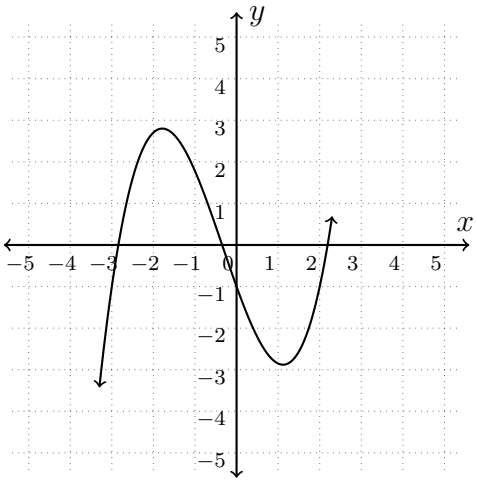
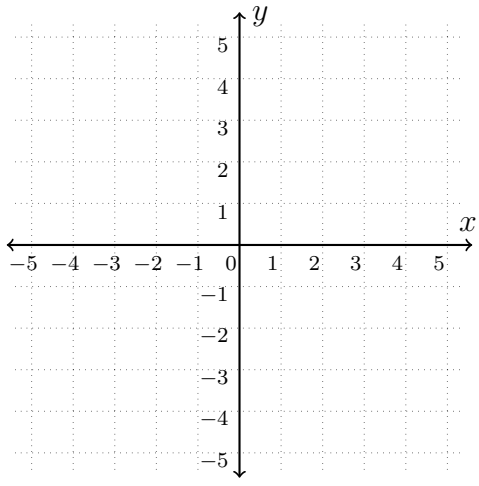
(1) **(4 points)** What is the inverse of $\begin{bmatrix} 4 & 7 \\ -5 & 3 \end{bmatrix}$?

(2) **(4 points)** What is the derivative of $2x^3 - 6x^2 - 9x + 10$?

(3) **(4 points)** Sketch the derivative of the function $f(x)$.





(4) **(4 points)** A particle is moving along the curve $x^2 - y^2 = -3$. As the particle passes through the point $(1, -2)$, it's x-coordinate increases at a rate of 5cm/sec.

(a) How fast is the y-value of the particle changing at this instant?

(b) What is the distance of the particle to the origin at this instant?

(c) How fast is the distance from the particle to the origin changing at this instant?

(5) **(4 points)** Complete the piecewise function, and use that to evaluate the given limit.

$$|t-4| = \begin{cases} & \text{when } t \geq 4 \\ & \\ & \text{when } t < 4 \end{cases}$$

$$\lim_{t \to 4^-} \frac{6(t-4)}{|t-4|}$$

(6) **(4 points)** Evaluate the following limit.

$$\lim_{x \to 3} \frac{5x-15}{x^2+x-12}$$

(7) **(4 points)** Consider the limit $\lim_{x\to 5} \dfrac{\sqrt{x^2+24}-\sqrt{10x-1}}{x-5}$.

(a) What is the conjugate of the numerator?

(b) Evaluate the limit.

(8) **(4 points)** Compute $\frac{dy}{dx}$ for $y = x^{x^4-2\cos(x)}$.

Name: Von Neumann, John

Student ID: 8675312

Instructor: J. Niknejad

Signature: _____

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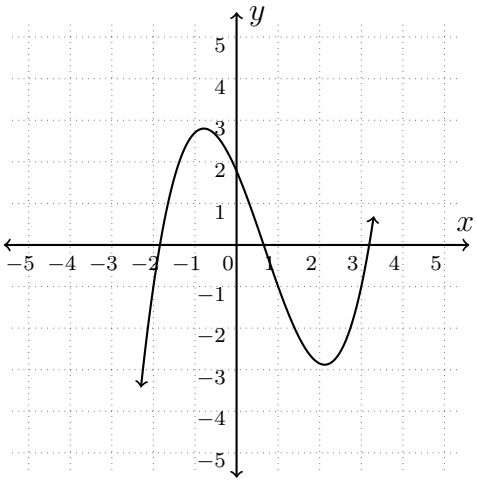
Instructions:

