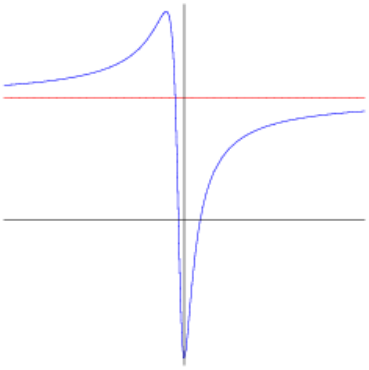
Week 4 Tuesday Homework (1319732)

Question **12345678910111213141516171819 20**

1. Question DetailsSCalcET6 2.6.AE.03. [679892]



Video Example

Online Textbook

EXAMPLE 3 Evaluate the limit below and indicate which properties of limits are used at each stage.

$$\lim_{x\to\infty}\frac{7x^2-4x-2}{4x^2+2x+1}$$

SOLUTION As x becomes large, both numerator and denominator become large, so it isn't obvious what happens to their ratio. We need to do some preliminary algebra.

To evaluate the limit at infinity of any rational function, we first divide both numerator and denominator by the highest power of x that occurs in the denominator. (We may assume that $x \neq 0$, since we are interested only in large values of x.) In this case the highest power of x in the denominator is x^2, so we have

$$\lim_{x\to\infty}\frac{7x^2-4x-2}{4x^2+2x+1} = \lim_{x\to\infty}\frac{\frac{7x^2-4x-2}{x^2}}{\frac{4x^2+2x+1}{x^2}}$$

$$= \lim_{x\to\infty}\frac{7-\frac{4}{x}-\frac{2}{x^2}}{4+\frac{2}{x}+\frac{1}{x^2}}$$

$$= \frac{\lim_{x\to\infty}\left(7-\frac{4}{x}-\frac{2}{x^2}\right)}{\lim_{x\to\infty}\left(4+\frac{2}{x}+\frac{1}{x^2}\right)}$$

$$= \frac{\lim_{x\to\infty}7-4\lim_{x\to\infty}\frac{1}{x}-2\lim_{x\to\infty}\frac{1}{x^2}}{\lim_{x\to\infty}4+2\lim_{x\to\infty}\frac{1}{x}+\lim_{x\to\infty}\frac{1}{x^2}}$$

$$= \frac{7 - \square - \square}{4 + \square + \square}$$

$$= \frac{\square}{\square}$$

A simple calculation shows that the limit as $x \to -\infty$ is also $\square$. The figure illustrates the results of these calculations by showing how the graph of the given rational function approaches the horizontal asymptote $y =$ $\square$.

2. Question DetailsSCalcET6 2.6.AE.06. [679842]

Video Example

Online Textbook

EXAMPLE 6 Evaluate the following limit.

$$\lim_{x\to 0^-} e^{2/x}$$

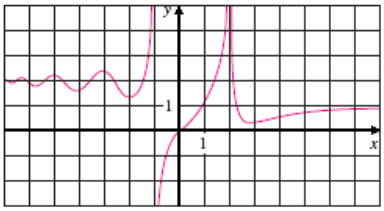
SOLUTION If we let $t = 2/x$, we know that $t \to -\infty$ as $x \to 0^-$. Therefore,

$$\lim_{x\to 0^-} e^{2/x} = \lim_{t\to-\infty} e^t = \square$$

3. Question DetailsSCalcET6 2.6.Tut.03. [697541]

4. Question DetailsSCalcET6 2.6.Tut.11. [697535]

5. Question DetailsSCalcET6 2.6.003. [679716]
For the function *f* whose graph is given, state the following. (If you need to use -∞ or ∞, enter -INFINITY or INFINITY.)



(a) $\lim_{x \to 2} f(x) =$ ____

(b) $\lim_{x \to -1^-} f(x) =$ ____

(c) $\lim_{x \to -1^+} f(x) =$ ____

(d) $\lim_{x \to \infty} f(x) =$ ____

(e) $\lim_{x \to -\infty} f(x) =$ ____

(f) the equations of the asymptotes

x = ____ (smaller value)

x = ____ (larger value)

y = ____ (smaller value)

y = ____ (larger value)

---

6. Question DetailsSCalcET6 2.6.015. [795703]
Find the limit. (If you need to use -∞ or ∞, enter -INFINITY or INFINITY. If an answer does not exist, enter DNE.)

$$\lim_{x \to \infty} \frac{1}{5x + 6}$$

____

---

7. Question DetailsSCalcET6 2.6.017. [1359860]
Find the limit. (If you need to use -∞ or ∞, enter -INFINITY or INFINITY, If an answer does not exist, enter DNE.)

$$\lim_{x \to -\infty} \frac{1 - x - x^2}{5x^2 - 9}$$

____

---

8. Question DetailsSCalcET6 2.6.018. [795710]
Find the limit. (If you need to use -∞ or ∞, enter -INFINITY or INFINITY. Enter your answer as a fraction. If an answer does not exist, enter DNE.)

$$\lim_{y \to \infty} \frac{4 - 5y^2}{5y^2 + 6y}$$

____

---

9. Question DetailsSCalcET6 2.6.020. [1336596]
Find the limit. (If you need to use -∞ or ∞, enter -INFINITY or INFINITY.)

