SAINT JOSEPH'S
PHILADELPHIA'S JESUIT UNIVERSITY

Calculus Readiness Test
Saint Joseph's University

There is no time limit for this test (though we do track how long it takes you). You should be able to complete the test within one hour. Please select the best answers for the questions below. If you decide to change an answer, just select the new answer prior to submitting your final results. Only submit the test once you have answered all the questions and are ready to finish. You may use scratch paper, but you may not use a calculator.

If not all the images appear, hit reload and allow the page to finish loading before beginning the exam.

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1. Suppose the population of a city doubles every twenty years from the year 1900 to the year 2000. If P_0 is the population of the city in 1900, how large is the population in 1960?

Answers

A) $6P_0$ B) $8P_0$ C) $64P_0$ D) $60P_0$

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2. If $x + 2y = 1$ and $3x - 2y = 3$, then $x =$

Answers

A) 3 B) 0 C) -1 D) 1

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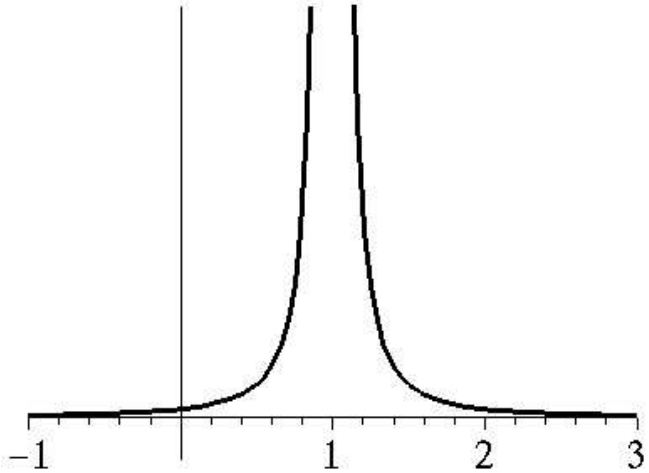
3. Of the following, which best represents the graph of $y = \dfrac{1}{x-1}$?

Answers

A)



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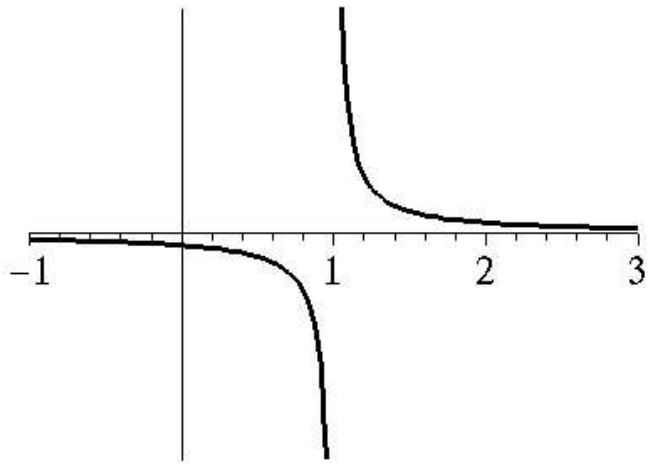

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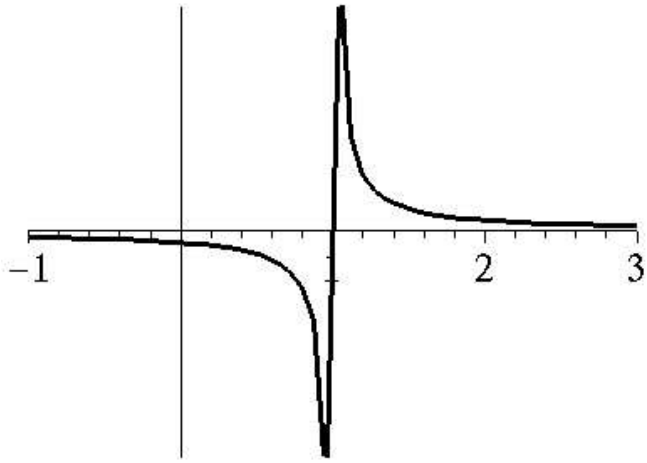

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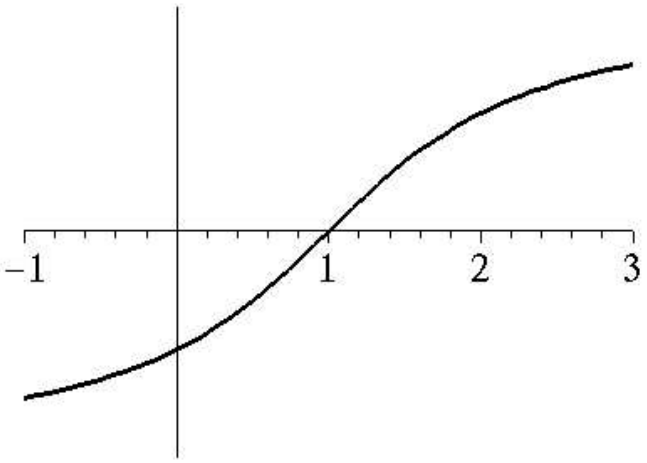

