Problem 1. **(1 point)** `Cooper/Cooper_1/Cooper_1_2_1.pg`

Cooper 1.2.1

Expand the following

a) $(x-y)(x+y)$
b) $(x+y)(x+y)$
c) $(x+x^2)(1-x)$

- A. a) $2x-3y$ b) $x^2+2xy-3y^2$ c) $2x-x^3$
- B. a) x^2-y^2 b) $x^2-2xy+y^2$ c) x^2-x^3
- C. a) x^2-y^2 b) $x^2+2xy-y^2$ c) $x-x^3$
- D. a) x^2-y^2 b) $2x^2+2xy$ c) $x-x^2$
- E. a) $x^2-2xy-y^2$ b) $x^2+2xy+y^2$ c) $x-x^3$
- F. a) x^2+y^2 b) $x^2+2xy-y^2$ c) $2x-x^3$
- G. a) x^2-y^2 b) $x^2+2xy+y^2$ c) $x-x^3$
- H. a) x^2-y^2 b) $x^2-2xy-y^2$ c) $x-x^3$
- I. a) x^2-2y^2 b) $-x^2+2xy+y^2$ c) $x-x^2$
- J. a) x^2+y^2 b) $2x^2+2xy+y^2$ c) $5x-x^3$
- K. a) x^2-xy-y^2 b) $x^2+2xy-y^2$ c) $x+x^3$

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- G

Problem 2. **(1 point)** `Cooper/Cooper_1/Cooper_1_2_7.pg`

Cooper 1.2.7

Choose the correct simplified form of the following equations:
(a) $(a-(b-c))-((a-b)-c)$
(b) $a-(a-(b-(a-b)))$
(c) $a-((a-(a-b))-(b-(a-b)))$

- A. a) $2a+2c$ b) $2b-a$ c) $-b$
- B. a) $2c$ b) $2b-a$ c) b
- C. a) $2a+5b+2c$ b) $2b-a$ c) $2a+2b$
- D. a) $-2c$ b) $2b+a$ c) b
- E. a) $2a+b+2c$ b) $2b-a$ c) $a+2b$
- F. a) $2a+b+2c$ b) $a+2b$ c) b
- G. a) $2c$ b) $2b-a$ c) $a-b$
- H. a) $2c$ b) $2b-a$ c) $a+5b$
- I. a) $2a+2c$ b) $2b-a$ c) $2a+3b$
- J. a) $2a+3b+2c$ b) $2b-a$ c) $2a+b$
- K. a) $2a-2c$ b) $2b-a$ c) $a-5b$

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- B

Problem 3. **(1 point)** `Cooper/Cooper_1/Cooper_1_3_5.pg`

Cooper 1.3.5

Convert the the following fractions into percentages
(a) $3/4$ (b) $2/3$ (c) x/y.

$a)$ _____
$b)$ _____
$c)$ _____
¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- `100*(3/4)`
- `100*(2/3)`
- `100*x/y`

Problem 4. (1 point) `Cooper/Cooper_1/Cooper_1_3_4.pg`

Cooper 1.3.4

Solve $\frac{a+2}{3} = -10a + 10$

$a =$ _____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `(-2-3*-10)/(1-3*-10)`

Problem 5. (1 point) `Cooper/Cooper_1/Cooper_1_3_10.pg`

Cooper 1.3.10

Express x% of 6 plus y% of 7 as a percentage of 11.

_____%

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `100*(x/100*6+y/100*7)/11`

Problem 6. (1 point) `Cooper/Cooper_1/Cooper_1_3_9.pg`

Cooper 1.3.9

Initially there were 7 liters of blue paint and 8 liters of crimson paint. A paint job uses 20% of the blue and 80% of the crimson paint.
(a) What percentage of the total combined amount of paint is used during the job?
(b) What percentage of the total combined amount of paint remains after the job is finished?

(a) _____%
(b) _____%

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- `100*(20/100*7+80/100*8)/(7+8)`
- `100-100*(20/100*7+80/100*8)/(7+8)`

Problem 7. (1 point) `Cooper/Cooper_1/Cooper_1_3_11.pg`

Cooper 1.3.11

A manager starts with a salary of 90000 dollars. After one year he received a 10% pay rise. After another year his pay is cut by 10%. What is his salary after this ?

$_____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `(90000+10/100*90000)-10/100*(90000+10/100*90000)`

Problem 8. (1 point) Cooper/Cooper_1/Cooper_1_4_1.pg

Cooper 1.4.1

Solve

$x + y = 2$

$x + 2y = 5$

$x = $ _____
$y = $ _____
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 2*2-5
- 5-2

Problem 9. (1 point) Cooper/Cooper_1/Cooper_1_5_16.pg

Cooper 1.5.16

A gas at temperature T, pressure P with volume V satisfies the gas equation

$$PV = KT$$

where K is a constant that depends on the gas. Express
(a) volume in terms of pressure and temperature
(b) pressure in terms of volume and temperature. (keep letters upper case)

$V = $ _____ $P = $ _____
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- K*T/P
- K*T/V

Problem 10. (1 point) Cooper/Cooper_1/Cooper_1_5_20.pg

Cooper 1.5.20

The perimeter of a rectangle equals one and a half times its area. Express the length of the rectangle in terms of the width (use variable "w" for width).

$l = $ _____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- (2*w)/((3/2)*w-2)

Problem 11. (1 point) Cooper/Cooper_1/Cooper_1_5_34.pg

Cooper 1.5.34

Make the following substitutions for x in the expression

$$\sqrt{x} + \frac{1}{x} + 3x^2.$$

$(a)x = 2 \quad (b)x = a \quad (c)x = c^2 \quad (d)x = a+b \quad (e)x = y+y^{-1}.$

$a)$ _____

$b)$ _____

$c)$ _____

$d)$ _____

$e)$ _____

¡!-
Answer(s) submitted:

-
-
-
-
-

(incorrect)
Correct Answers:

- sqrt(2)+.5+12
- sqrt(a)+1/a+3*a^2
- c+1/c^2+3*c^4
- sqrt(a+b)+1/(a+b)+3*(a+b)^2
- sqrt(y+1/y)+1/(y+y^(-1))+3(y+1/y)^2

3

Problem 1. **(1 point)** `local/HW02/Cooper_1_3_8-revised.pg`

Cooper 1.3.8

(a) What is 17% of 7 added to 28% of 14?
(b) What is x% of 8 plus 7% of y?
(c) What is x% of y% as a percentage?

(a) _____
(b) _____
(c) _____%
¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- `17/100*7+28/100*14`
- `x/100*8+7/100*y`
- `x*y/100`

Problem 2. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_1/Cooper_1_3_9.pg`

Cooper 1.3.9

Initially there were 6 liters of blue paint and 10 liters of crimson paint. A paint job uses 20% of the blue and 80% of the crimson paint.
(a) What percentage of the total combined amount of paint is used during the job?
(b) What percentage of the total combined amount of paint remains after the job is finished?

(a) _____%
(b) _____%
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- `100*(20/100*6+80/100*10)/(6+10)`
- `100-100*(20/100*6+80/100*10)/(6+10)`

Problem 3. **(1 point)** `local/HW02/Cooper_1_3_10-revised.pg`

Cooper 1.3.10

Express x% of 3 plus y% of 9 as a percentage of 11.

_____%
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `100*(x/100*3+y/100*9)/11`

Problem 4. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_1/Cooper_1_3_11.pg`

Cooper 1.3.11

A manager starts with a salary of 50000 dollars. After one year he received a 10% pay rise. After another year his pay is cut by 10%. What is his salary after this ?

$_____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `(50000+10/100*50000)-10/100*(50000+10/100*50000)`

Problem 5. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_1/Cooper_1_5_8.pg`

Cooper 1.5.8

Solve $(2x+4)^{-1} = (x-10)^{-1}$

$x =$ _____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `-(4+10)`

Problem 6. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_1/Cooper_1_5_15.pg`

Cooper 1.5.15

Solve
$$2x - y + z = 3$$
$$8y - z = 1$$
$$5z = 10$$

$x = $ _____
$y = $ _____
$z = $ _____
¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- (3+3/8-2)/2
- (3)/8
- 2

Problem 7. (**1 point**) `local/HW02/Cooper_1_5_16.pg`

Cooper 1.5.16

A gas at temperature T, pressure P with volume V satisfies the gas equation
$$PV = KT$$
where K is a constant that depends on the gas.
(a) Express volume in terms of pressure and temperature.
(b) Express pressure in terms of volume and temperature.
(Please use the given uppercase letters for the variables and constant.)

(a) $V = $ _____
(b) $P = $ _____
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- K*T/P
- K*T/V

Problem 8. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_1/Cooper_1_5_19.pg`
Cooper 1.5.19

Find two positive numbers so that twice their sum equals their product and one number is 5 times the other number. Enter the smaller number first. Hints: page 46 problem solving tips 1-12. Talk to a friend.

_____
_____
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- (2*5+2)/5
- 2*5+2

Problem 9. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_21.pg`

Cooper 3.2.21

Car A leaves San Diego at noon driving at 60 mph along a route which is 400 miles long to San Francisco. Car B leaves San Francisco 2 hours later traveling along the same route at 80 mph. How far from the midpoint of the route are they when they meet? Are they closer to San Diego (answer "y" for yes or "n" for no)?

How far from the midpoint? _____ miles

Are they closer to San Diego? _____ (answer y or n)
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 40
- n

Problem 10. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_31.pg`

Cooper 3.2.31

A jet airliner flies at 300 mph for the first half hour and last half hour of a flight. The rest of the time it flies at 600 mph. How long does it take to fly a distance of 3300 miles?

time of flight= _____ hours
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 5+1

Problem 1. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_1/Cooper_1_2_3.pg`

Cooper 1.2.3

Chose the correct expansions for the following expressions:
(a) $(x+y) \times (x+y) \times (x+y)$
(b) $(1+p+p^2) \times (1-p)$

- A. a) $x^3 + yx^2 + 2x^2y + 2xy^2 + y^2x + y^3$ b) $p^5 - p^3$
- B. a) $x^3 + yx^2 + 2x^2y + 2xy^2 + y^2x - y^3$ b) $1 - p^2$
- C. a) $x^3 + yx^2 + 2x^2y + 3xy^2 + y^2x + y^3$ b) $1 - p^3$
- D. a) $x^3 + yx^2 + 2x^2y + 2xy^2 - y^2x + y^3$ b) $1 + p^3$
- E. a) $x^3 + yx^2 + 2x^2y + 8xy^2 + y^2x + y^3$ b) $1 + p^3$
- F. a) $x^3 + yx^2 + 2x^2y + 2xy^2 + y^2x + y^3$ b) $1 - p^3$
- G. a) $x^3 + yx^2 + 2x^2y + 2xy^2 + y^2x + y^3$ b) $p^2 - p - p^3$
- H. a) $x^3 - yx^2 + 2x^2y + 2xy^2 + y^2x + y^3$ b) $1 - p^3$
- I. a) $x^3 + yx^2 + 2x^2y + 4xy^2 + y^2x + y^3$ b) $1 + p^3$
- J. a) $x^3 + yx^2 - 2x^2y + 2xy^2 + y^2x + y^3$ b) $1 - p^3$
- K. a) $x^3 + yx^2 + 2x^2y + 2xy^2 + y^2x + y^3$ b) $p - p^3$

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- F

Problem 2. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_1/Cooper_1_2_7.pg`

Cooper 1.2.7

Choose the correct simplified form of the following expressions:
(a) $(a - (b - c)) - ((a - b) - c)$
(b) $a - (a - (b - (a - b)))$
(c) $a - ((a - (a - b)) - (b - (a - b)))$

- A. a) $2c$ b) $2b - a$ c) $a - b$
- B. a) $2a + 2c$ b) $2b - a$ c) $-b$
- C. a) $-2c$ b) $2b + a$ c) b
- D. a) $2a + b + 2c$ b) $2b - a$ c) $a + 2b$
- E. a) $2a + 5b + 2c$ b) $2b - a$ c) $2a + 2b$
- F. a) $2c$ b) $2b - a$ c) b
- G. a) $2a + 2c$ b) $2b - a$ c) $2a + 3b$
- H. a) $2a + b + 2c$ b) $a + 2b$ c) b
- I. a) $2a - 2c$ b) $2b - a$ c) $a - 5b$
- J. a) $2c$ b) $2b - a$ c) $a + 5b$
- K. a) $2a + 3b + 2c$ b) $2b - a$ c) $2a + b$

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- F

Problem 3. (1 point) Cooper_oml/Cooper_oml.v2/Cooper_1/Cooper_1_3_7.pg

Cooper 1.3.7

(a) What is 35% of 400 dollars
(b) What is x% of 25 dollars ?
(c) What is 30% of 50% as a percentage ?

$a) = \$$ _____

$b) = \$$ _____

$c) =$ _____ %

¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- 140
- x/4
- 1500/100

Problem 4. (1 point) Cooper_oml/Cooper_oml.v2/Cooper_1/Cooper_1_4_1.pg

Cooper 1.4.1

Solve
$x + y = 7$

$x + 2y = 1$

$x =$ _____
$y =$ _____
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 2*7-1
- 1-7

Problem 5. (1 point) local/HW03/Cooper_1_5_1-revised.pg

Cooper 1.5.1

Simplify the following; If more than one variable remains in the answer, write your solution such that the variables appear in alphabetical order. Also to represent something of the form a times b, write a*b instead of ab, and do not use parentheses.

(a) $\dfrac{x^3}{x^2} =$ _____

(b) $\dfrac{x^4 y^2}{xy} =$ _____

(c) $\dfrac{abc^2}{ac} =$ _____

(d) $\dfrac{a^2}{a^3/a^5} =$ _____

(e) $(1/x)^{-2} =$ _____

(f) $(t^2 \times t^3)^2/t^{-3} =$ _____

¡!-
Answer(s) submitted:

-
-
-
-
-
-

(incorrect)
Correct Answers:

- x
- x^3*y
- b*c
- a^4
- x^2
- t^13

2

Problem 6.

Cooper 1.5.27

Work out without a calculator

$$\left(5+\frac{2}{\sqrt{3\times(8-5)-4\times(21-25)}}\right)^{-1}.$$

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- (5+2/5)**(-1)

Problem 7.

