

answers to cpcalc final exam review packet - Microsoft Word Viewer

File Edit View Tools Window Help

cpcalculus final review packet

7. Evaluate using the properties of definite integrals

i) $\int_{-5}^8 f(x) dx = -1$; $\int_{-5}^2 f(x) dx = 5$; find $\int_2^8 f(x) dx = -6$

ii) $\int_3^{15} f(x) dx = 3$; $\int_3^{-4} f(x) dx = 11$; find $\int_{-4}^{15} f(x) dx = -8$

iii) $\int_{-7}^6 f(x) dx = -1$; $\int_{-7}^2 f(x) dx = 7$; find $\int_2^6 -5 f(x) dx = ?$ 40

$\int_2^6 f dx = \int_2^{-7} f dx + \int_{-7}^6 f dx$

$-5 \int_2^6 = -5 \left[\int_2^{-7} f dx + \int_{-7}^6 f dx \right]$

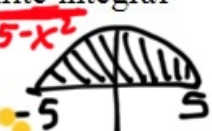
$= -5(-8)$

Created with Doceri

Start 100% 7:41 AM 6/12/2013

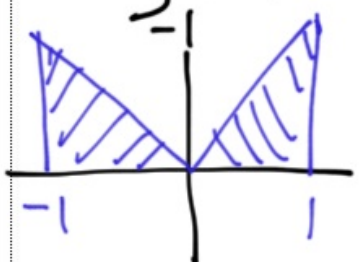
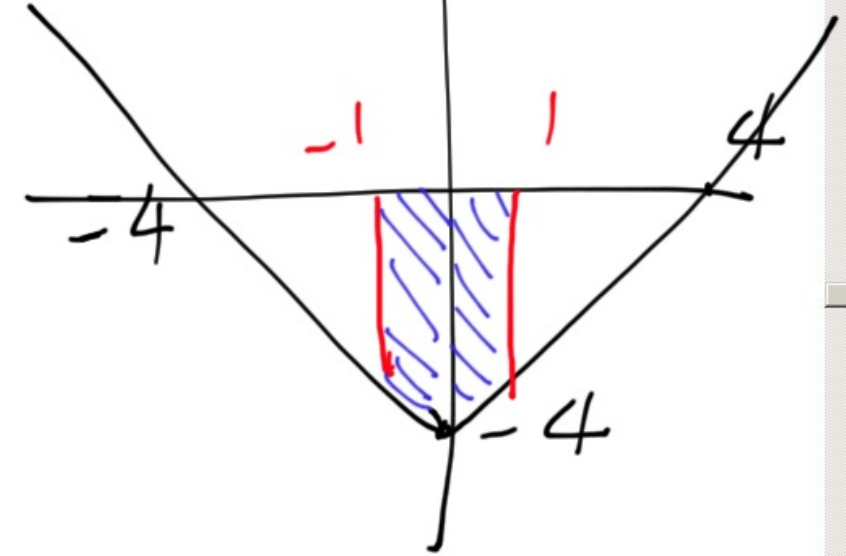
9. Evaluate the definite integral

a)
$$= \frac{-25\pi}{2} - \int_{-5}^5 \sqrt{25-x^2} dx$$

$$= \frac{-25\pi}{2}$$


b) Answer = -7

$$= \int_{-1}^1 |x| dx - 4 \int_{-1}^1 dx$$

$$= 1 - 8 = -7$$



Created with Doceri

answers to cpcalc final exam review packet - Microsoft Word Viewer

cpcalculus final review packet

10. Find the area bounded by the function $f(x)$ and the x-axis on the given interval using RRAM.

$\left\{ \sum_{i=1}^n 1 = n; \sum_{i=1}^n i = \frac{n(n+1)}{2}; \sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}; \sum_{i=1}^n i^3 = \frac{n^2(n+1)^2}{4} \right\}$

$f(x) = 1+x^2; [-1, 2]$

$\Delta x = \frac{b-a}{n} = \frac{2-(-1)}{n} = \frac{3}{n}$

$x_i = a + (\Delta x)_i = -1 + \frac{3i}{n}$

$A = \lim_{n \rightarrow \infty} \sum_{i=1}^n \Delta x f(x_i)$

$A = \lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{3}{n} \left[1 + \left(-1 + \frac{3i}{n} \right)^2 \right]$