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4. Simplify

$$\frac{(3x^2y^{-1})^2}{-x^2y^{-4}}.$$

Answers

A) $9x^2y^2$ B) $-9x^2y^2$ C) $9x^2y^{-6}$ D) $-9x^6y^{-6}$

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5. Simplify

$$8^{x-1}\,2^{3-2x}$$

Answers

A) 4^x B) 2^x C) 16^{2-x} D) 1

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6. If the length and width of a rectangle that has an area of 6 square inches are each increased by 1 inch, by how much is its area increased?

Answers

A) The answer cannot be determined from the information given. B) 6 in^2 C) 8 in^2 D) 12 in^2

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7. Simplify

$$\frac{3}{x+1}+\frac{1}{x-1}$$

$\frac{3}{x+1} + \frac{1}{x-1}$

Answers

A) $\frac{4x-2}{x^2-1}$ B) $\frac{2}{x}$ C) $\frac{3}{x^2-1}$ D) $\frac{2x}{x^2-1}$

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8. Solve the following equation for x.

$$\sqrt{x^2+16} = 5$$

Answers

A) $x = 1$ B) $x = 3$ or $x = -3$ C) $x = 0$ D) $x = 1$ or $x = -1$

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9. Solve the following equation for x.

$$(x-1)(3x-5) = 1.$$

Answers

A) $x = 2$ or $x = 2/3$ B) $x = 2$ only C) $x = 2$ or $x = 0$ D) $x = 2$ or $x = 4/3$

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10. Simplify $\frac{1}{-9^{-1/2}}$.

Answers

A) $-1/3$ B) $1/3$ C) -3 D) $-2/9$

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11. Solve the following equation for x.

$$\frac{x-4}{(x-2)(x-3)} = 0.$$

Answers

A) $x = 0$, $x = 2$, $x = 3$, or $x = 4$

B) $x = 2$ or $x = 3$

C) $x = 2$, $x = 3$, or $x = 4$

D) $x = 4$

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12. If $f(x) = \dfrac{x}{x+1}$, what is $f(x-1)$?

Answers

A) $\dfrac{x-1}{x+1}$

B) $\dfrac{x}{x+1} - 1$

C) $\dfrac{x-1}{x}$

D) $\dfrac{x}{x-1}$

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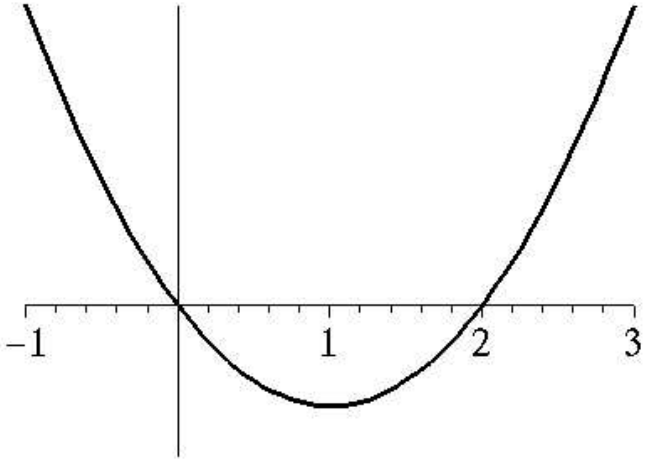
13. If f is a function whose graph is the parabola shown, then $f(x) \leq 0$ whenever