Cooper 3.1.5

Car A leaves Los Angeles at noon driving North to San Francisco at 60 mph. Car B leaves at 1 pm traveling the same route at 80 mph. How many hours after car B leaves will it catch up with car A?

_____ hours
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 3

Problem 8.

Cooper 3.2.3

(a) Express the surface area A (total of all six sides) of a cubical box in terms of the volume V of the box.

$A(V) = $ _____

(b) Express the volume V of this box in terms of the total surface area A.

$V(A) = $ _____

Hint: The cube root of, say, $37+w$ is typed into WeBWorK as $(37+w)$ raised to the power $(1/3)$, like this: $(37+w)\char`\^(1/3)$.
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 6*V^(2/3)
- (A/6)^(3/2)

Problem 9. (1 point) `local/HW03/Cooper_3_2_5-revised.pg`

Cooper 3.2.5

(a) A liter of paint covers an area of 6 square meters. It takes 3 liters of paint to paint a rectangular wall that is 3 meters high. How wide is the wall?

The width of the wall is _____ meters.

(b) A liter of paint covers an area of A square meters. It takes v liters of paint to paint a rectangular wall that is h meters high. How wide is the wall?

The width of the wall is _____ meters.

(c) On scratch paper use your answer from part (b) to work out the answer to (a). Make sure you get the same answer.
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- `6*3/3`
- `Av/h`

Problem 10. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_9.pg`

Cooper 3.2.9

Central park is a rectangle with an area of 840 acres. It is 1/2 a mile wide. One acre is 43,560 square feet. Two people start at the south-west corner at 1:30 pm and start walking round the park in opposite directions. One walks at 1 mph the other walks at 4 mph. How long until they meet again?. A mile is 5280 feet.

Time from start _____ hours
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `25/(4*(1+4))`

Problem 1. (1 point) local/HW04/Cooper_1_6_2-revised.pg

Cooper 1.6.2

If $f(x) = x^3$, what are

(a) $f^{-1}(1000)$

(b) $f^{-1}(a)$

Enter N into a blank if there is no solution.

$f^{-1}(1000) = $ _____
$f^{-1}(a) = $ _____

WeBWorK Hint: Ender a cube root as, for example, 61^ 1/3.
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 10
- a^(1/3)

Problem 2. (1 point) Cooper_oml/Cooper_oml.v2/Cooper_1/Cooper_1_6
_4.pg

Cooper 1.6.4

The function $f(x)$ converts US dollars into Japanese Yen. What does the inverse function do? use 'U' for dollar and 'Y' for yen (capital letters)

Converts _____ to _____
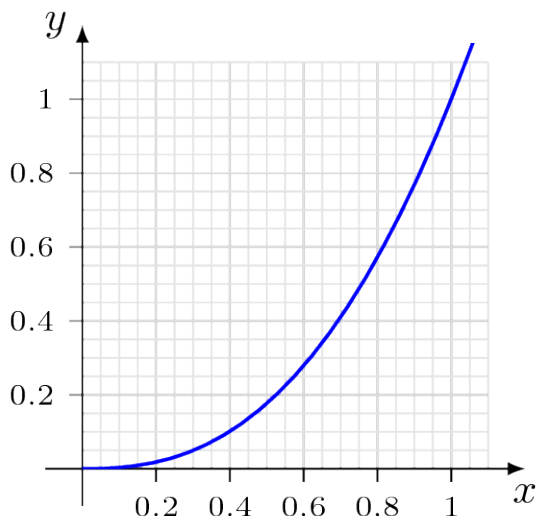¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- Y
- U

Problem 3. (1 point) local/HW04/Cooper_1_6_7-revised.pg

Cooper 1.6.7

Use the graph above (and **not** the graph in the textbook) to find

(a) $f^{-1}(0.4)$ _____

(b) $f(0.4)$ _____

(c) $f(0.1 + f^{-1}(0.4))$ _____

(d) $f(f^{-1}(0.4))$ _____

(e) $f(f^{-1}(f(0.5)))$ _____
¡!-
Answer(s) submitted:

-
-
-
-
-

(incorrect)
Correct Answers:

- .68
- .10
- .54
- .4
- .17

Problem 4. (1 point) `local/HW04/Cooper_1_6_8-revised.pg`

Cooper 1.6.8

Find a formula for the inverse of $f(x) = 1 + x^{-1}$.

$f^{-1}(y) =$ _____

¡!-
Answer(s) submitted:

-

(incorrect)
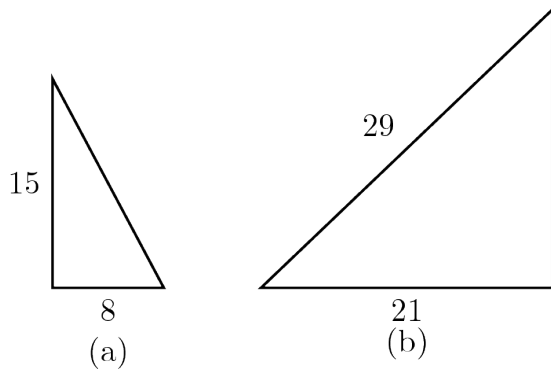*Correct Answers:*

- 1/(y-1)

Problem 5. (1 point) `local/HW04/Cooper_1_7_1-revised.pg`

Cooper 1.7.1

Find the length of the unknown sides in the triangles shown below.

(a) _____ (b) _____
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 17
- 20

Problem 6. (1 point) `local/HW04/Cooper_1_7_3-revised.pg`

Cooper 1.7.3

What is the distance between the points $(7, -10)$ and $(33, 55)$ Leave your answer as a square root, for example $\sqrt{31}$. This is typed into WeBWorK as either sqrt(31) or 31^(1/2).

$y =$ _____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- ((7-33)^2+(-10-55)^2)^(.5)

Problem 7. (1 point) `local/HW04/Cooper_1_7_8-revised.pg`

Cooper 1.7.8

Two cars leave the origin at noon. One goes north at 100 mph and the other goes east at 30 mph. Express the distance between the cars in terms of the number of hours they have been driving. Use t for number of hours.

distance = _____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- (100^2+30^2)^(.5)*t

Problem 8. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_15.pg`

Cooper 3.2.15

(a) A cube has surface area $96m^2$. What is the volume of the cube?
Volume of Cube= _____ m^3

(b) What is the volume of a cube with surface area A m^2.
Volume of Cube= _____ m^3
your answer will involve A not a.

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- `4**3`
- `(A/6)^(3/2)`

Problem 9. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_26.pg`

Cooper 3.2.26

A box, with rectangular sides, base and top is to have a volume of 2 cubic feet. It has a square base. Express the surface area A of the box in terms of the width w of the base. If the material for the base and top costs 40 dollars/ft^2 and that for the sides costs 50 dollars/ft^2 express the total cost C as a function of the width.

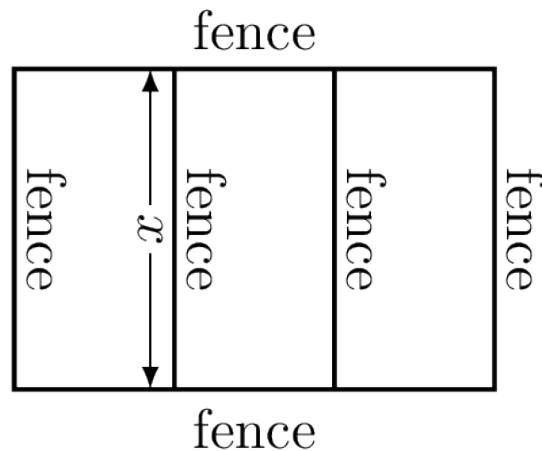A(w)= _____ ft^2

C(w)= $ _____
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- `4*2/w+2*w^2`
- `50*4*2/w+40*2*w^2`

Problem 10. **(1 point)** `local/HW04/Cooper_3_2_30-revised.pg`

Cooper 3.2.30

A farmer wants to make a rectangular field with a total area of 3000 square meters. It is surrounded by a fence. It is divided into 3 equal areas by fences as shown. Express the total length L of all the fence required in terms of the length x of one of the fences which divide the field.

L(x)= _____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `4*x+2*3000/x`

Problem 1. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_1/Cooper_1_5`
`_22.pg`

Cooper 1.5.22

Solve:
$$-x + \frac{x^2 - 2}{x + 1} = 5$$
(Hint: put over a common denominator.)

$x =$ _____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `-(5+2)/(5+1)`

Problem 2. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_1/Cooper_1_5`
`_36.pg`

Cooper 1.5.36

Make the substitution $x = a + a^{-1}$ into $x + 2x^{-1}$. Put your answer
over a common denominator and simplify.

_____
¡!-
Answer(s) submitted:

-

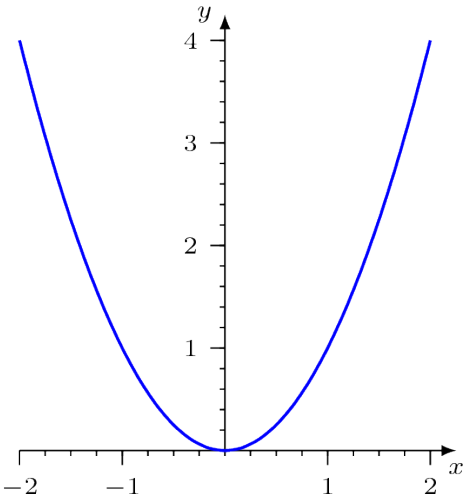(incorrect)
Correct Answers:

- `(a^4+4a^2+1)/(a^3+a)`

Cooper 2.2.1
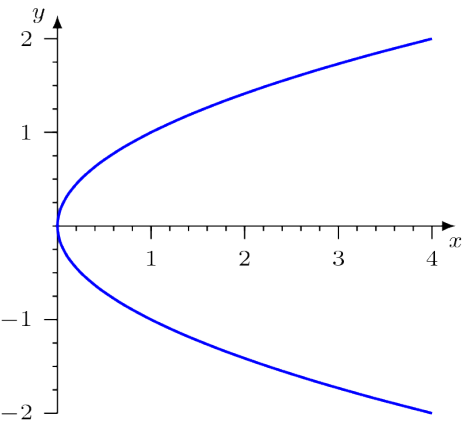
Tear out a page of graph paper from the end of the book. On the graph paper, draw the graph of $y = x^2$ for $-2 \le x \le 2$. Use the table of values below and the fact that the graph is symmetric across the y-axis. Mathematically this means $(-x)^2 = x^2$. What this means when you look at the graph is that parts of the graph on either side of the y-axis look the same, except that one is the mirror image of the other. This graph will often be used later in the course. So keep it safe.

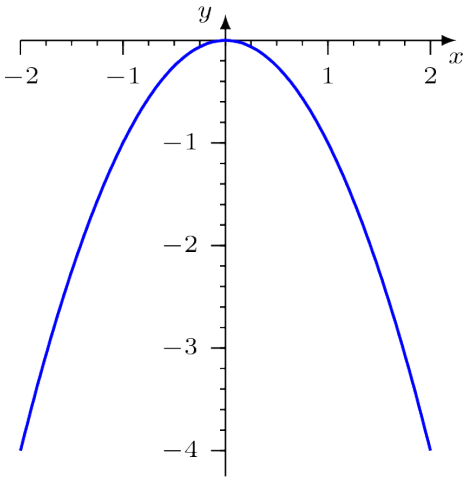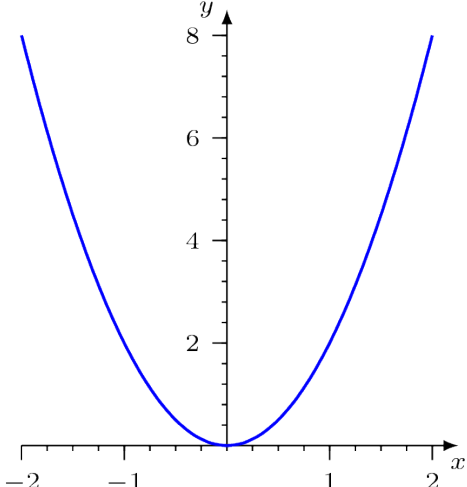| x	0	0.25	0.5	0.75	1	1.25	1.5	1.75	2
y	0	0.0625	0.25	0.5625	1	1.5625	2.25	3.0625	4

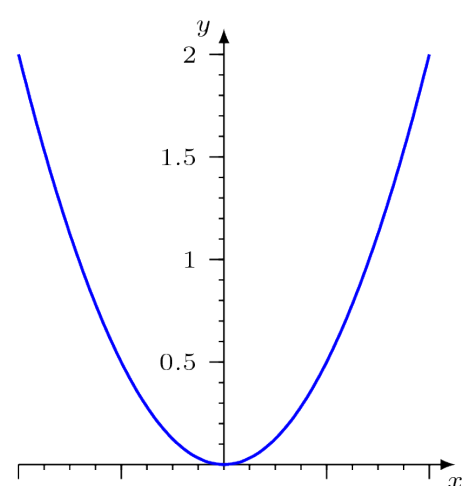Which of the graphs below best matches the one you drew?

• A.

• B.

• C.

• D.

• E.

¡!-
Answer(s) submitted:

•

(incorrect)
Correct Answers:

2

- A

Problem 4. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_1_8.pg`

Cooper 3.1.8

Oil is leaking from an oil tanker at the rate of 1000 liters per hour. 8 liters of oil spread out over 10 square meters of ocean surface. A circular oil slick forms.

(a) Express the radius R of the oil slick as a function of the time t (in hours) the tank has been leaking. If your answer involves pi type pi not 3.14

R(t)=_____ meters

(b) After how many hours will the oil slick have radius 1 kilometer?

_____ hours

Hint: you will find a CUNNING PLAN at the bottom of page 47.
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- sqrt(1000*10/8*t/3.14159265358979)
- 2513.27412287183

Problem 5. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_1.pg`

Cooper 3.2.1

A rectangular field is to have an area of $25m^2$ and is to be surrounded by a fence. The cost C of the fence is 12 dollars per meter of length. Express the total cost of the fence in terms of the width of the field (use the variable 'w' for width).