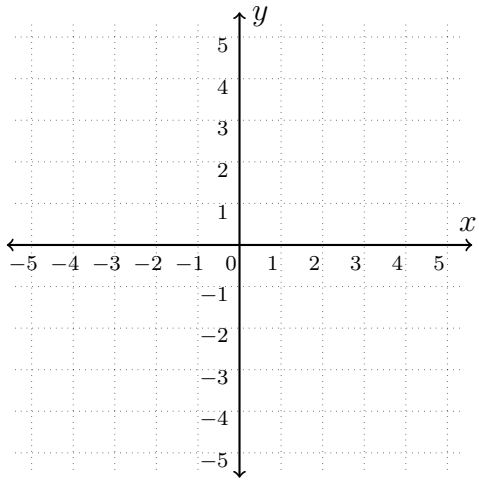
1. Any cover page materials, per your departmental standards.

(1) **(4 points)** What is the inverse of $\begin{bmatrix} 6 & 9 \\ -5 & 3 \end{bmatrix}$?

(2) **(4 points)** What is the derivative of $4x^3 - 8x^2 - 9x + 7$?

(3) **(4 points)** Sketch the derivative of the function $f(x)$.





(4) **(4 points)** A particle is moving along the curve $x^2 + 2y^2 = 9$. As the particle passes through the point $(1, -2)$, it's x-coordinate increases at a rate of 4cm/sec.

(a) How fast is the y-value of the particle changing at this instant?

(b) What is the distance of the particle to the origin at this instant?

(c) How fast is the distance from the particle to the origin changing at this instant?

(5) **(4 points)** Complete the piecewise function, and use that to evaluate the given limit.

$$|7-t| = \begin{cases} & \text{when } t \geq 7 \\ & \\ & \text{when } t < 7 \end{cases}$$

$$\lim_{t \to 7^+} \frac{4|7-t|}{(7-t)}$$

(6) **(4 points)** Evaluate the following limit.

$$\lim_{x \to 1} \frac{x^2 + 2x - 3}{3x - 3}$$

(7) **(4 points)** Consider the limit $\lim_{x\to 1} \dfrac{\sqrt{x^2+4}-\sqrt{6x-1}}{x-1}$.

(a) What is the conjugate of the numerator?

(b) Evaluate the limit.

(8) **(4 points)** Compute $\frac{dy}{dx}$ for $y = x^{e^{2x}-4\cos(x)}$.

Name: Euler, Leonhard

Student ID: 8675313

Instructor: J. Niknejad

Signature: _____

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Instructions:

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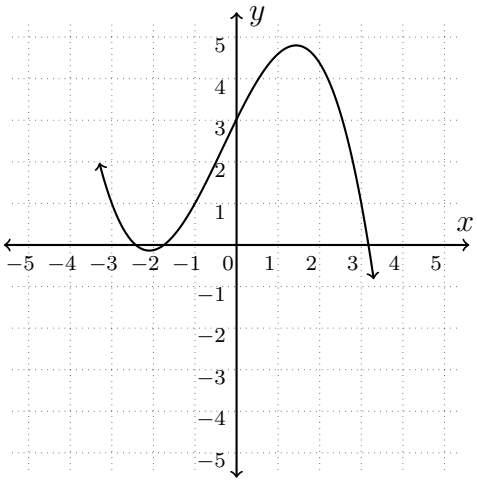
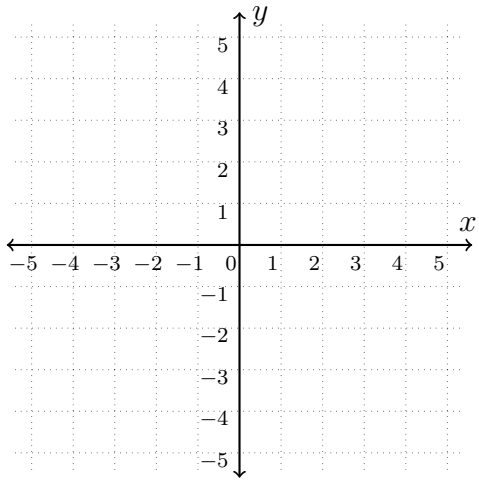
(1) **(4 points)** What is the inverse of $\begin{bmatrix} -6 & 3 \\ -3 & 1 \end{bmatrix}$?