Answers

A) $x \geq 2$ or $x \leq 0$

B) $0 \leq x \leq 2$

C) $x \leq 0$

D) $x \leq 1$

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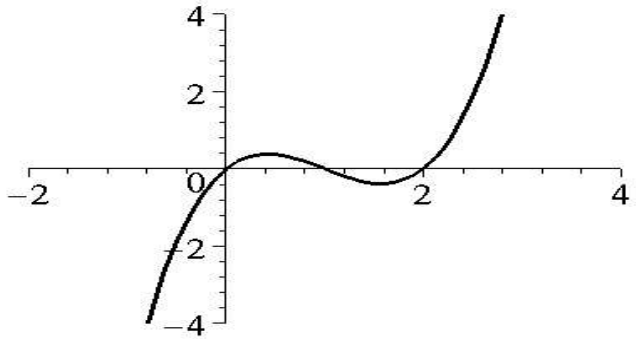
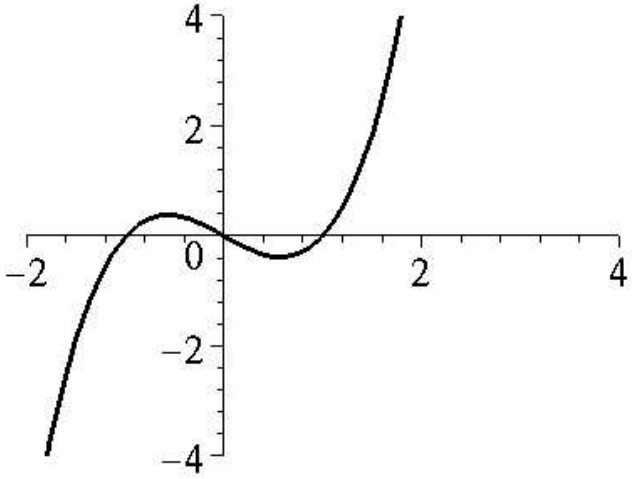
14. If the graph of f is sketched to the right, which of the following best represents the graph of $f(x) - 1$?



Answers

A)



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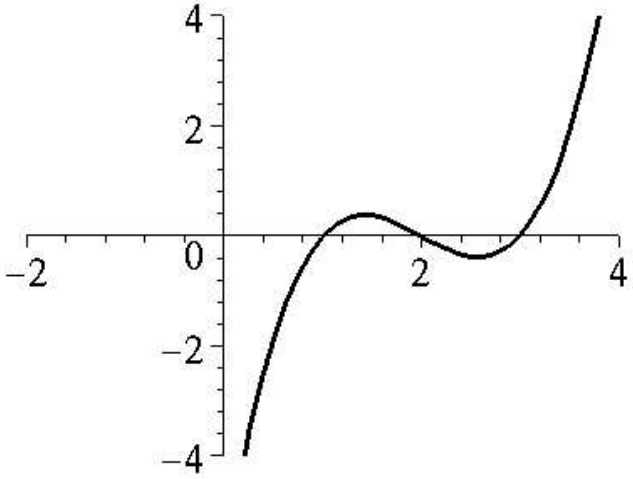

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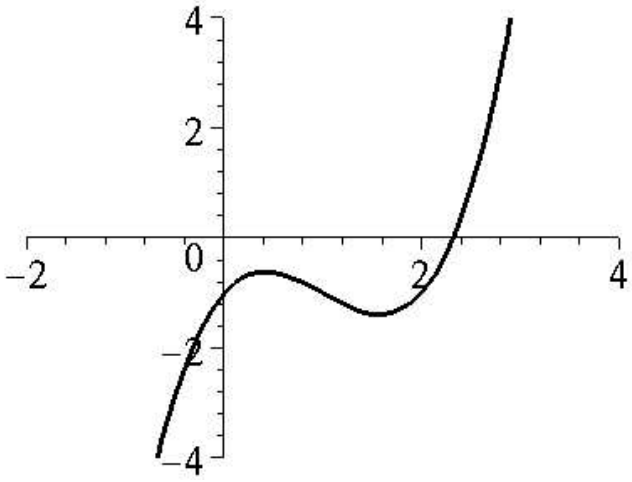

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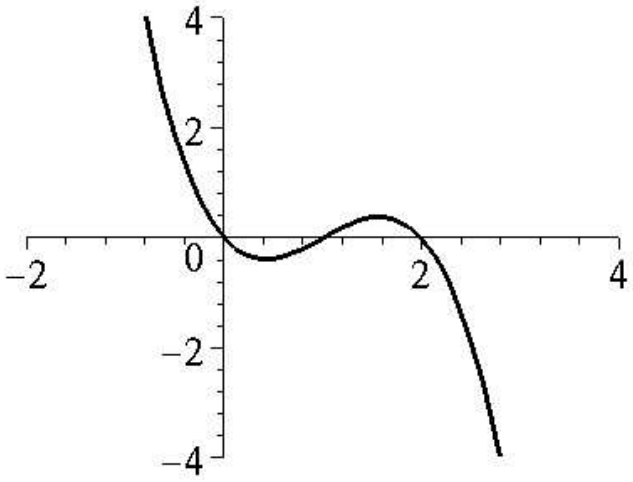

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15. If $3^x = 2$, then $x =$

Answers

A) $\log_3 2$ B) $2/3$ C) $\log_2 3$ D) -1

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16. The inequality $|x + 1| > 2$ is equivalent to