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

____

---

10. Question DetailsSCalcET6 2.6.023. [679777]
Find the limit. (If you need to use -∞ or ∞, enter -INFINITY or INFINITY.)

$$\lim_{x \to \infty} \frac{\sqrt{9x^6 - x}}{x^3 + 2}$$

____

---

11. Question DetailsSCalcET6 2.6.026. [679702]
Find the limit. (If you need to use -∞ or ∞, enter -INFINITY or INFINITY.)

$$\lim_{x \to -\infty} \left(x + \sqrt{x^2 + 4x} \right)$$

____

12. Question DetailsSCalcET6 2.6.039. [679752]
Find the horizontal and vertical asymptotes of the curve.

$$y = \frac{8x + 6}{x - 8}$$

x = ☐

y = ☐

---

13. Question DetailsSCalcET6 2.6.042. [795713]
Find the horizontal and vertical asymptotes of the curve.

$$y = \frac{9 + x^4}{x^2 - x^4}$$

x = ☐ (smallest value)

x = ☐

x = ☐ (largest value)

y = ☐

---

14. Question DetailsSCalcET6 2.6.048. [656832]
Find a formula for a function that has vertical asymptotes $x = 1$ and $x = 3$ and horizontal asymptote $y = 1$.

- ○ $f(x) = \frac{x^2 - 2x + 3}{x^2}$
- ○ $f(x) = \frac{x^2 - 4x + 3}{x^2}$
- ○ $f(x) = \frac{x^2}{x^2 - 2x + 3}$
- ○ none of these are correct
- ○ $f(x) = \frac{x^2}{x^2 - 4x + 3}$
- ○ $f(x) = \frac{x^2}{x^2 - \frac{7}{2}x + 3}$

---

15. Question DetailsSCalcET6 2.7.AE.01. [1288824]

Video Example

Online Textbook

EXAMPLE 1 Find an equation of the tangent line to the parabola $y = x^2$ at the point $P(4, 16)$.

SOLUTION Here we have $a = 4$, and $f(x) = x^2$, so the slope is

$$m = \lim_{x \to 4} \frac{f(x) - f(4)}{x - 4}$$

$$= \lim_{x \to 4} \frac{\square}{x - 4}$$

$$= \lim_{x \to 4} \frac{(x - 4)(\square)}{x - 4}$$

$$= \lim_{x \to 4} (\square)$$

$$= \square + 4 = \square$$

Using the point slope form of the equation of a line, we find an equation of the tangent line at (4, 16) is

y - ☐ = ☐ (x - ☐)

or y = ☐ x - ☐

16. Question DetailsSCalcET6 2.7.AE.04. [1289559]

Video Example

Online Textbook

EXAMPLE 4 Find the derivative of the function $f(x) = x^2 - 3x + 8$ at the number a.

SOLUTION From the definition we have

$$f'(a) = \lim_{h \to 0} \frac{f(a + h) - f(a)}{h}$$

$$= \lim_{h \to 0} \frac{[\ \square\ - 3(a + h) + 8] - [a^2 - 3a + 8]}{h}$$

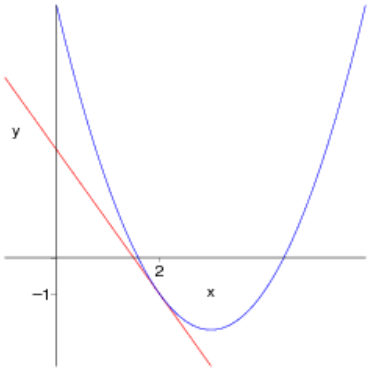
$$= \lim_{h \to 0} \frac{a^2 + \square\ - 3a - 3h + 8 - a^2 + 3a - 8}{h}$$

$$= \lim_{h \to 0} \frac{\square}{h}$$

$$= \lim_{h \to 0} (\ \square\ )$$

$$= \square$$

17. Question DetailsSCalcET6 2.7.AE.05. [679825]



Video Example

Online Textbook

EXAMPLE 5 Find an equation of the tangent line to the parabola $y = x^2 - 6x + 7$ at the point (2, -1).

SOLUTION From the previous example, we know the derivative of $f(x) = x^2 - 6x + 7$ at the number a is $f'(a) = 2a - 6$. Therefore the slope of the tangent line at (2, -1) is $f'(2) = 2(2) - 6 =$ $\square$. Thus an equation of the tangent line, shown in the figure, is

$y - (\ \square\ ) = \square\ (x - \square\ )$

or $y = \square\ x + 3$

18. Question DetailsSCalcET6 2.7.Tut.01. [697554]

19. Question DetailsSCalcET6 2.7.Tut.03. [697536]

20. Question DetailsSCalcET6 2.7.Tut.04. [697539]

Assignment Details

Name (AID): **Week 4 Tuesday Homework (1319732)**

Submissions Allowed: **5**

Category: **Homework**

Code:

Locked: **No**

Author: **Jernigan, John (** jjernigan@ccp.edu **)**

Last Saved: **Jul 20, 2010 06:49 PM EDT**

Permission: **Protected**

Randomization: **Person**

Which graded: **Last**

Feedback Settings

Before due date	**After due date**
Question Score	Question Score
Assignment Score	Assignment Score
Publish Essay Scores	Publish Essay Scores
Question Part Score	Key
Mark	Question Part Score
Add Practice Button	Solution
Help/Hints	Mark
Response	Add Practice Button
Save Work	Help/Hints
	Response