$\sum = \frac{3}{n} \left[2 - \frac{6i}{n} + \frac{9i^2}{n^2} \right]$

$\sum = \left[\frac{6}{n} - \frac{18}{n^2} \sum i + \frac{27}{n^3} \sum i^2 \right]$

$= 6 - 9 + 9$

$= 6$

Area = 6

Created with Doceri

7:56 AM 6/12/2013

cpcalculus final review packet

5. Evaluate the indefinite integral (choose either one to be graded)

$$\int_0^{\pi} (\cos x) * \cos(\sin x) dx = \sin 1 \text{ or}$$

$$\frac{d}{dx} \int_{\sqrt{x}}^{x^2-3x} \{ \sin t - \ln t \} dt = -\frac{\sin \sqrt{x} - \ln x}{2\sqrt{x}} + (2x-3) \{ \sin(x^2-3x) - \ln(x^2-3x) \}$$

$u = \sin x \Rightarrow \frac{du}{dx} = \cos x$
 $du = \cos x dx = \cos u du = \sin(\sin x)$
 $= \sin 1 - 0$

$$\int_{\sqrt{x}}^{x^2-3x} \frac{1}{\sqrt{x}} \{ \sin \sqrt{x} - \ln \sqrt{x} \} dx$$

$$= \frac{1}{2\sqrt{x}} [\sin \sqrt{x} - \ln \sqrt{x}] + (2x-3) [\sin(x^2-3x) - \ln(x^2-3x)]$$

Created with Doceri

Page: 35 of 45 Words: 614 English (U.S.) 160% 8:10 AM 6/12/2013

answers to cpcalc final exam review packet [Compatibility Mode] - Microsoft Word

File Home Insert Page Layout References Mailings Review View Add-Ins Acrobat Table Tools Design Layout

Times New Rom: 12 A A Aa abc A

Paste B I U abc x₂ x² ab A A

Clipboard Font Paragraph Styles

AaBbCcI AaBbC AaBbCcI A Change Styles Editing

Emphasis Heading 1 Normal

7. Solve the differential equation with the given point on the graph of the function f(x):

$$\int dx \frac{dy}{dx} = (2x - \sin \frac{x}{2}) dx \Rightarrow y = x^2 + 2 \cos \frac{x}{2}$$

$$\Rightarrow y = \int (2x - \sin \frac{x}{2}) dx = x^2 + 2 \cos(\frac{x}{2}) + C = Y = 2$$

$$2 + C = 2$$

Created with Doceri

Page: 37 of 45 Words: 614 English (U.S.) 160%

Start e W P Ps X

EN 100%

8:24 AM 6/12/2013

8. Use the Fundamental Theorems of Calculus and the properties learned:

If $\int_{-2}^3 f(t) dt = 1$, find

a) $\int_{-2}^3 -10f(t) dt = -10$

b) $\int_{-2}^3 \{6 + f(t)\} dt = 31$

c) $\int_3^{-2} \frac{\{1 - f(t)\}}{10} dt = \frac{2}{5}$

$= \frac{1}{10} \left[\int_3^{-2} 1 dx - \int_3^{-2} f dt \right] = \frac{1}{10} [-4]$

$\times \int_3^{-2} = -5 = -\frac{5}{2}$

Created with Doceri

Page: 38 of 45 | Words: 614 | English (U.S.) | 160% | 8:31 AM 6/12/2013

final review answers cpcalculus - Microsoft Word

File Home Insert Page Layout References Mailings Review View Add-Ins Acrobat TableTools Design Layout

Clipboard Font Paragraph Styles

a) $g(0) = 9/2; g'(0) = 1$
 b) max at $x = 3$
 c) abs min at $x = -4$
 d) POI $x = -3, 1, 2$

Graph of f

The graph of the function f shown above consists of a semicircle and three line segments. Let g be the function given by $\frac{d}{dx} \int_{-3}^x f(t) dt = f(x)$.