Answers

A) $x > 1$ or $x < -1$ B) $x > 1$ C) $x > 1$ or $x < -3$ D) $x > -3$

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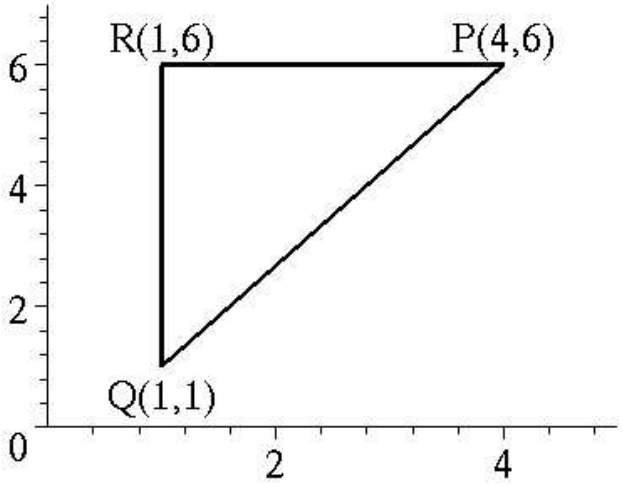
17. In the figure shown to the right, what is the distance between the points P and Q?



Answers

A) 6 B) $\sqrt{34}$ C) 4 D) 8

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18. The graph of $y = x^2 + 5x + 4$ intercepts the y -axis at $y =$

Answers

A) 4 B) -4 and -1 C) 4 and 0 D) 0

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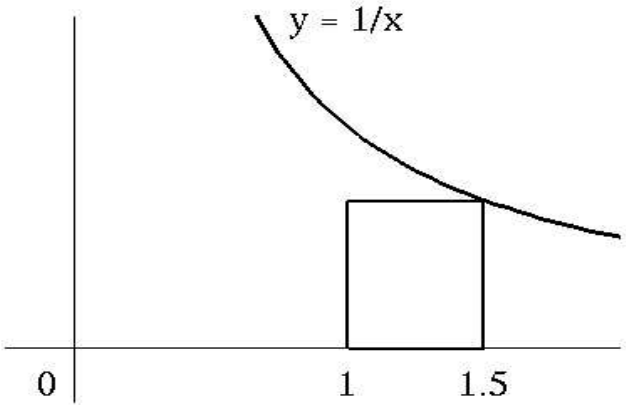
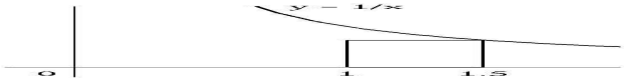
19. The area of the rectangle in the figure shown equals





Answers

A) $1/3$ B) $1/2$ C) $2/3$ D) $3/4$

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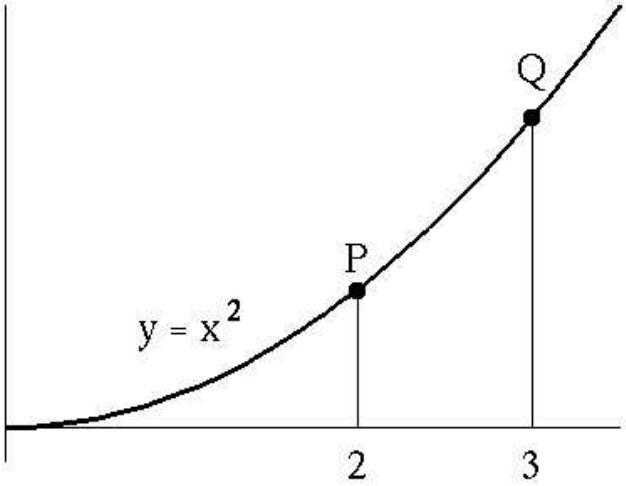
20. Which of the following represents the slope of the line through P and Q?



Answers

A) 9/4 B) 1 C) 2 D) 5

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21. Simplify:

$$\sin^3\theta + \sin\theta\cos^2\theta$$

Answers

A) $\cos\theta$ B) $2\sin\theta$ C) $\sin\theta$ D) $\sin 4\theta \cos 2\theta$

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22. If θ is an angle in radians such that $0 \le \theta < 2\pi$ and $\sin\theta = -\cos\theta$, then $\theta =$

Answers

A) $\frac{\pi}{3}$ or $\frac{\pi}{6}$ B) $\frac{3\pi}{4}$ C) $\frac{3\pi}{4}$ or $\frac{7\pi}{4}$ D) $\frac{\pi}{2}$ or $\frac{3\pi}{2}$

23. Simplify:

$$\tan\theta \sin^2\theta \cos\theta \csc^2\theta$$

Answers

A) $\csc\theta$ B) $\cos\theta$ C) $\sec\theta$ D) $\sin\theta$

24. For which of the following values of x (in radians) is $\tan x$ **not** defined?

(I) 0

(II) $\frac{\pi}{2}$

(III) π

(IV) $\frac{3\pi}{2}$

Answers

A) (II) and (IV) B) (II) C) (I) and (III) D) $\tan x$ is defined for all of the above values.

25. If $f(x) = \cos 2x$, where x is in radians, then $f(3\pi/2) =$

Answers

A) 1 B) -1 C) $\frac{1}{4}$ D) $\frac{1}{2}$

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