(2) **(4 points)** What is the derivative of $5x^3 - 4x^2 - 5x + 7$?

(3) **(4 points)** Sketch the derivative of the function $f(x)$.





(4) **(4 points)** A particle is moving along the curve $x^2+2y^2=11$. As the particle passes through the point $(3,1)$, it's x-coordinate increases at a rate of 5cm/sec.

(a) How fast is the y-value of the particle changing at this instant?

(b) What is the distance of the particle to the origin at this instant?

(c) How fast is the distance from the particle to the origin changing at this instant?

(5) **(4 points)** Complete the piecewise function, and use that to evaluate the given limit.

$$|t-4| = \begin{cases} & \text{when } t \geq 4 \\ & \\ & \text{when } t < 4 \end{cases}$$

$$\lim_{t \to 4^-} \frac{|t-4|}{2(4-t)}$$

(6) **(4 points)** Evaluate the following limit.

$$\lim_{x \to 2} \frac{6x-12}{x^2-2x}$$

(7) **(4 points)** Consider the limit $\lim_{x\to 2} \dfrac{\sqrt{x^2+8}-\sqrt{7x-2}}{x-2}$.

(a) What is the conjugate of the numerator?

(b) Evaluate the limit.

(8) **(4 points)** Compute $\frac{dy}{dx}$ for $y = x^{x^3+3\cos(x)}$.

Name: Leibniz, Gottfried

Student ID: 8675314

Instructor: I. Crump

Signature: _____

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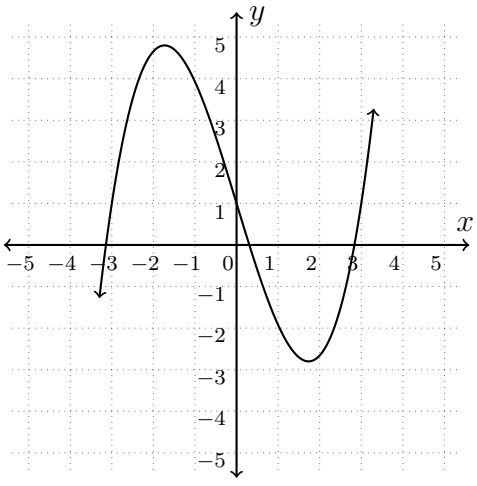
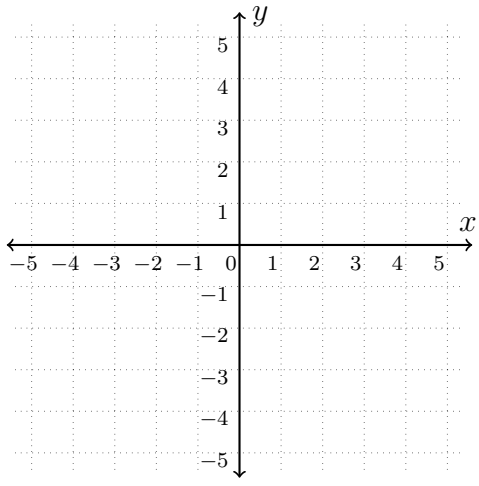
(1) **(4 points)** What is the inverse of $\begin{bmatrix} 4 & 5 \\ -3 & 4 \end{bmatrix}$?

(2) **(4 points)** What is the derivative of $5x^3 - 5x^2 - 2x + 10$?

(3) **(4 points)** Sketch the derivative of the function $f(x)$.





(4) **(4 points)** A particle is moving along the curve $xy = 8$. As the particle passes through the point $(4, 2)$, it's x-coordinate increases at a rate of 2cm/sec.

(a) How fast is the y-value of the particle changing at this instant?

(b) What is the distance of the particle to the origin at this instant?

(c) How fast is the distance from the particle to the origin changing at this instant?

(5) **(4 points)** Complete the piecewise function, and use that to evaluate the given limit.

$$|t-2| = \begin{cases} & \text{when } t \geq 2 \\ & \\ & \text{when } t < 2 \end{cases}$$

$$\lim_{t \to 2^-} \frac{|t-2|}{6(t-2)}$$

(6) **(4 points)** Evaluate the following limit.

$$\lim_{x \to 3} \frac{x^2 - 4x + 3}{6x - 18}$$

(7) **(4 points)** Consider the limit $\lim_{x\to 4} \dfrac{\sqrt{x^2+14}-\sqrt{8x-2}}{x-4}$.