(a) Find $g(0)$ and $g'(0)$. $g'(0) = f(0) = 1$

(b) Find all values of x in the open interval $(-5, 4)$ at which g attains a relative maximum. Justify your answer. $g' = f(x) = 0$

(c) Find the absolute minimum value of g on the closed interval $[-5, 4]$. Justify your answer.

Created with Doceri

Page: 8 of 9 Words: 615 English (U.S.) 150%

Start e W P Ps X Start EN 97% 11:38 AM 6/12/2013

final review answers cpcalculus - Microsoft Word

File Home Insert Page Layout References Mailings Review View Add-Ins Acrobat TableTools Design Layout

Clipboard Font Paragraph Styles Editing

$a) g(0) = 9/2; g'(0) = 1$
 $b) \text{max at } x = 3$
 $c) \text{abs min at } x = -4$
 $d) \text{POI } x = -3, 1, 2$

Graph of f

The graph of the function f shown above consists of a semicircle and three line segments. Let g be the function given by $g(x) = \int_{-3}^x f(t) dt$.

(a) Find $g(0)$ and $g'(0)$.

(b) Find all values of x in the open interval $(-5, 4)$ at which g attains a relative maximum. Justify your answer.

(c) Find the absolute minimum value of g on the closed interval $[-5, 4]$. Justify your answer.

Page: 8 of 9 Words: 615 English (U.S.) 150%

Created with Doceri

Start e W P Ps X File Σ 97% 11:38 AM 6/12/2013

final review answers cpcalculus - Microsoft Word

File Home Insert Page Layout References Mailings Review View Add-Ins Acrobat TableTools Design Layout

Clipboard Font Paragraph Styles Editing

$a) g(0) = 7/2, g'(0) = 1$
 $b) \max at x = 3$
 $c) \text{abs min at } x = -4$
 $d) \text{POI } x = -3, 1, 2$

Graph of f

The graph of the function f shown above consists of a semicircle and three line segments. Let g be the function given by $g(x) = \int_{-3}^x f(t) dt$.

(a) Find $g(0)$ and $g'(0)$.

(b) Find all values of x in the open interval $(-5, 4)$ at which g attains a relative maximum. Justify your answer.

(c) Find the absolute minimum value of g on the closed interval $[-5, 4]$. Justify your answer.

(d) Find all values of x in the open interval $(-5, 4)$ at which the graph of g has a point of inflection.

Created with Doceri

Page: 8 of 9 Words: 615 English (U.S.) 150%

Start e W P Ps X Start EN 97% 11:50 AM 6/12/2013

final review answers cpcalculus - Microsoft Word

File Home Insert Page Layout References Mailings Review View Add-Ins Acrobat Table Tools Design Layout

Clipboard Font Paragraph Styles Editing

$a) g(0) = 9/2; g'(0) = 1$
 $b) \max_{atx} = 3$
 $c) \text{abs min}_{atx} = -4$
 $d) \text{POI}_{x} = -3, 1, 2$

Graph of f

The graph of the function f shown above consists of a semicircle and three line segments. Let g be the function given by $g(x) = \int_{-3}^x f(t) dt$.

(a) Find $g(0)$ and $g'(0)$.

(b) Find all values of x in the open interval $(-5, 4)$ at which g attains a relative maximum. Justify your answer.

(c) Find the absolute minimum value of g on the closed interval $[-5, 4]$. Justify your answer.

(d) Find all values of x in the open interval $(-5, 4)$ at which the graph of g has a point of inflection.

$g'' = f' = 0$ or DNE; $g''(x) = f'(x)$ has opp sign with

Created with Doceri

Page: 8 of 9 Words: 615 English (U.S.) 130%

Start e W P Ps X Start EN 97% 11:59 AM 6/12/2013

final review answers cpcalculus - Microsoft Word

File Home Insert Page Layout References Mailings Review View Add-Ins Acrobat TableTools Design Layout

Clipboard Font Paragraph Styles Editing

$a) g(0) = 9/2; g'(0) = 1$
 $b) \max_{atx} = 3$
 $c) \text{abs min}_{atx} = -4$
 $d) \text{POI}x = -3, 1, 2$

Graph of f

The graph of the function f shown above consists of a semicircle and three line segments. Let g be the function given by $g(x) = \int_{-3}^x f(t) dt$.