$C(w) = \$$ _____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 12*(2(25/w)+2(w))

Problem 6. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_2.pg`

Cooper 3.2.2

I have three numbers. The biggest one is twice the middle one, and the biggest one plus the middle one is four times the smallest one. The smallest one plus the middle one is two less than the biggest one. What are the numbers?

smallest number = _____
middle number = _____
biggest number = _____
¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- 6
- 8
- 16

Problem 7. (1 point) `local/setHW05/Cooper_4_1_1_oml-revised.pg`

Cooper 4.1.1

A car travels at constant speed for 3 days and covers 1500 miles. What is the speed in centimeters/minute? You may use the (approximate) conversion factors on page 55 of the text (in particular that 1 mile is about 8/5 km), or you may relate everything to the conversion 1 inch = 2.54cm.

_____ cm/min
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 1000*1500/(9*3)

Problem 8. (1 point) `local/setHW05/Cooper_4_1_2_oml-revised.pg`

Cooper 4.1.2

If a car travels 25 miles per gallon of fuel (in other words the car does 25 mpg), how many kilometers does it travel per liter of fuel? (Use the approximations on page 55 of the text. In particular, use the approximations that 1 mile is about 8/5 km and that 1 liter is about 2 pints. It might also help to remember that 1 gallon is 8 pints.)

_____ km

Answer(s) submitted:

-

(incorrect)

Correct Answers:

- 0.4*25

Problem 9. (1 point) `local/setHW05/Cooper_4_1_3_oml-revised.pg`

Cooper 4.1.3

The Earth travels in a circle around the sun once every year. The radius of the circle is 98 million miles. What is the speed of the Earth in miles per hour? In centimeters per day? (Again use the conversion factors on page 55 of the text if you would rather approximate than use exact values. See other problems for these factors if the book isn't handy.)

_____ mi/hr

_____ cm/day

Answer(s) submitted:

-
-

(incorrect)

Correct Answers:

- 70000
- 2.67*10^11

Problem 10. (1 point) `local/setHW05/Cooper_1_6_11_oml-revised.pg`

Cooper 1.6.11

Use the tax table on page 27 (the same as the tax table of Lecture 03) to answer the following questions.

(a) What is $f^{-1}(1860)$?

(b) If someone paid 3000 in taxes, what was their income?

(a) _____ (lower limit)
(b) _____ (lower limit)
¡!-
Answer(s) submitted:

-
-

(incorrect)

Correct Answers:

- 23000
- 32500

Problem 1. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_1_2.pg`

Cooper 6.1.2

Find the equation of the line passing through (2,-1) and (-2,8).

y=_____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `(8+1)/(-2-2)*(x-2)-1`

Problem 2. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_1_4.pg`

Cooper 6.1.4

Find the equation of the line through (2,a) and (3,b).

y=_____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `(b-a)/(3-2)*(x-2)+a`

Problem 3. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_1_5.pg`

Cooper 6.1.5

Find the equation of the line through (3,1) with slope 2. Enter your solution in the form y=mx+b.

y=_____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `2*(x-3)+1`

Problem 4. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_1_6.pg`

Cooper 6.1.6

Find the equation of the line which passes through the origin and (4,1). Enter your solution in the form y=mx+b.

y=_____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `x/4`

Problem 5. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_1_8.pg`

Cooper 6.1.8

Find the equation of the line through (9,-1) which meets the x axis at x=3. Enter your solution in the form y=mx+b.

y=_____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `-1/(9-3)*(x-3)`

Problem 6. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_1_9.pg`

Cooper 6.1.9

Find the equation of the line which meets the x-axis at x=5 and the y-axis at y=-9. Enter your solution in the form y=mx+b.

y=_____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- (-1)*-9/5*x+-9

Problem 7. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_1_10.pg`

Cooper 6.1.10

Solve the equations 2x+3y=8 and x-y= -1.

x=_____
y=_____
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 1
- 2

Problem 8. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_1_11.pg`

Cooper 6.1.11

Where do the lines y=3x+8 and 2y=x-1 cross?

x=_____
y=_____
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- -3.4
- -2.2

Problem 9. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_1_12.pg`

Cooper 6.1.12

Find where the line which passes through the two points (1,2) and (3,5) intersects the line through (2,1) and (7,-10).

x=_____
y=_____
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 1.32432432432432
- 2.48648648648649

Problem 10. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_1_15.pg`

Cooper 6.1.15

Two car companies Elvis and Hearts rent cars. The Elvis car costs 30 dollars plus 20 cents per mile. The Hearts car costs 50 dollars with 50 free miles and then costs 15 cents per mile. On scratch paper graph the cost against distance driven for both companies.

(a) It is cheaper to rent from Elvis if you are driving less than _____ miles.

(b) Which of the following pieces of information about the lines in your graphs represents the cost per mile

- A. intersection point
- B. slope
- C. y-intercept
- D. x-intercept

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 250
- B

2

Problem 1. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_2_1.pg`

Cooper 6.2.1

If y is proportional to x and x is 4 when y is 50, then what is y when:

(a) $x = 8$? $y =$ _____

(b) $x = 2$? $y =$ _____

(c) $x = a$? $y =$ _____

(d) $x = a^2$? $y =$ _____

(e) $x = 0$? $y =$ _____

(f) $x = (a+b)$? $y =$ _____

(g) $x = 1/w$? $y =$ _____

¡!-
Answer(s) submitted:

-
-
-
-
-
-
-

(incorrect)
Correct Answers:

- 100
- 25
- a*50/4
- a**2*50/4
- 0
- (a+b)*50/4
- 50/(4*w)

Problem 2. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_2_3.pg`

Cooper 6.2.3

The amount of taxes a city collects is proportional to the population of the city. In 1980 the population was 2 million and it had increased to 3 million by 1992. If 10 billion dollars in taxes were collected in 1980 how much was collected in 1992?

_____ billion dollars

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 15

Problem 3. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_2_4.pg`

Cooper 6.2.4

The mass of a sphere made of gold is proportional to the diameter, d, cubed. Express the mass m of the sphere as a function of the diameter. Use C as your proportionality constant.

m(d)=_____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- C*d**3

Problem 4. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_2_6.pg`

Cooper 6.2.6

The temperature, T, of a gas is jointly proportional to the pressure P of the gas and the volume V occupied by the gas. Use C as your proportionality constant.

(a) Express the temperature in terms of the pressure and the volume.

T(P,V)=_____

(b) Use your answer to (a) to express the pressure in terms of the volume and the temperature.

P(T,V)=_____

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- C*P*V
- T/C/V

Problem 5. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_2_7.pg`

Cooper 6.2.7

The weight of a sphere is proportional to its radius cubed. If a sphere of diameter 1 cm has a mass of 5 grams, what diameter sphere has a mass of 40 grams?

diameter=_____ cm

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 2

Problem 6. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_2_11.pg`

Cooper 6.2.11

U.S. hard disc drive companies attempt to double hard disc drive capacity every two years. If they succeed, is hard disc drive capacity proportional to time? Enter T for true and F for false.

___

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- F

Problem 7. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_2_12.pg`

Cooper 6.2.12

The time is takes to build a skyscraper is proportional to its height and inversely proportional to the number of construction workers. If it takes 10 workers 2.5 years to build a 20 story building, how long will it take 100 workers to build a 80 story building?

_____ years

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 1

Problem 8. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_4_1.pg`

Cooper 6.4.1

The world population in 1990 was 5.4 billion and in 1995 was 5.8 bilion. Use linear extrapolation to find the population in 2010.

_____ billion

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 7

Problem 9. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_4_3.pg`

Cooper 6.4.3

The average sea-level in 1900 at London-bridge was 33 feet. In 1990 it was 33.08 feet. Use linear interpolation or extrapolation to find:

(a) What the average sea-level was in 1930.

_____ feet

(b) In what year the average sea-level will be 38 feet.

_____

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 33.0266666666667
- 7525

Problem 10. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_11.pg`

Cooper 3.2.11

There are more than 1/4 million species of beetle. Assume the average length of a beetle is 1cm and the average walking speed is 10 cm per second. These beetles walk up a gang-plank that is 5 meters long onto an ark. They do this in pairs, side by side, one male and one female from each species. The pairs of beetles are spaced 2 cm apart. How many hours will it take for 1/4 million species of beetles to embark onto the ark once the first pair starts up the gangplank?

_____ hours

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- (25000*(1+2)+50)/3600

Problem 11. (1 point) `local/HW7p11.pg`

Please click the link and watch the following video **Vsauce: 1,2,3,4,5,6,7,...** to put many of the concepts of next week's lecture into context. Logarithms seem strange to the vast majority of people, and this video does a wonderful job of discussing why they are an incredibly natural way of viewing the world. In fact, many of our senses already experience the world this way, even before we learn how to count!

What number is "between" 1 and 9?

- 1
- 3
- 5
- 7
- 9

Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 3

Problem 1. (1 point) `local/HW08/Cooper_5_1_2-revised.pg`

Cooper 5.1.2

Calculate the following limits (Use I if the limit does not exist or is infinity) .

(a) $\lim\limits_{x \to 5} x + 2 =$ _____

(b) $\lim\limits_{x \to \infty} x^{-1} =$ _____

(c) $\lim\limits_{x \to 0} 1/x =$ _____

(d) $\lim\limits_{x \to \infty} (7 + x^{-1}) =$ _____

(e) $\lim\limits_{x \to \infty} x/(5x + 2) =$ _____

¡!-
Answer(s) submitted:

-
-
-
-
-

(incorrect)
Correct Answers:

- 7
- 0
- I
- 7
- 0.2

Problem 2. (1 point) `local/HW08/Cooper_5_1_3-revised.pg`

Cooper 5.1.3

If you have $350 in the bank but your bank balance shows $354, what is the percentage error? Do not put a minus sign.

_____ %

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 1.14285714285714

Problem 3. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_5/Cooper_5_2_1.pg`

Cooper 5.2.1

If x is increased from 4 to 5 how much does

$$\frac{1 + x}{2 + x}$$

change by?

_____

Does the function increase or decrease when x goes from 4 to 5? (Use I for increase and D for decrease)

_____

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 0.0238095238095237
- I

Problem 4. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_5/Cooper_5_2_2.pg`

Cooper 5.2.2

What is the change in $f(x) = x^3 + x$ when x is increased by 0.1 starting from $x = 2$?

_____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 1.361

Problem 5. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_5/Cooper_5_2_3.pg`

Cooper 5.2.3

For each of the values of h given, when x is increased from 3 to $3 + h$, work out

$$\frac{\text{the change in } x^2}{h}$$

$h = 1$ _____
$h = .1$ _____
$h = .01$ _____
$h = .001$ _____
¡!-
Answer(s) submitted:

-
-
-
-

(incorrect)
Correct Answers:

- 7
- 6.10000000000001
- 6.00999999999985
- 6.00099999999948

Problem 6. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_5/Cooper_5_2_4.pg`

Cooper 5.2.4

If x is increased from 4 to $4 + h$, how much does $x^2 + x$ increase by?

_____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 2*4*h+h^2+h

Cooper 5.3.1

In this problem, you are given expressions in summation notation. On your paper, you should write them instead as a series of terms added together. Then, please answer the following questions:

(a)Fill in the following:

$$\sum_{n=1}^{5} n =$$

___ + ___ + ___ + ___ + ___

(b) $\sum_{m=1}^{4} a_m$

Which of these best represents the above summation written out as a sum?

- A. $a_1 + a_2$
- B. $a_1 + a_2 + a_3 + a_4$
- C. $1_m + 2_m + 3_m + 4_m$
- D. $1 + 2 + 3 + 4$
- E. $a_m + 2a_m + 3a_m + 4a_m$
- F. $1_m + 2_m$

(c) $\sum_{k=2}^{6} (a_k + b_k)$

Which of these best represents the above summation written out as a sum?

- A. $(2_n + 2_n) + (3_n + 3_n) + (4_n + 4_n) + (5_n + 5_n)$
- B. $(a_1 + b_1) + (a_2 + b_2) + (a_3 + b_3) + (a_4 + b_4) + (a_5 + b_5) + (a_6 + b_6)$
- C. $(a_1 + a_2 + a_3 + a_4 + a_5 + a_6) + (b_1 + b_2 + b_3 + b_4 + b_5 + b_6)$
- D. $(a_1 + a_2 + a_3 + a_4 + a_5 + a_6) + (b_2 + b_3 + b_4 + b_5 + b_6)$
- E. $(a_2 + a_3 + a_4 + a_5 + a_6) + (b_1 + b_2 + b_3 + b_4 + b_5 + b_6)$
- F. $(a_2 + b_2) + (a_3 + b_3) + (a_4 + b_4) + (a_5 + b_5) + (a_6 + b_6)$
- G. None of the above

(d) $\sum_{n=-2}^{2} f(n)$

Which of these best represents the above summation written out as a sum?

- A. $f(0)$
- B. $(-2n) + (-1n) + 0 + 1n + 2n$
- C. f(-2)+f(-1)+f(0)+f(1)+f(2)

- D. $-2 - 1 + 0 + 1 + 2$
- E. $-2 - 1 + 1 + 2$
- F. 0
- G. $f(-2) + f(-1) + f(1) + f(2)$

(e) $3 \left(\sum_{i=1}^{3} x_i \right)$

Which of these best represents the above summation written out as a sum?

- A. $3(1_i + 2_i + 3_i)$
- B. $3x_1 + 3x_2 + 3x_3 + 3x_4$
- C. $3(x_1 + x_2 + x_3)$
- D. $3_i + 6_i + 9_i$
- E. $3(1 + 2 + 3)$
- F. $x_3 + x_6 + x_9$
- G. None of the above

(f) $\left(\sum_{n=10}^{13} c_n \right) + \left(\sum_{n=14}^{15} c_n \right)$

Which of these best represents the above summation written out as a sum?

- A. $(a_{10} + a_{11} + a_{12} + a_{13}) + (a_{14} + a_{15})$
- B. $1_n + 2_n + 3_n + 4_n + 5_n + 6_n + 7_n + 8_n + 9_n + 10_n + 11_n + 12_n + 13_n + 14_n + 15_n$
- C. $(c_{10} + c_{11} + c_{12} + c_{13}) + (c_{14} + c_{15})$
- D. $10_n + 11_n + 12_n + 13_n + 14_n + 15_n$
- E. $c_1 + c_2 + c_3 + c_4 + c_5 + c_6 + c_7 + c_8 + c_9 + c_{10} + c_{11} + c_{12} + c_{13}$
- F. $(10 + 11 + 12 + 13) + (14 + 15)$
- G. $(10c_n + 11c_n + 12c_n + 13c_n) + (14c_n + 15c_n)$
- H. None of the above

(g) $\sum_{n=2}^{5} (a_n + b_n)^2$

Which of these best represents the above summation written out as a sum?