(a) What is the conjugate of the numerator?

(b) Evaluate the limit.

(8) **(4 points)** Compute $\frac{dy}{dx}$ for $y = x^{e^{2x}-3\cos(x)}$.

Name: Babbage, Charles

Student ID: 8675315

Instructor: _____

Signature: _____

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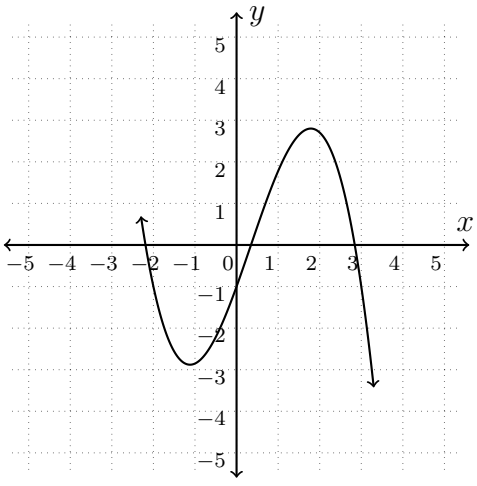
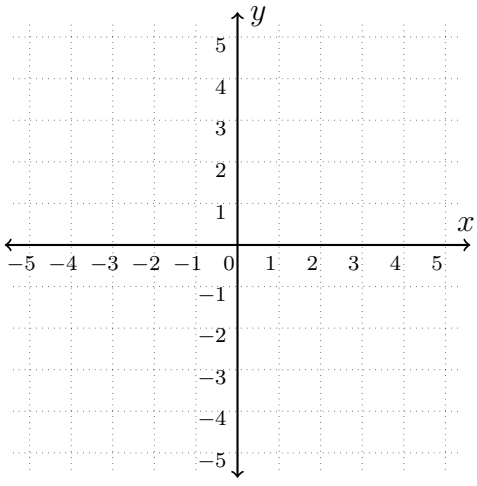
(1) **(4 points)** What is the inverse of $\begin{bmatrix} -6 & 9 \\ -7 & 3 \end{bmatrix}$?

(2) **(4 points)** What is the derivative of $6x^3 - 9x^2 - 3x + 7$?

(3) **(4 points)** Sketch the derivative of the function $f(x)$.





(4) **(4 points)** A particle is moving along the curve $x^2 - 2y^2 = 8$. As the particle passes through the point $(4, 2)$, it's x-coordinate increases at a rate of 3cm/sec.

(a) How fast is the y-value of the particle changing at this instant?

(b) What is the distance of the particle to the origin at this instant?

(c) How fast is the distance from the particle to the origin changing at this instant?

(5) **(4 points)** Complete the piecewise function, and use that to evaluate the given limit.

$$|2-t| = \begin{cases} & \text{when } t \geq 2 \\ & \\ & \text{when } t < 2 \end{cases}$$

$$\lim_{t \to 2^+} \frac{4(2-t)}{|2-t|}$$

(6) **(4 points)** Evaluate the following limit.

$$\lim_{x \to 1} \frac{x^2 - 3x + 2}{5x - 5}$$

(7) **(4 points)** Consider the limit $\lim_{x\to 3} \dfrac{\sqrt{x^2+14}-\sqrt{7x+2}}{x-3}$.

(a) What is the conjugate of the numerator?

(b) Evaluate the limit.

(8) **(4 points)** Compute $\frac{dy}{dx}$ for $y = x^{e^{2x}+2\cos(x)}$.