(a) Find $g(0)$ and $g'(0)$.

(b) Find all values of x in the open interval $(-5, 4)$ at which g attains a relative maximum. Justify your answer.

(c) Find the absolute minimum value of g on the closed interval $[-5, 4]$. Justify your answer.

(d) Find all values of x in the open interval $(-5, 4)$ at which the graph of g has a point of inflection.

Created with Doceri

Page: 8 of 9 Words: 615 English (U.S.) 130%

Start e W P Ps X Start EN 97% 12:09 PM 6/12/2013

final review answers cpcalculus - Microsoft Word

File Home Insert Page Layout References Mailings Review View Add-Ins Acrobat Table Tools Design Layout

Clipboard Font Paragraph Styles Editing

$a) g(0) = 9/2; g'(0) = 1$
 $b) \max at x = 3$
 $c) \text{abs min at } x = -4$
 $d) \text{POI } x = -3, 1, 2$

Graph of f

The graph of the function f shown above consists of a semicircle and three line segments. Let g be the function given by $g(x) = \int_{-3}^x f(t) dt$.

(a) Find $g(0)$ and $g'(0)$.

(b) Find all values of x in the open interval $(-5, 4)$ at which g attains a relative maximum. Justify your answer.

(c) Find the absolute minimum value of g on the closed interval $[-5, 4]$. Justify your answer.

(d) Find all values of x in the open interval $(-5, 4)$ at which the graph of g has a point of inflection.

Handwritten notes:
 $g'' = f = 0 \text{ / undef } \Rightarrow x = -3 / 1 / 2$
 $g''(x) = f'(x) \Rightarrow \text{opp sign with } g''(x) = f'(x)$

Created with Doceri

Page: 8 of 9 Words: 615 English (U.S.) 130%

Start e W P Ps X [Taskbar icons] EN 97% 12:10 PM 6/12/2013

-1

10. Find the area bounded by the function $f(x)$ and the x-axis on the given interval using RRA

$$\left\{ \sum_{i=1}^n 1 = n; \sum_{i=1}^n i = \frac{n(n+1)}{2}; \sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}; \sum_{i=1}^n i^3 = \frac{n^2(n+1)^2}{4} \right\}$$

$f(x) = 1 + x^2; [-1, 2]$

Area = 6

Fundamental Theorems of Calculus:

$$\int_a^b f(x) dx = F(b) - F(a) \text{ if } \frac{dF(x)}{dx} = f(x)$$

$$\text{If } F(x) = \int_a^{u(x)} f(t) dt, \text{ then } F'(x) = \frac{du(x)}{dx} f(u(x))$$

1. Evaluate the indefinite integral using substitution $\int \frac{x dx}{\sqrt{x-2}} = \frac{2\sqrt{(x-2)^3}}{3} + 4\sqrt{x-2} + C$

Created with Doceri

Page: 6 of 9 Words: 615 English (U.S.) 160% 97% 12:14 PM 6/12/2013

final review answers cpcalculus - Microsoft Word

File Home Insert Page Layout References Mailings Review View Add-Ins Acrobat TableTools Design Layout

Clipboard Font Paragraph Styles Editing

$a) g(0) = 9/2; g'(0) = 1$
 $b) \max_{atx} = 3$
 $c) \text{abs min}_{atx} = -4$
 $d) \text{POI}_{x} = -3, 1, 2$

Graph of f

The graph of the function f shown above consists of a semicircle and three line segments. Let g be the function given by $g(x) = \int_{-3}^x f(t) dt$. $g(0) = \int_{-3}^0 f dx = 9/2$

(a) Find $g(0)$ and $g'(0)$.

(b) Find all values of x in the open interval $(-5, 4)$ at which g attains a relative maximum. Justify your answer.

(c) Find the absolute minimum value of g on the closed interval $[-5, 4]$. Justify your answer.

(d) Find all values of x in the open interval $(-5, 4)$ at which the graph of g has a point of inflection.

Page: 8 of 9 Words: 615 English (U.S.) 140%

Start 97% 11:29 AM 6/12/2013

Created with Doceri