- A. $(2_n + 2_n)^2 + (3_n + 3_n)^2 + (4_n + 4_n)^2 + (5_n + 5_n)^2$
- B. $(a_2 + a_3 + a_4 + a_5)^2 + (b_2 + b_3 + b_4 + b_5)^2$
- C. $(a_2 + b_2)^2 + (a_3 + b_3)^2 + (a_4 + b_4)^2 + (a_5 + b_5)^2$
- D. $(a_1^2 + b_1^2) + (a_2^2 + b_2^2) + (a_3^2 + b_3^2) + (a_4^2 + b_4^2) + (a_5^2 + b_5^2)$
- E. $(a_1 + b_1)^2 + (a_2 + b_2)^2 + (a_3 + b_3)^2 + (a_4 + b_4)^2 + (a_5 + b_5)^2$
- F. $(a_1 + a_2 + a_3 + a_4 + a_5)^2 + (b_2 + b_3 + b_4 + b_5)^2$
- G. $(a_2^2 + a_3^2 + a_4^2 + a_5^2) + (b_2^2 + b_3^2 + b_4^2 + b_5^2)$

(h) $\sum_{n=1}^{5} 1/n!$

Which of these best represents the above summation written out as a sum?

- A. $1/1 + 1/2 + 1/3 + 1/4 + 1/5$
- B. $1/1! + 1/2! + 1/3! + 1/4! + 1/5!$
- C. $1/2! + 1/3! + 1/4! + 1/5!$
- D. $1/n! + 2/n! + 3/n! + 4/n! + 5/n!$
- E. $2/n! + 3/n! + 4/n! + 5/n!$
- F. None of the above

(i)Fill in the following:

$$\sum_{n=1}^{4} x^n/n =$$

_____ + _____ + _____ + _____

¡!-
Answer(s) submitted:

-
-
-
-
-
-
-
-
-
-
-
-
-
-
-

(incorrect)
Correct Answers:

- 1
- 2
- 3
- 4
- 5
- B
- F
- C
- C
- C
- C
- B
- x
- x^2/2
- x^3/3
- x^4/4

Cooper 5.3.2

Write out the following summations as a series of terms added together. For example

$$\sum_{k=1}^{150} k = 1 + 2 + 3 + \dots + 150$$

Then answer the question.

(a) $\sum_{n=1}^{1000} \dfrac{a_n}{a_n^2 + 1}$

Which of these best represents the above summation written out as a sum?

- A. $\dfrac{a_1}{a_n^2+1} + \dfrac{a_2}{a_n^2+1} + \dfrac{a_3}{a_n^2+1} + \dots + \dfrac{a_{999}}{a_n^2+1} + \dfrac{a_{1000}}{a_n^2+1}$
- B. $\dfrac{a_1}{a_1^2+1} + \dfrac{a_2}{a_2^2+1} + \dfrac{a_3}{a_3^2+1} + \dots + \dfrac{a_{99}}{a_{99}^2+1} + \dfrac{a_{100}}{a_{100}^2+1}$
- C. $\dfrac{a_1}{a_n^2+1} + \dfrac{a_2}{a_n^2+1} + \dfrac{a_3}{a_n^2+1} + \dots + \dfrac{a_{99}}{a_n^2+1} + \dfrac{a_{100}}{a_n^2+1}$
- D. $\dfrac{a_1}{a_1^2+1} + \dfrac{a_2}{a_2^2+1} + \dfrac{a_3}{a_3^2+1} + \dots + \dfrac{a_{999}}{a_{999}^2+1} + \dfrac{a_{1000}}{a_{1000}^2+1}$
- E. $\dfrac{1_n}{1_n^2+1} + \dfrac{2_n}{2_n^2+1} + \dfrac{3_n}{3_n^2+1} + \dots + \dfrac{999_n}{1000_n^2+1} + \dfrac{a_{1000}}{a_n^2+1}$
- F. None of the above

(b) $\sum_{n=1}^{100} (a_{n+1} - a_n)$

Which of these best represents the above summation written out as a sum?

- A. $(a_1 - a_0) + (a_2 - a_1) + (a_3 - a_2) + \dots + (a_{100} - a_{99}) + (a_{101} - a_{99})$
- B. $(1_{n+1} - 1_n) + (2_{n+1} - 2_n) + (3_{n+1} - 3_n) + \dots + (99_{n+1} - 99_n) + (100_{n+1} - 100_n)$
- C. $(a_1 - a_0) + (a_2 - a_1) + (a_3 - a_2) + \dots + (a_{99} - a_{98}) + (a_{100} - a_{99})$
- D. $(a_2 - a_1) + (a_3 - a_2) + (a_4 - a_3) + \dots + (a_{99} - a_{98}) + (a_{100} - a_{99})$
- E. None of the above

(c) $\dfrac{1}{N} \sum_{p=1}^{N} x_p$

Which of these best represents the above summation written out as a sum?

- A. $\dfrac{x_1}{N} + \dfrac{x_2}{N} + \dfrac{x_3}{N} + \dots + x_{-1} + x$
- B. $\dfrac{1}{N}(x_1 + x_2 + x_3 + \dots x_{99} + x_N)$
- C. $\dfrac{1}{N}(x_1 + x_2 + x_3 + \dots + x_{99} + x_{100})$

- D. $\dfrac{1}{N}(1_p + 2_p + 3_p + \dots + (N-1)_p + N_p)$
- E. None of the above

(d) $\sum_{n=1}^{200} \dfrac{x^n}{n!} =$

Which of these best represents the above summation written out as a sum?

- A. $\dfrac{1}{n!} + \dfrac{2^n}{n!} + \dfrac{3^n}{n!} + \dots + \dfrac{199^n}{n!} + \dfrac{200^n}{n!}$
- B. $x + \dfrac{x^2}{2!} + \dfrac{x^3}{3!} + \dots + \dfrac{x^{99}}{99!} + \dfrac{x^{100}}{100!}$
- C. $x + \dfrac{x^2}{2!} + \dfrac{x^3}{3!} + \dots + \dfrac{x^{199}}{199!} + \dfrac{x^{200}}{200!}$
- D. $\dfrac{x^n}{n!} + \dfrac{x^n}{n!} + \dfrac{x^n}{n!} + \dots + \dfrac{x^n}{n!} + \dfrac{x^n}{n!}$
- E. None of the above

¡!-
Answer(s) submitted:

-
-
-
-

(incorrect)
Correct Answers:

- D
- E
- E
- C

Cooper 5.3.3

Which of the choices best represents the given expression combined into a single summation?

$$(a) \left(\sum_{n=1}^{50} x_n\right) + \left(\sum_{m=51}^{100} x_m\right)$$

- A. $\sum_{n=1}^{100} x_m$
- B. $\sum_{n=1}^{100} x_n + x_m$
- C. $\sum_{n=1}^{50} x_n + x_m$
- D. $\sum_{n=1}^{50} x_n$
- E. $\sum_{n=1}^{100} x_n$
- F. None of the above

$$(b) \left(\sum_{k=1}^{20} a_k\right) + \left(2\sum_{k=1}^{20} b_k\right)$$

- A. $\sum_{k=1}^{40} a_k + b_k$
- B. $\sum_{n=1}^{20} a_k + 2b_k$
- C. $\sum_{k=1}^{20} a_k$
- D. $\sum_{k=1}^{20} a_n + 2b_n$
- E. $\sum_{k=1}^{40} a_k$
- F. None of the above

$$(c) \left(\sum_{i=1}^{100} x_i\right) - \left(\sum_{i=71}^{100} x_i\right)$$

- A. $\sum_{i=1}^{100} x_i$

- B. $\sum_{i=1}^{70} x_i$
- C. 0
- D. $\sum_{i=71}^{100} x_i$
- E. $\sum_{i=1}^{70} x_i - x_j$
- F. None of the above

¡!-
Answer(s) submitted:
-
-
-

(incorrect)
Correct Answers:
- E
- F
- B

Cooper 5.3.4

Which summation represents the average of the numbers $a_1, a_2, \ldots, a_{400}$

- A. $\left(\sum_{n=1}^{400} a_m/400\right)$
- B. $\frac{1}{400}\left(\sum_{m=1}^{400} a_n\right)$
- C. $\left(\sum_{n=1}^{400} n/400\right)$
- D. $\frac{1}{400}\left(\sum_{n=1}^{400} a_n\right)$
- E. $\left(\sum_{n=1}^{400} a_n\right)$
- F. None of the above

¡!-
Answer(s) submitted:
-

(incorrect)
Correct Answers:
- D

Problem 1. (**1 point**) `local/setHW09/Garfield-HW09-Problem01.pg`

For each of the following, find the resulting power of 10:
(a) $10^7 \times 10^7 = 10$ to the power _____,
(b) $\left(10^2\right)^7 = 10$ to the power _____,
(c) $\left(10^7 \times 10^7/10^7\right)^{-2} = 10$ to the power _____.
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- 14
- 14
- -14

Problem 2. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_12.pg`

Cooper 3.2.12

The radius of the earth is 4000 miles. How fast is someone on the equator moving compared to someone at the north pole due to daily rotation of the Earth (in miles per hour)?

speed= _____ mph
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 8000*3.14159265358979/24

Problem 3. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_35.pg`

Cooper 3.2.35

As dry air rises, it expands, and this causes it to cool about 1 degree Celsius for every 100 meter rise, up to a height of 12 Km. If the ground temperature is $27°$ write a formula for the temperature T in terms of the height h (where h is measured in meters and less than 12 Km) above ground.

T(h)=_____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 27-h/100

Problem 4. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_37.pg`

Cooper 3.2.37

Which number gives the same result when you subtract 5 as when you divide by 5?

_____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 5**2/(5-1)

Problem 5. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_52.pg`

Cooper 3.2.52

On the planet Golgafrincham there are two systems for measuring temperature. Using the Celia scale, water freezes at $0°$ C and boils at $50°$ C. Using the Furryhat scale, water freezes at $10°$ F and boils at $110°$ F. Both systems divide the temperatures in between into equal increments. Let x be the temperature in degrees Celia and y be the temperature in degrees Furryhat.

(a) Find a formula which converts temperatures measured in Celia into Furryhat.

y(x)= _____.$°$ F

(b) Find a formula which does the inverse.

x(y)= _____.$°$ C

(c) What temperature is the same in both Celia and Furryhat?

_____

¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- `10+(110-10)/50*x`
- `(y-10)*50/(110-10)`
- `10/(1-(110-10)/50)`

Problem 6. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_16.pg`

(a) A square has perimeter 36m what is the area of the square?
(b) Same question, but this time the perimeter of the square is L meters.(use a capital 'L' in your answer)

(a) _____

(b) _____
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- `(36/4)^2`
- `(L/4)^2`

Problem 7. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_5/Cooper_5_1_5.pg`

Cooper 5.1.5

Find the following limit (Hint: simplify the fraction before thinking about limits.) What would happen if you just plug in h=0 before doing any simplifying. (Use I if the limit does not exist or is infinity)

$$\lim_{h \to 0} \frac{(5+h)^2 - 5^2}{h}$$

_____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `10`

Problem 8. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_2_5.pg`

Cooper 6.2.5

The rate R that a certain disease spreads is proportional to the number of infected individuals and is also proportional to the number of uninfected individuals. The total population is P and the number of infected individuals is D. Express the rate that the disease spreads in terms of this information. Use C as your proportionality constant.

R(P,D)=_____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `C*D*(P-D)`

Problem 9. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_2_12.pg`

Cooper 6.2.12

The time is takes to build a skyscraper is proportional to its height and inversely proportional to the number of construction workers. If it takes 10 workers 2.5 years to build a 20 story building, how long will it take 70 workers to build a 80 story building?

_____ years

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 1.42857142857143

Problem 10. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_6/Cooper_6_4_2.pg`

Cooper 6.4.2

For the function $f(x) = \sqrt{x}$ we know f(4)=2 and f(9)=3.

(a) Use linear interpolation to find $\sqrt{5}$

$\sqrt{5} \approx$ _____

(b) Use the table of square roots in the back of the text to find the error to 3 decimal places.

Error = _____

(c) What is the percentage error? (Recall that percentage error is 100*error/(exact answer).)

Percent error = _____

¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- 2.2
- 0.036
- 1.60996894379985

Problem 1. (2 points) `local/setHW05/Cooper_7_13_1_oml-revised.pg`

Cooper 7.13.1

Use the log table on page 289 of your book to find the following logarithms. Make sure you can do the same problem using the graph on page 290. If it cannot be done, write: impossible

(a) $\log(6.835) = $ _____

(b) $\log(3000) = $ _____

(c) $\log(6835) = $ _____

(d) $\log(100) = $ _____

(e) $\log(0.5133) = $ _____

(f) $\log(-9) = $ _____

(g) $\log(890.0009) = $ _____

(h) $\log(0) = $ _____

(i) $\log(0.0006835) = $ _____

¡!-
Answer(s) submitted:

-
-
-
-
-
-
-
-
-

(incorrect)
Correct Answers:

- `ln(6.835)/ln(10)`
- `ln(3000)/ln(10)`
- `ln(6835)/ln(10)`
- `2`
- `ln(0.5133)/ln(10)`
- `impossible`
- `ln(890.0009)/ln(10)`
- `impossible`
- `ln(0.0006835)/ln(10)`

Problem 2. (2 points) `local/setHW05/Cooper_7_13_5_oml-revised.pg`

Cooper 7.13.5

Use the log table on page 289 of your book to find the following anti-logarithms.