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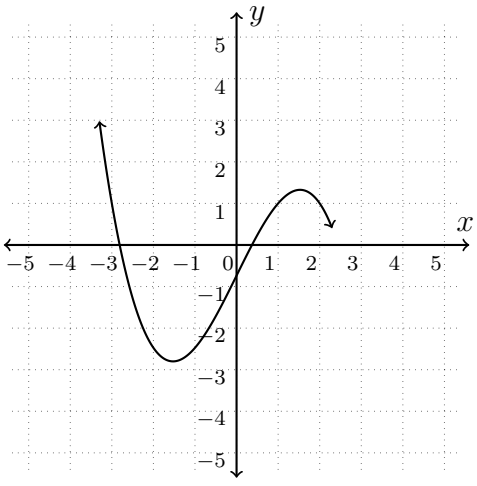
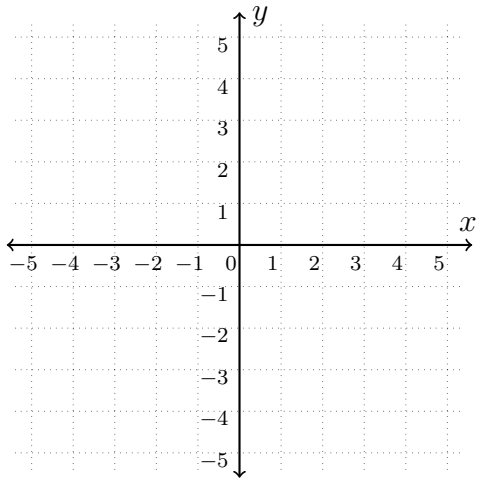
(2) **(4 points)** What is the derivative of $3x^3 - 3x^2 - 6x + 11$?

(3) **(4 points)** Sketch the derivative of the function $f(x)$.





(4) **(4 points)** A particle is moving along the curve $x^2 - y^2 = 5$. As the particle passes through the point $(3, 2)$, it's x-coordinate increases at a rate of 5cm/sec.

(a) How fast is the y-value of the particle changing at this instant?

(b) What is the distance of the particle to the origin at this instant?

(c) How fast is the distance from the particle to the origin changing at this instant?

(5) **(4 points)** Complete the piecewise function, and use that to evaluate the given limit.

$$|6-t| = \begin{cases} & \text{when } t \geq 6 \\ & \\ & \text{when } t < 6 \end{cases}$$

$$\lim_{t \to 6^+} \frac{|6-t|}{2(6-t)}$$

(6) **(4 points)** Evaluate the following limit.

$$\lim_{x \to 4} \frac{x^2 - x - 12}{5x - 20}$$

(7) **(4 points)** Consider the limit $\lim_{x\to 2} \dfrac{\sqrt{x^2+7}-\sqrt{6x-1}}{x-2}$.

(a) What is the conjugate of the numerator?

(b) Evaluate the limit.

(8) **(4 points)** Compute $\frac{dy}{dx}$ for $y = x^{e^{3x}+3\sin(x)}$.

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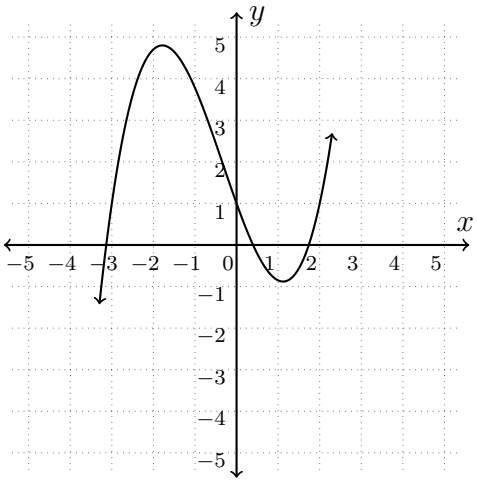
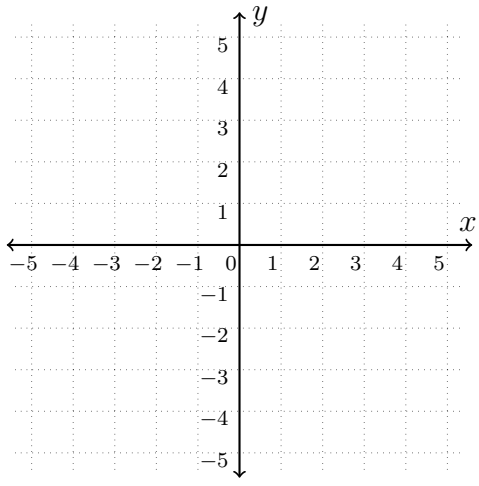
(3) **(4 points)** Sketch the derivative of the function $f(x)$.