(a) antilog$(0.5793) = $ _____

(b) antilog$(1.0100) = $ _____

(c) antilog$(4.4) = $ _____

(d) antilog$(2) = $ _____

(e) antilog$(30) = $ _____

(f) antilog$(3.0323) = $ _____

(g) antilog$(-7.9) = $ _____

(h) antilog$(-3.9114) = $ _____

(i) antilog$((-9)+0.9010) = $ _____

(j) antilog$((-6)+0.4971) = $ _____

¡!-
Answer(s) submitted:

-
-
-
-
-
-
-
-
-
-

(incorrect)
Correct Answers:

- `10^(0.5793)`
- `10^(1.01)`
- `10^(4.4)`
- `100`
- `10^(30)`
- `10^(3.0323)`
- `10^(-7.9)`
- `10^(-3.9114)`
- `10^(-9+0.901)`
- `10^(-6+0.4971)`

Problem 3. (1 point) `local/setHW05/Cooper_5_1_6_oml-revised.pg`

Cooper 5.1.6

Set

$$x_1 = \frac{1}{2} \qquad x_2 = \frac{1}{2} + \frac{1}{4} \qquad x_3 = \frac{1}{2} + \frac{1}{4} + \frac{1}{8}$$

$$x_4 = \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} \qquad \ldots$$

Write out x_5. Work out what each of the numbers x_1 to x_5 is. What do you think that the limit of x_n is as $n \to \infty$ (Use I if the limit does not exist or is infinity) ?

$x_5 = $ _____

$\lim_{n \to \infty} x_n = $ _____

¡!-

Answer(s) submitted:

-
-

(incorrect)

Correct Answers:

- 0.96875
- 1

Problem 4. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_6.pg`

Cooper 3.2.6

A painter is paid 8 dollars per hour and can paint 8 m^2 with a roller in this time. Renting a spray gun costs 5 dollars for each hour of use, and the painter can paint 20 m^2 per hour with the spray gun. It takes 1/2 an hour for the painter to clean up after using the roller, but 1 hour using the spray gun. You must pay the painter for her time and you must also pay for renting the spray gun for the total amount of time (including clean up) the spray gun was needed. How much money do you save by using the spray gun on a paint job that involves painting 40 m^2.

money saved= _____ dollars

¡!-

Answer(s) submitted:

-

(incorrect)

Correct Answers:

- 2.5*8-15

Problem 5. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_19.pg`

Cooper 3.2.19

I have two cans of paint. Can A has 9 parts of blue paint to one part of yellow paint. Can B is 20 percent blue paint and the rest is yellow paint. How much paint should I use from each can to obtain 6 liters of paint which is half blue and half yellow.

amount of can A= _____ liters

amount of can B= _____ liters

¡!-

Answer(s) submitted:

-
-

(incorrect)

Correct Answers:

- 6*3/7
- 6*4/7

Problem 6. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_4/Cooper_4_6_4.pg`

Cooper 4.6.4

If the volume of a certain pyramid is x and another pyramid is made which is 3 times larger (i.e. all the linear dimensions have been increased by a factor of 3), what is the volume of the new pyramid (in terms of x)?

_____

¡!-

Answer(s) submitted:

-

(incorrect)

Correct Answers:

- (3)^3x

Problem 7.

Cooper 1.5.12

A circular can has height h and the base is a circle with radius R. The volume is $\pi R^2 h$. If the volume must be 100π express R in terms of h.

$R = $ _____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 10/h^(.5)

Problem 8.

Cooper 4.1.8 This is one of my all-time-favorite problems :)

BEWARE: answers in the back of the book are very approximate and not good enough for webwork. You need to work it out yourself.

Light travels 186,282 miles in one second. A light year is the distance light travels in one year. It is about 4.3 light years to the nearest star, Proxima Centauri, (other than our sun!)

How many miles away is Proxima Centauri?

_____ miles

b)The distance from Los Angeles to New York is about 2,000 miles. If this distance is represented by the width of a grain of sand (say 1/100 of an inch) how many miles away would Proxima Centauri be?

_____ miles

c) The diameter of our galaxy, the Milky Way, is about 100,000 light years. With this representation used in (b) what would the diameter of the Milky Way be (in miles under our scale)?

_____ miles

d) Imagine we now represent the Milky Way by a single grain of sand. The universe is 15 billion light years across. How many feet would this correspond to?

_____ feet

[According to the HitchHiker's Guide to the Galaxy: "Space is big, I mean really big. You may think it's a long way to the chemist but that's just peanuts to space."]

¡!-
Answer(s) submitted:

-
-
-
-

(incorrect)
Correct Answers:

- 2.53*10^13
- 1993.43
- 4.64*10^7
- 125

Problem 1. (1 point) `local/setHW11/Cooper_7_13_2_oml-revised.pg`

Cooper 7.13.2

Use the log tables in your book to find the following logarithms. DO NOT DO ANY MULTIPLICATION.

(a) $\log(396 \times 440) =$ _____

(b) $\log(8.73 \times 43.99) =$ _____

(c) $\log(305 \times 4.0712) =$ _____

(d) $\log(55 \times 33.3) =$ _____

(e) $\log(0.0047 \times 7.07) =$ _____

¡!-
Answer(s) submitted:

-
-
-
-
-

(incorrect)
Correct Answers:

- `ln(396*440)/ln(10)`
- `ln(8.73*43.99)/ln(10)`
- `ln(305*4.0712)/ln(10)`
- `ln(55*33.3)/ln(10)`
- `ln(0.0047*7.07)/ln(10)`

Problem 2. (1 point) `local/setHW11/Cooper_7_13_3_oml_revised.pg`

Cooper 7.13.3

Use the log tables in your book to find the following logarithms. DO NOT DO ANY DIVISIONS.

(a) $\log(1/3) =$ _____

(b) $\log(3/100) =$ _____

(c) $\log(308/4.0812) =$ _____

(d) $\log(45/32.3) =$ _____

(e) $\log(0.0043/7.07) =$ _____

¡!-
Answer(s) submitted:

-
-
-
-
-

(incorrect)
Correct Answers:

- `ln(1/3)/ln(10)`
- `ln(3/100)/ln(10)`
- `ln(308/4.0812)/ln(10)`
- `ln(45/32.3)/ln(10)`
- `ln(0.0043/7.07)/ln(10)`

Problem 3. (**1 point**) `local/setHW11/Cooper_7_13_6-revised.pg`

Cooper 7.13.6

Use logs and antilogs to perform the following calculations. DO NOT JUST MULTIPLY THE WAY YOU LEARNED IN 3rd GRADE! DO NOT JUST USE A CALCULATOR!

(a) $369 \times 486 = $ _____

(b) $8.73 \times 43.64 = $ _____

(c) $308 \times 4.0612 = $ _____

(d) $40 \times 28.3 = $ _____

(e) $0.0049 \times 8.08 = $ _____

¡!-
Answer(s) submitted:

-
-
-
-
-

(incorrect)
Correct Answers:

- 369*486
- 8.73*43.64
- 308*4.0612
- 40*28.3
- 0.0049*8.08

Problem 4. (**1 point**) `local/setHW11/Cooper_7_13_7-revised.pg`

Cooper 7.13.7

Use logs and antilogs to perform the following calculations. DO NOT JUST DIVIDE THE WAY YOU LEARNED IN 6th GRADE! DO NOT JUST USE A CALCULATOR!

(a) $1/6 = $ _____

(b) $2/100 = $ _____

(c) $306/4.0312 = $ _____

(d) $27/62.3 = $ _____

(e) $0.0076/4.04 = $ _____

¡!-
Answer(s) submitted:

-
-
-
-
-

(incorrect)
Correct Answers:

- 1/6
- 2/100
- 306/4.0312
- 27/62.3
- 0.0076/4.04

Problem 5. (1 point) `local/setHW11/Cooper_2_2_11-revised.pg`

Cooper 2.2.11

To do this question you need to know that speed is distance travelled divided by time taken.

Three objects move along the x-axis. They start at the origin and move right. The three graphs show the speeds of the three objects plotted against time. Calculate how far each object is from the origin at t=4. (The diagrams below are equivalent to the ones in the text on page 42.)

(a) _____ meters

(b) _____ meters

(c) _____ meters

¡!-

Answer(s) submitted:

-
-
-

(incorrect)

Correct Answers:

- 80
- 80
- 30

Problem 6. (1 point) `local/setHW11/Cooper_3_2_27-revised.pg`

Cooper 3.2.27

A window has the shape of a semi-circle placed on top of a rectangle as shown below. (The diagram at the top of page 50 in the text is equivalent.)

(a) Express the area A of the window in terms of the width w and height h of the rectangle.
(b) If the area is 5, express the height in terms of the width.

(a) A(h,w)= _____

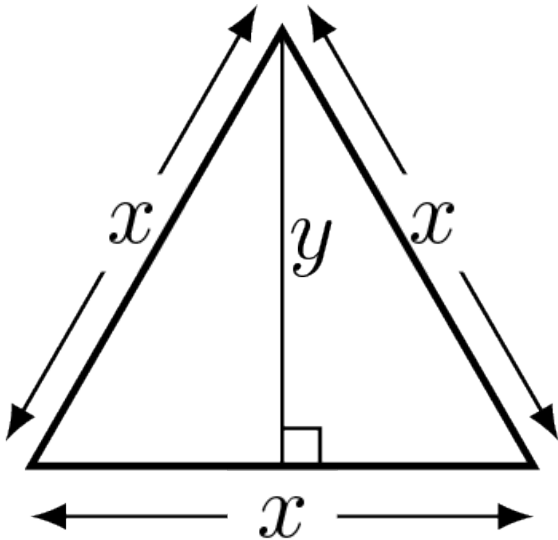(b) h(w) = _____

¡!-

Answer(s) submitted:

-
-

(correct)

Correct Answers:

- 3.141592653*w^(2)/8+h*w
- (5-3.141592653*w^2/8)/w

Problem 7. **(1 point)** `local/setHW11/Cooper_3_2_44-revised.pg`

Cooper 3.2.44

The diagram below shows an equilateral triangle (one with all sides of equal length). (The diagram in the text on page 51 is equivalent.)

(a) Find y in terms of x. (Here x is the length of a side, and y is the length of the perpendicular bisector.)
(b) Find the area A in terms of x. (Hint: Pythagoras.)

(a) $y(x) =$ _____

(b) $A(x) =$ _____
¡!-
Answer(s) submitted:

- •
- •

(incorrect)
Correct Answers:

- x*sqrt(3)/2
- x*x*sqrt(3)/4

Problem 8. **(1 point)** `local/setHW11/Cooper_1_3_12-revised.pg`

Cooper 1.3.12

Express the following as a power of a:
(a) $a^3 \times a^2 \times a^8$
(b) $(a^2 \times a^{-8})^3$
(c) $(1/a^{-8})^{-2}$
(For each answer, just put the exponent of a in the answer box.)

(a) The exponent of a is _____

(b) The exponent of a is _____

(c) The exponent of a is _____
¡!-
Answer(s) submitted:

- •
- •
- •

(incorrect)
Correct Answers:

- 3+2+8
- (2-8)*3
- 8*-2

Problem 9. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_1/Cooper_1_3_13.pg`

Cooper 1.3.13

Calculate (without a calculator!)
(a) $10^8/10^3$
(b) $(10^3)^{10}$
(c) $(10^{473} \times 10^{-300} \times 10^{-173})^{3288}$

a) _____

b) _____

c) _____
¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- `10^{8}/10^3`
- `(10^3)^{10}`
- `1`

Problem 10. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_4/Cooper_4_1_6.pg`

Cooper 4.1.6

In this question, 5 miles equals 8 kilometers.

(a) In Canada some roads have a speed limit of 95 km/h. What is this limit in miles/hour?

(b) You are driving 75 mph in Nevada. How many miles do you travel in one minute?

You are driving on a two lane road that is 12 miles long. From the start, you have been stuck behind a car that is going 60 mph.

(c) How long (in minutes) will it take for you to reach the end of the road if you do not pass?

(d) How fast must you travel (in mph) to reduce this time by one minute if you pass right at the start?

(a)_____ mph

(b)_____ miles

(c)_____ minutes

(d)_____ mph
¡!-
Answer(s) submitted:

-
-
-
-

(incorrect)
Correct Answers:

- `59.375`
- `1.25`
- `12`
- `720/11`

Trevor Klar
math34a-01-s22-schley
Assignment HW12 due 05/05/2022 at 11:59pm PDT

Problem 1. (1 point) `local/setHW12/Cooper_7_13_4-revised.pg`

Cooper 7.13.4

Use the log tables in your book to find the logarithms of the following. You may use a calculator ONLY TO MULTIPLY and ONLY in parts (c), (d), and (g).

(a) $\log(9^{100}) = $ _____

(b) $\log(100^9) = $ _____

(c) $\log(3.076^{2.059}) = $ _____

(d) $\log(31^{-8.2}) = $ _____

(e) $\log(\sqrt{37}) = $ _____

(f) $\log(1/\sqrt{37}) = $ _____
[Hint: Think about NEGATIVE exponents]

(g) $\log(1/(91^{6.1})) = $ _____
¡!-
Answer(s) submitted:

-
-
-
-
-
-
-

(incorrect)
Correct Answers:

- `ln(9^100)/ln(10)`
- `ln(100^9)/ln(10)`
- `ln(3.076^2.059)/ln(10)`
- `ln(31^-8.2)/ln(10)`
- `ln(sqrt(37))/ln(10)`
- `ln(1/sqrt(37))/ln(10)`
- `ln(1/(91^6.1))/ln(10)`

Problem 2. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_7/Cooper_7_1 3_12.pg`

Cooper 7.13.12

Use logarithms to solve the equation for x. [Hint: take logs of both sides and simplify]

$$10^{x+3} = 0.2$$

x= _____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `-3+ln(0.2)/ln(10)`

Problem 3. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_7/Cooper_7_1 3_13.pg`

Cooper 7.13.13

Use logarithms to solve the equation for x. [Hint: take logs of both sides and simplify]

$$2^x = 0.4020$$

x= _____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `ln(0.402)/ln(2)`

Problem 4. (1 point) `local/setHW12/Cooper_7_13_14-revised.pg`

Cooper 7.13.14

Use logarithms to solve the equation for x. [Hint: take logs of both sides and simplify]

$$10^x = y$$

x= _____

¡!-

Answer(s) submitted:

-

(incorrect)

Correct Answers:

- `log(y)`

Problem 5. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_7/Cooper_7_1 3_15.pg`

Cooper 7.13.15

Use logarithms to solve the equation for x. [Hint: take logs of both sides and simplify]

$$2^x = 7 \times 3^x$$

x= _____

¡!-

Answer(s) submitted:

-

(incorrect)

Correct Answers:

- `ln(7)/(ln(2)-ln(3))`

Problem 6. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_7/Cooper_7_1 3_18.pg`

Cooper 7.13.18

A bank pays 4 percent interest compounded annually. There are 1000 dollars in the account in January 1904. You may use a calculator.

a) How much money will be in the account in January 1905?
_____ dollars

b) How much money will be in the account in January 1906?
_____ dollars

c)How much money will be in the account in January 1907?
_____ dollars

d) How much money will be in the account in January 1914?
_____ dollars

e) How much money will be in the account x years after 1904?
_____ dollars

f) In what year will there first be one million dollars in the account? [Hint: use your answer from (e) and logs]
in the year _____

¡!-

Answer(s) submitted:

-
-
-
-
-
-

(incorrect)

Correct Answers:

- `(1+.01*4)*1000`
- `(1+.01*4)^2*1000`
- `(1+.01*4)^3*1000`
- `(1+.01*4)^10*1000`
- `(1+.01*4)^x*1000`
- `1904+3/logten(1+.01*4)`

Problem 7. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_1/Cooper_1_5_8.pg`

Cooper 1.5.8

Solve $(2x+1)^{-1} = (x-7)^{-1}$

$x = $ _____

¡!-

Answer(s) submitted:

-

(incorrect)

Correct Answers:

- -(1+7)

Problem 8. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_10.pg`

Cooper 3.2.10

I have milk that contains 1 percent fat and milk that contains 4 percent fat. A customer wants a double latte made with 1/2 of a pint of 2 percent milk. How much of each type of milk should I use ?