(4) **(4 points)** A particle is moving along the curve $x^2+3y^2=19$. As the particle passes through the point $(4,1)$, it's x-coordinate increases at a rate of 2cm/sec.

(a) How fast is the y-value of the particle changing at this instant?

(b) What is the distance of the particle to the origin at this instant?

(c) How fast is the distance from the particle to the origin changing at this instant?

(5) **(4 points)** Complete the piecewise function, and use that to evaluate the given limit.

$$|2-t| = \begin{cases} & \text{when } t \geq 2 \\ & \\ & \text{when } t < 2 \end{cases}$$

$$\lim_{t \to 2^+} \frac{|2-t|}{6(t-2)}$$

(6) **(4 points)** Evaluate the following limit.

$$\lim_{x \to 1} \frac{6x-6}{x^2-4x+3}$$

(7) **(4 points)** Consider the limit $\lim_{x\to 4} \dfrac{\sqrt{x^2+21}-\sqrt{9x+1}}{x-4}$.

(a) What is the conjugate of the numerator?

(b) Evaluate the limit.

(8) **(4 points)** Compute $\frac{dy}{dx}$ for $y = x^{x^4+3\cos(x)}$.

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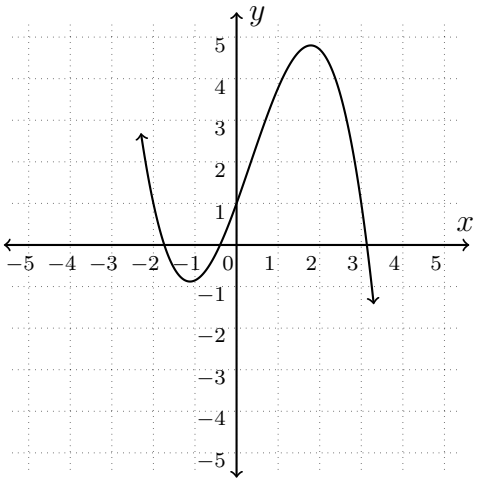
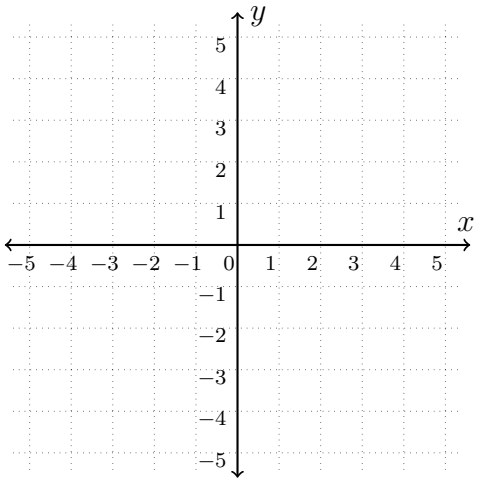
(2) **(4 points)** What is the derivative of $3x^3 - 3x^2 - 10x + 5$?

(3) **(4 points)** Sketch the derivative of the function $f(x)$.





(4) **(4 points)** A particle is moving along the curve $x^2 - y^2 = -3$. As the particle passes through the point $(1, -2)$, it's x-coordinate increases at a rate of 3cm/sec.

(a) How fast is the y-value of the particle changing at this instant?

(b) What is the distance of the particle to the origin at this instant?

(c) How fast is the distance from the particle to the origin changing at this instant?

(5) **(4 points)** Complete the piecewise function, and use that to evaluate the given limit.

$$|t-6| = \begin{cases} & \text{when } t \geq 6 \\ & \\ & \text{when } t < 6 \end{cases}$$

$$\lim_{t \to 6^-} \frac{(6-t)}{3|t-6|}$$

(6) **(4 points)** Evaluate the following limit.

$$\lim_{x \to 5} \frac{x^2 - 8x + 15}{4x - 20}$$

(7) **(4 points)** Consider the limit $\lim_{x\to 1} \dfrac{\sqrt{x^2+5}-\sqrt{4x+2}}{x-1}$.

(a) What is the conjugate of the numerator?

(b) Evaluate the limit.

(8) **(4 points)** Compute $\frac{dy}{dx}$ for $y = x^{x^4+2\sin(x)}$.