Hint: see the link to mixtures problems on the course web page

amount of 1 percent milk= _____ pints
amount of 4 percent milk= _____ pints

¡!-

Answer(s) submitted:

-
-

(incorrect)

Correct Answers:

- 2/(3*2)
- 1/(3*2)

Problem 9. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_16.pg`

(a) A square has perimeter 36m what is the area of the square?
(b) Same question, but this time the perimeter of the square is L meters.(use a capital 'L' in your answer)

(a) _____
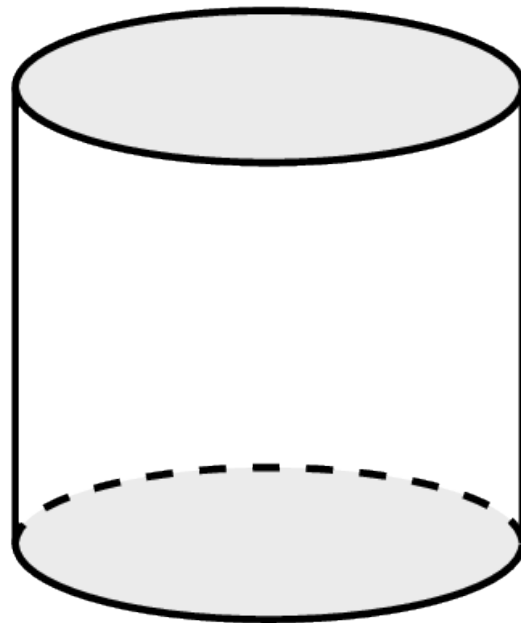
(b) _____

Answer(s) submitted:

-
-

(incorrect)

Correct Answers:

- (36/4)^2
- (L/4)^2

Problem 10. (**1 point**) `local/setHW12/Cooper_3_2_28-revised.pg`

Cooper 3.2.28

A cylindrical metal can is to be constructed with a volume of 32 cm^3. It has a base and top. Express the surface area A in terms of the radius r of the base.

$A(r) = $ _____ cm^2

¡!-

Answer(s) submitted:

-

(incorrect)

3 *Correct Answers:*

- 2*32/r+2*3.141592653*r^2

Problem 1. (**1 point**) `local/setHW13/Cooper_7_13_8-revised.pg`

Cooper 7.13.8

Use logs and antilogs to perform the following calculations. DO NOT FIND THE ANSWER ANY OTHER WAY. You may use a calculator ONLY TO MULTIPLY and ONLY in parts (c), (d), and (g).

(a) $3^{100} =$ _____

(b) $100^3 =$ _____

(c) $3.076^{2.027} =$ _____

(d) $76^{-7.1} =$ _____

(e) $\sqrt{75} =$ _____

(f) $1/\sqrt{75} =$ _____

(g) $1/(53^{3.6}) =$ _____
¡!-
Answer(s) submitted:

-
-
-
-
-
-
-

(incorrect)
Correct Answers:

- 3^100
- 100^3
- 3.076^2.027
- 76^-7.1
- sqrt(75)
- 1/sqrt(75)
- 1/(53^3.6)

Problem 2. (**1 point**) `local/setHW13/Cooper_7_13_10-revised.pg`

Cooper 7.13.10

Split the following up into logs of single variables combined with $+$, $-$, $\times$.
The problems have all been partially done below. Some spaces should perhaps be left blank. The rest should be filled in with whatever is necessary. Write I in all spaces if that problem is impossible.

(a) $\log(x \times y) = \log(x)$____$\log(y)$

(b) $\log(x^6 \times y^7) =$ ____$\log(x)$____$\log(y)$

(c) $\log(\sqrt{x}) =$ ____$\log(x)$

(d) $\log(x + y) = \log(x)$____$\log(y)$

(e) $\log(x \times \log(y)) = \log(x)$____$\log($_____$)$

¡!-
Answer(s) submitted:

-
-
-
-
-
-
-
-

(incorrect)
Correct Answers:

- +
- 6
- +
- 7
- 1/2
- I
- +
- log(y)

Problem 3. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_7/Cooper_7_13_17.pg`

Cooper 7.13.17

A population of rabbits doubles every year and there were 1 million rabbits at the start of 1990.

a) How many rabbits are there in 1995? [Hint: How many in 1991, 1992?...]

_____ million

b) In what year will there be 10 million rabbits? [Hint: use logs]
____

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 32
- 1990+1/logten(2)

Problem 4. (1 point) `local/setHW13/Cooper_7_13_20-revised.pg`

Cooper 7.13.20

Bacteria are growing exponentially in an environment of unlimited space and food. The doubling time is 1 hour.

(a) If there are initially x milligrams of bacteria, express the mass of the bacteria as a function of time t.

$f(t) =$ _____

(b) Use your answer to part (a) to write down an equation whose solution is the time at which there are $3x$ milligrams of bacteria. Enter your answer in a form like $3x = 5t^2$.

_____

(c) Solve your equation from part (b).

$t =$ _____ hours

(d) Your answer to part (c) should be between 1 and 2 hours. Check that it is. Do you understand why it has to be?
¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- x*2^t
- No correct answer specified
- ln(3)/ln(2)

Cooper 7.13.21

The population of rabbits on an island is growing exponentially. In 1950 there were 300 rabbits and by 1960 this population had grown to 2400 rabbits. Thus the population of rabbits t years after 1950 is given by

$$R(t) = R \times 2^{t/K}$$

a) Find R and K

R= _____

K= _____

b) Make sure you can explain why the doubling time for the population is K.

c) Find the doubling time.

_____

d) See if your answer to (c) is reasonable in terms of the data.
¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- 300
- 10*ln(2)/ln(2400/300)
- 10*ln(2)/ln(2400/300)

Cooper 7.13.25

Use the graph of $y = 10^x$ in the back of your book. Do not use a calculator or log tables.
Find:

a) $10^{0.1}$

_____

b) antilog(0.45)

_____

c) antilog(5.068)

_____

d) $10^{-7.3}$

_____

e) antilog(100)

_____

¡!-
Answer(s) submitted:

-
-
-
-
-

(incorrect)
Correct Answers:

- 10^0.1
- 10^0.45
- 10^5.068
- 10^-7.3
- 10^100

Problem 7. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_7/Cooper_7_13_39.pg`

Cooper 7.13.39

An area is contaminated with an element which has a half-life of 20 years. How long does it take until only 1 percent of the element remains?

_____ years

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `20*ln(.01)/ln(.5)`

Problem 8. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_7/Cooper_7_13_40.pg`

Cooper 7.13.40

The half-life of carbon-14 is 5730 years. A bone is discovered which has 40 percent of the carbon-14 found in the bones of other living animals. How old is the bone?

_____ years

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `5730*ln(.01*40)/ln(.5)`

Problem 9. (1 point) `local/setHW13/Cooper_2_2_12-revised.pg`

Cooper 2.2.12

The graph below shows the distance in meters of an object from the origin after t seconds. (Using the graph in the textbook is equivalent.)
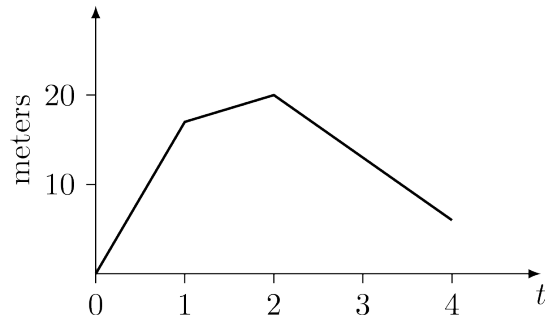
What was the speed of the object at the following times.

(a) At $t = 0.5$, the speed was _____ m/s

(b) At $t = 1.5$, the speed was _____ m/s

(c) At $t = 3.5$, the speed was _____ m/s

(d) What is the significance of the fact that the graph slopes downwards between $t = 2$ and $t = 4$?
[Hint: speed=distance gone divided by time taken] (You don't have to answer this here)
¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- `17`
- `3`
- `7`

4

Problem 10. (1 point) `local/setHW13/Cooper_2_2_21-revised.pg`

Cooper 2.2.21
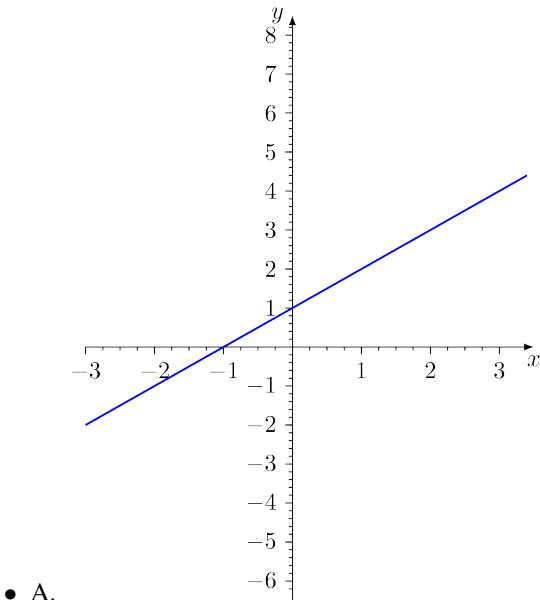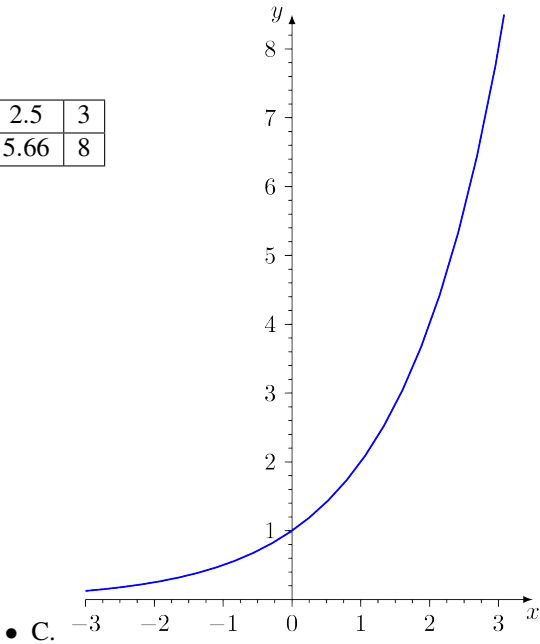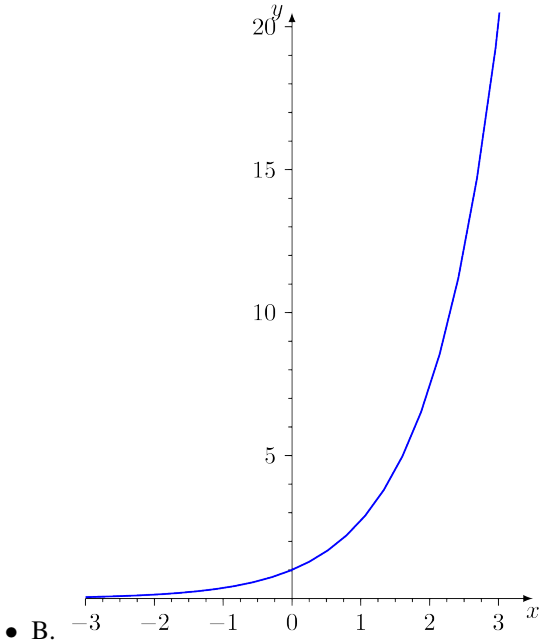
The table shows some values of $y = 2^x$.

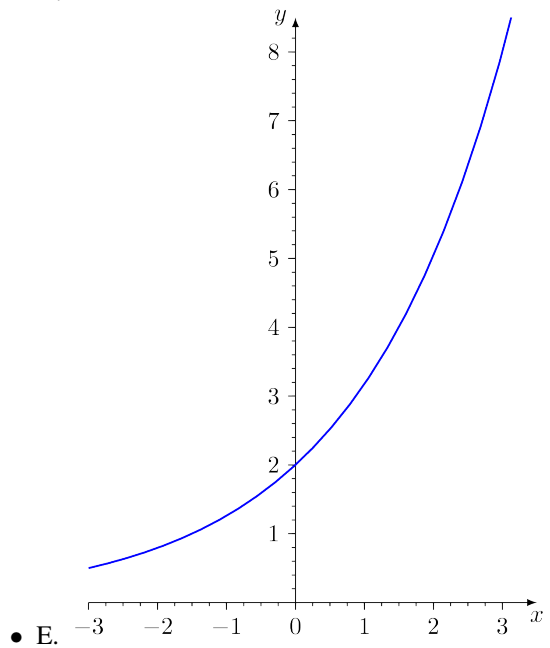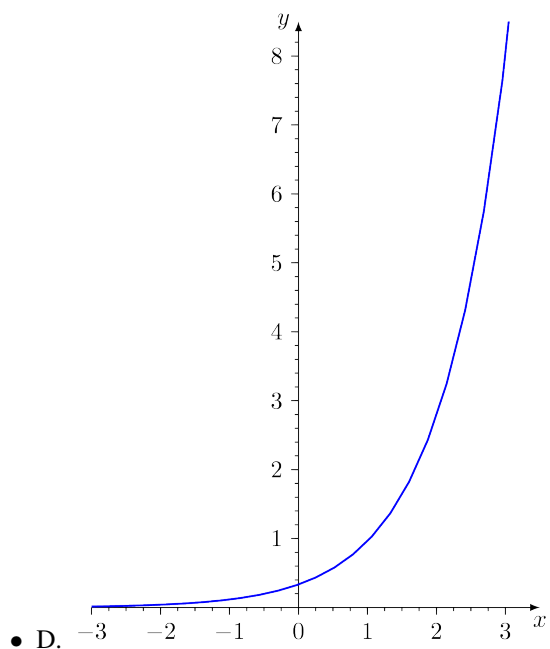| x	-3	-2.5	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2	2.5	3
y	0.12	0.18	0.25	0.35	(a)	0.70	1	1.41	2	2.83	(b)	5.66	8

Fill in the missing values of the table:

(a)_____

(b)_____

On graph paper, plot the graph of $y = 2^x$ for $-3 \le x \le 3$ using the table of values given.

Which of the graphs below best matches the one you drew?
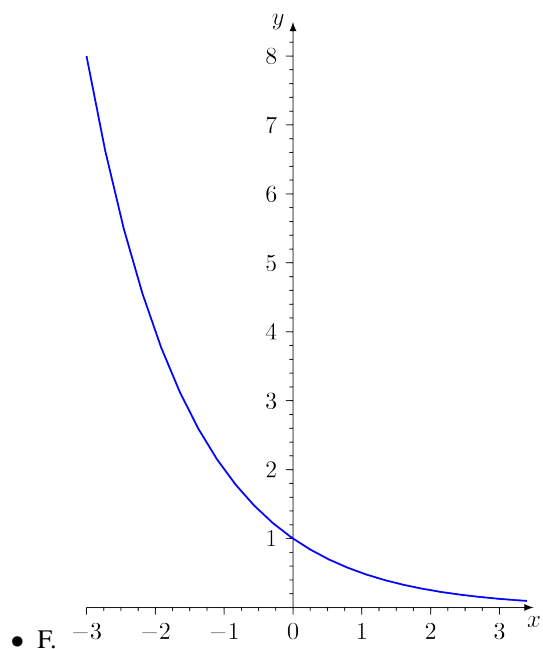
● A.

● B.

● C.

● D.

● F.

● E.

¡!-

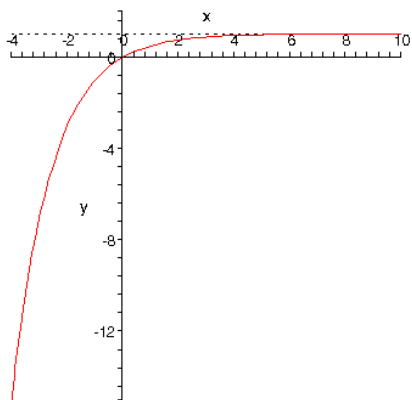**Problem 1.** (1 point) Cooper_oml/Cooper_oml.v2/Cooper_7/Cooper_7_1 3_36.pg

Cooper 7.13.36

Here is the graph $y = 2^x$
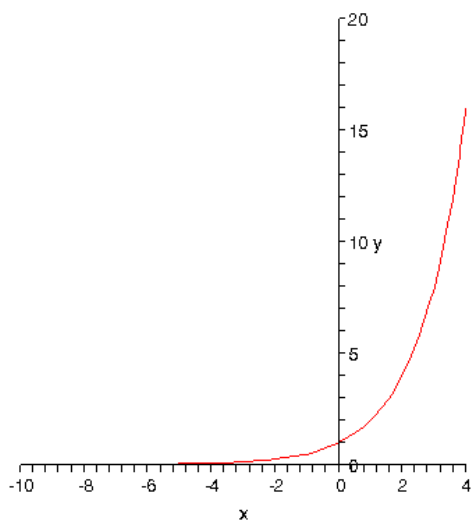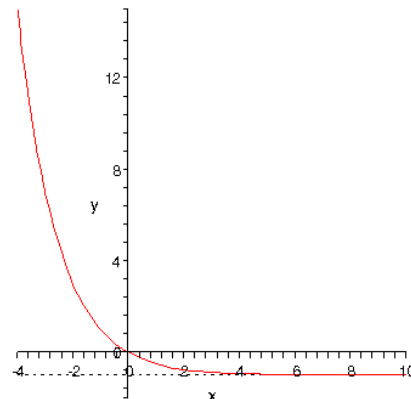

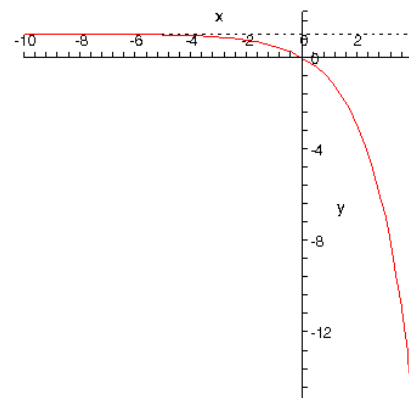On your paper, sketch the graph of $y = 1 - 2^{-x}$ [HINT: first sketch 2^{-x}]
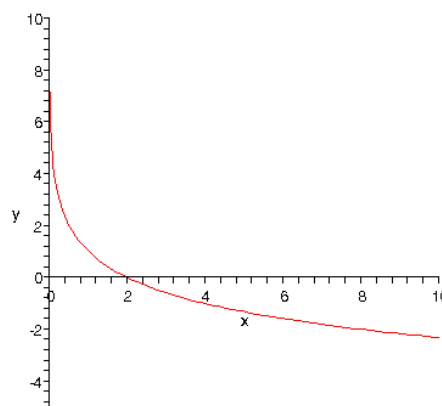
Which of these best matches your graph?

• A.

• B.

• C.

• D.

• E.
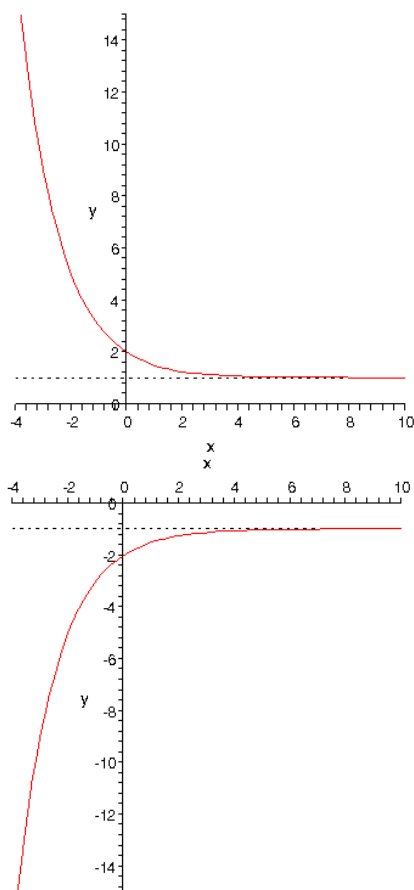
• F.

What does your graph tell you about $1 - 2^{-x}$ when x is large? If you believe it will be close to a number, write that number. If you believe it will be approaching ∞ or $-\infty$, then write 'infinity' or '-infinity'.

_____

¡!-
Answer(s) submitted:

•
•

(incorrect)
Correct Answers:

• A
• 1

Cooper 7.13.45

On the planet Maximillian live Sprogs and Graks. Initially there were 2400 sprogs and 300 Graks. The population of Sprogs doubles every 14 years and that of Graks doubles every 7 years.

a) How many Graks were there after $3\frac{1}{2}$ years?

_____ Graks

b) When are there as many Sprogs as Graks?

_____ years later

¡!-
Answer(s) submitted:

•
•

(incorrect)
Correct Answers:

• `300*2^(.5)`
• `6*7`

Problem 3. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_7/Cooper_7_1`
`3_51.pg`

Cooper 7.13.51

Use natural logs to solve the following:

a) $e^x = 10$

x= _____

b) $e^{2x} = e^{16}$

x= _____

c) $5^x = 7$

x= _____

d) $8 \times 2^x = 3^x$

x= _____

Problem 4. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2`
`_39.pg`

Cooper 3.2.39

An airplane departs from LA and flies to NY every 30 minutes. The trip takes 5 hours and 5 minutes. An airplane takes off from NY at the same time that one takes of from LA and flies to LA at the same speed. How many planes does it pass going in the opposite direction?.

_____

Problem 5. (2 points) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_`
`2_43.pg`

Cooper 3.2.43

An airline sells all the tickets for a certain route at the same price. If it charges 200 dollars per ticket it sells 10,000 tickets. For every 15 dollars the ticket price is reduced, an extra thousand tickets are sold. Thus if the tickets are sold for 185 dollars each then 11,000 tickets sell. It costs the airline 100 dollars to fly a person.

(a) Express the total profit P in terms of the number n of tickets sold.
(b) Express the total profit P in terms of the price p of one ticket.

(a) P(n)= $ _____

(b) P(p)= $ _____
You will see this type problem a lot when we do max/min problems in calculus.

Problem 6. (2 points) `local/setHW14/Cooper_3_2_45-revised.pg`

Cooper 3.2.45
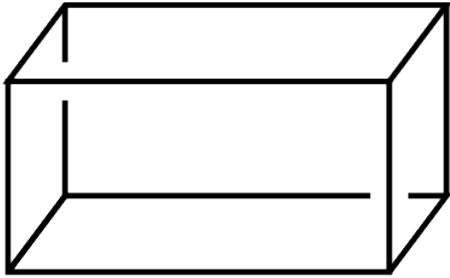
Frame shown thick

An aquarium with a square base has no top. There is a metal frame. Glass costs 9 dollars/m² and the frame costs 7 dollars/m. The volume is to be 20 m³. Express the total cost C in terms of the height h in meters. (Hint: work out the cost of the glass and frame separately.)

$C(h) =$ _____ dollars

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `9(20/h+4*sqrt(20*h))+7(8*sqrt(20/h)+4*h)`

Problem 7. (2 points) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_53.pg`

Cooper 3.2.53

A hummingbird needs 10 grams of sugar and 8 grams of protein each day. One honeysuckle flower provides 20 mg of sugar and 10 mg of protein. One nasturtium flower provides 10 mg of sugar and 10 mg of protein. It takes 10 seconds to feed from a nasturtium and 15 seconds per honeysuckle. How many minutes does it take to get exactly the food it needs? (1 gram equals 1000 mg.)

_____ minutes

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `(15*(200)+10*(600))/60`

Problem 1. (2 points) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_1_1.pg`

Cooper 8.1.1

Cooper 8.1.1

The distance in miles of a car from its starting point after t hours is given by the formula $f(t) = 60t$.

(a) What is the average rate of change of $f(t)$ between $t = 4$ and $t = 6$

_____

(b) What is the average rate of change of $f(t)$ between $t = 4$ and $t = 5$

_____

(c) What is the average rate of change of $f(t)$ between $t = 4$ and $t = 4.1$

_____

(d) On graph paper sketch y=f(t) for $0 \le t \le 4$. What is the slope of your graph?

_____

(e) What are the units of the slope?

- A. Miles per hour squared
- B. Hours
- C. Square miles
- D. Miles per hour
- E. Hours per mile
- F. Miles

¡!-
Answer(s) submitted:

-
-
-
-
-

(incorrect)
Correct Answers:

- 60

- 60
- 60
- 60
- D

Problem 2. (1 point) `local/setHW15/Cooper_8_1_2-revised.pg`

Cooper 8.1.2
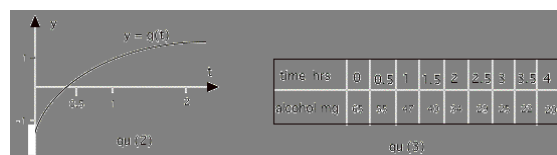
For this problem refer to the graph of $y = g(t)$ labelled qu(2) above (also shown on page 121 of the text).

(a) Find the average rate of change of $g(t)$ between $t = 0$ and $t = 2$.

_____

(b) Find the average rate of change of $g(t)$ between $t = 0$ and $t = 1$.

_____

(c) Find the average rate of change of $g(t)$ between $t = 0$ and $t = 0.5$.

_____
¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- 1.375
- 2.25
- 3

Problem 3. (2 points) `local/setHW15/Cooper_8_1_3-revised.pg`

Cooper 8.1.3

Time (hrs)	0	.5	1	1.5	2	2.5	3	3.5	4
Alcohol (mg)	65	55	47	40	34	29	25	22	20

The table above shows how much alcohol is in the blood of a rat during a period of 4 hours. on average, how quickly is the amount of alcohol decreasing during the following time periods

(a) t=2 and t=4

_____ mg/hour

(b) t=2 and t=3

_____ mg/hour

(c) t=2 and t=2.5

_____ mg/hour

(d) During which half hour period was the rate of decrease fastest?

The half hour period starting at t=_____
¡!-
Answer(s) submitted:

-
-
-
-

(incorrect)
Correct Answers:

- 7
- 9
- 10
- 0

Problem 4. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_1_4.pg`

Cooper 8.1.4

A tanker ship is off-loading its oil tank at a terminal. It takes 20 minutes to fill a 600 gallon tank. What is the average flow rate of oil into the truck in gallons per hour?

_____ gallons per hour
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 1800

Problem 5. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_2_1.pg`

Cooper 8.2.1

A car drives at 40 miles per hour for 1 hour then at 50 miles per hour for the next 30 minutes and then is stationary for 30 minutes. On a piece of graph paper, sketch a graph showing distance traveled against time taken. What was the average speed over the entire two hours?

_____ miles per hour
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 32.5

Problem 6. (**1 point**) `local/setHW15/Cooper_8_2_3-revised.pg`

Cooper 8.2.3

The table shows the position of a point on the *x*-axis during the time interval $0 \le t \le 1$ where *x* is measured in meters and *t* in seconds.

t	0	.2	.4	.6	.8	1
x	3	3.8	4.8	6.0	7.4	9.0

(a) Estimate the speed of the particle at t=0.9.

_____ m/s

(b) When was the speed greatest?

During the interval starting at t=_____seconds

(c) What was the average speed during the one second?

_____m/s

¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- 8
- 0.8
- 6

Problem 7. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_2_4.pg`

Cooper 8.2.4

Suppose that an object is moving along the ground and that the distance (in centimeters) it has travelled after t seconds is given by the formula $f(t) = t^2$ *cm*. Calculate the average speed during the 1 millionth of a second after t=2.

_____cm/s

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `4.00000100064801`

Cooper 8.2.5

The graph below (or on page 124 of the text) shows the height of a ball thrown into the air on the planet Brontitaur. The vertical units are meters and the horizontal units seconds. Calculate the average speed of the ball on the following intervals.
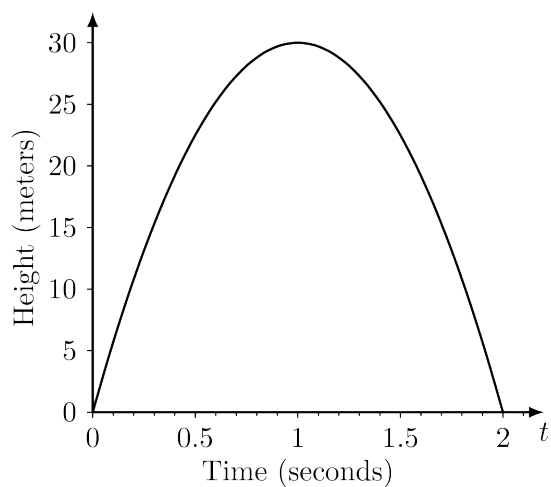
$[0, .5]$

_____m/s

$[.5, 1]$

_____m/s

$[1, 1.5]$

_____m/s

$[1.5, 2]$

_____m/s

What is the speed of the ball at t=1?

_____m/s

¡!-
Answer(s) submitted:

-
-
-
-
-

(incorrect)
Correct Answers:

- 40
- 20
- 20
- 40
- 0

Problem 1. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_7/Cooper_7_1` `3_32.pg`

Cooper 7.13.32

Solve $a \times b^t = c \times d^t$ for t.

t= _____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `(ln(a)-ln(c))/(ln(d)-ln(b))`

Problem 2. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_2` `_8.pg`

Cooper 8.2.8

The population (in millions) of a certain country t years after 1900 is given by the function $p(t)$. There were 480 million in 1900. If $p'(t) = 5$ throughout the time span 1900 to 1910, what was the population of the country in 1907? (Hint: What was the practical signifigance of $p'(t) = 5$)

_____people
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `515000000`

Problem 3. (**1 point**) `local/Cooper_8_2_9-revised.pg`

Cooper 8.2.9

After t years I have $f(t)$ thousand dollars in the bank.

(a) What are the units of $f'(t)$?
- A. Thousands of dollars per year.
- B. Thousands of dollars
- C. Years per thousand dollars
- D. Dollars
- E. Dollars per year
- F. Years

(b) What is the practical meaning of $f'(7) = 0.3$?
- A. My account is increasing at a rate of 30 cents per year at the start of year 7.
- B. My account is increasing at a rate of 300 dollars per year at the start of year 7.
- C. My account will increase by 300 dollars during the 7th year.
- D. My account is increasing at a rate of 7000 dollars a year in April of the first year.

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- `A`
- `B`

Cooper 8.3.2

The volume (in m³) of water in my (large) bathtub when I pull out the plug is given by $f(t) = 4 - t^2$ (t is in minutes). This formula is only valid for the two minutes it takes my bath to drain.

(a) Find the average rate the water leaves my tub between $t = 1$ and $t = 2$

_____

(b) Find the average rate the water leaves my tub between $t = 1$ and $t = 1.1$

_____

(c) What would you guess is the exact rate water leaves my tub at $t = 1$?

_____

(d) In this bit h is a very small number. Find the average rate the water leaves my tub between $t = 1$ and $t = 1 + h$. Simplify your answer as much as possible.

_____

(e) What do you get if you put in $h = 0$ in the answer to (d)?

_____

¡!-
Answer(s) submitted:

-
-
-
-
-

(incorrect)
Correct Answers:

- 3
- 2.1
- 2
- 2+h
- 2

Cooper 8.4.3

An ice cube is melting. The mass of the ice cube after t minutes is $m(t)$ grams. You are told that the rate of change of $m(t)$ is -4 grams/min.

(a) How much mass does the ice cube lose in 5 minutes?

_____grams

(b) If the ice cube starts out with a mass of 80 grams how long until it has all melted?

_____minutes

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 20
- 20

Problem 6. (1 point) `local/setHW16/Cooper_8_4_4.pg`

Cooper 8.4.4

Acceleration is the rate of change of velocity. The velocity (positive means down) of a pumpkin thrown off the top of Cheadle hall t seconds after launch is $32t$ ft/sec (until it hits the ground).

(a) What is the average rate of change of velocity between $t = 1$ and $t = 2$?

_____feet per second per second

(b) What is the average rate of change of velocity between $t = 1$ and $t = 1.1$?

_____feet per second per second

(c) If the pumpkin lands after 2.5 seconds, what is the speed of the pumpkin when it hits?

_____feet per second

¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- 32
- 32
- 80

Problem 7. (1 point) `local/Cooper_8_4_6-revised.pg`

Cooper 8.4.6

Use the graph of $y = x^2$ below to calculate the following. (This graph is also on page 128 of your book).

$y = x^2$
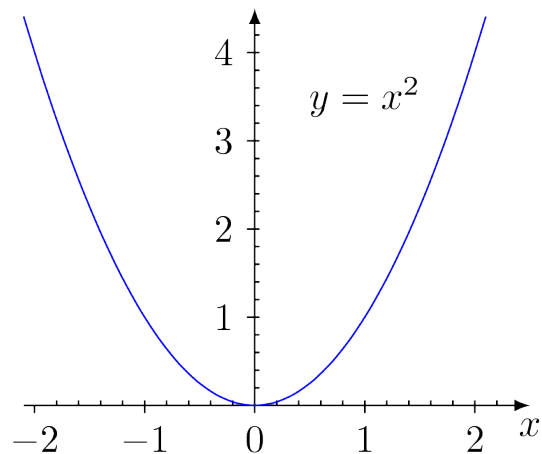
(a) What is the slope of the tangent line to the graph at $x = 1.5$?

_____

(b) What is the slope of the tangent line to the graph at $x = -1$?

_____

(c) What is the slope of the secant line that goes through the points with x coordinates $t = 0.5$ and $t = 1$?

_____

¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- 3
- -2
- 1.5

3

Cooper 8.5.1

Let $A(r)$ be the area in square meters enclosed by a circle of radius r meters.

(a) What are the units of $A'(r)$

- A. cubic meters
- B. square meters
- C. meters per minute
- D. meters

(b) What is the meaning of the statement that $A'(3) = 6\pi$

- A. The area increases by 6π square meters whenever the radius is increased by three meters.
- B. When the radius is 6π meters the area is increasing at a rate of 3 square meters per meter of radius.
- C. The area increases by 3 square meters whenever the radius is increased by one meter.
- D. The area increases by 3 square meters whenever the radius is increased by 6π meters.
- E. When the radius is 3 meters the area is increasing at a rate of 6π square meters per three meters of radius.
- F. When the radius is 3 meters the area is increasing at a rate of 6π square meters per meter of radius.
- G. The area increases by 6π square meters whenever the radius is increased by one meter.

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- D
- F

Cooper 8.5.2

The height of an airplane above the ground when it has flown x miles is $h(x)$ feet.

(a) What are the units of $h'(x)$?

- A. unitless
- B. miles per foot
- C. foot-miles
- D. feet per mile
- E. feet per hour

(b) What is the meaning of the statement that $h'(10) = 500$?

- A. After 11 miles the plane is 500 feet higher than it was after 10 miles.
- B. The plane rises 500 feet for every mile it flies.
- C. When the plane has flown 10 miles it is rising at a rate of 500 feet per mile of flight.
- D. When the plane has flown 10 miles it is rising at a rate of 500 feet per 10 miles of flight.
- E. The plane rises 10 feet for every 500 miles it flies.
- F. The plane rises 10 feet for every mile it flies.
- G. The plane rises 500 feet for every 10 miles it flies.

(c) During which part of the flight would you expect $h'(x)$ to be negative?

- A. ascent
- B. descent
- C. acceleration
- D. cruising
- E. deceleration

(d) What would it mean if $h'(x)$ were negative?

- A. The plane is getting colder.
- B. The plane is losing altitude.
- C. The plane is gaining speed.
- D. The plane is losing speed.
- E. The plane is taking off.
- F. The plane is gaining altitude.

¡!-
Answer(s) submitted:

-
-
-
-

(incorrect)
Correct Answers:

- D

4

- C
- B
- B

Problem 10. **(1 point)** `local/setHW16/Cooper_8_5_3-revised.pg`

Cooper 8.5.3

The volume of water in a reservoir depends on the height of the water measured on a marker on a dam. If the volume is $V(x)$ gallons when the height is x meters:

(a) What are the units of $V'(x)$?
- A. gallons per meter
- B. meters per gallon
- C. gallon-meters
- D. gallons per minute

(b) What is the meaning of $V'(30) = 5 \cdot 10^7$?
- A. When the height is $5 \cdot 10^7$ meters the volume is increasing at a rate of 30 gallons per meter of height.
- B. The volume increases by 30 gallons whenever the height is increased by $5 \cdot 10^7$ meters.
- C. The volume increases by $5 \cdot 10^7$ gallons whenever the height is increased by 30 meters.
- D. When the height is 30 meters the volume is increasing at a rate of $5 \cdot 10^7$ gallons per 30 meters of height.
- E. The volume increases by $5 \cdot 10^7$ gallons whenever the height is increased by one meter.
- F. When the height is 30 meters the volume is increasing at a rate of $5 \cdot 10^7$ gallons per meter of height.
- G. The volume increases by 30 gallons whenever the height is increased by one meter.

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- A
- F

Problem 1. (1 point) `local/setHW17/Cooper_8_4_7-revised.pg`

Cooper 8.4.7

For this question refer either to the graph for question 7 on page 128 of your textbook or to the reproduction below.
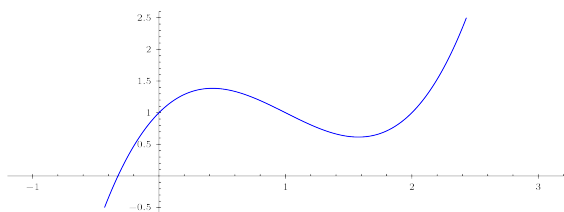
(a) On what intervals is the derivative positive? (Use I for infinity and -I for negative infinity, and enter the left-most interval first.)

___ $< x <$ ___
___ $< x <$ ___

(b) Where is the derivative zero? (Enter the smaller number first.)

x=___

x=___
¡!-
Answer(s) submitted:

-
-
-
-
-
-

(incorrect)
Correct Answers:

- -I
- 0.4
- 1.6
- I
- 0.4
- 1.6

Problem 2. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_4_9.pg`

Cooper 8.4.9

The number of hours of daylight in Santa Barbara varies throught the year and is given by the graph for question 9 on page 128 of the text.

(a) How many days after January 1st is the longest day?

_____

(b) How many days after January 1st is the shortest day?

_____

(c) How many days after January 1st is the number of hours of daylight increasing most rapidly?

_____

(d) How many days after January 1st is the number of hours of daylight decreasing most rapidly?

_____
¡!-
Answer(s) submitted:

-
-
-
-

(incorrect)
Correct Answers:

- 175
- 355
- 100
- 250

Cooper 8.4.10

Use the graph of $f(x) = 10^x$ at the back of the text to find:

(a) The average rate of change of $f(x)$ between $x = 0.3$ and $x = 0.4$.

_____

(b) The slope of the tangent line to the graph at $x = 0.35$.

$m =$ _____

(c) The slope of the line tangent to $g(x) = 2 \times 10^x$ at $x = 0.35$.

$m =$ _____

(d) The slope of the line tangent to $h(x) = C \times 10^x$ at $x = 0.35$, where C is any constant.

$m =$ _____
¡!-
Answer(s) submitted:

-
-
-
-

(incorrect)
Correct Answers:

- 5
- 5.2
- 10.4
- 5.2*C

Cooper 8.5.2

The height of an airplane above the ground when it has flown x miles is $h(x)$ feet.

(a) What are the units of $h'(x)$?

- A. feet per hour
- B. unitless
- C. miles per foot
- D. feet per mile
- E. foot-miles

(b) What is the meaning of the statement that $h'(10) = 500$?

- A. The plane rises 10 feet for every mile it flies.
- B. When the plane has flown 10 miles it is rising at a rate of 500 feet per mile of flight.
- C. The plane rises 10 feet for every 500 miles it flies.
- D. After 11 miles the plane is 500 feet higher than it was after 10 miles.
- E. The plane rises 500 feet for every mile it flies.
- F. The plane rises 500 feet for every 10 miles it flies.
- G. When the plane has flown 10 miles it is rising at a rate of 500 feet per 10 miles of flight.

(c) During which part of the flight would you expect $h'(x)$ to be negative?

- A. descent
- B. acceleration
- C. ascent
- D. deceleration
- E. cruising

(d) What would it mean if $h'(x)$ were negative?

- A. The plane is gaining speed.
- B. The plane is gaining altitude.
- C. The plane is taking off.
- D. The plane is losing altitude.
- E. The plane is getting colder.
- F. The plane is losing speed.

¡!-
Answer(s) submitted:

-
-
-
-

(incorrect)
Correct Answers:

- D

- B
- A
- D

Cooper 8.5.4

If a commodity is priced at p dollars the number of items that sell is $Q(p)$.

(a) What does $Q(50) = 20,000$ mean?

- A. For every 50 dollars the price of the commodity decreases, 20,000 more items are sold.
- B. When the commodity costs 50 dollars for every dollar the price of the commodity is increased 20,000 more items are sold.
- C. For every 20,000 dollars the price of the commodity decreases, 50 more items are sold.
- D. At a price of 50 dollars 20,000 items of the commmodity are sold.
- E. At a price of 20,000 dollars 50 items of the commodity are sold.

(b) What are the units of $Q'(p)$?

- A. unitless
- B. item-dollars
- C. dollars per item
- D. dollars per year
- E. items per dollar

(c) What is the meaning of the statement that $Q'(50) = -200$?

- A. 50 fewer items are sold for every dollar increase in price.
- B. At 49 dollars 200 more items are bought then at 50 dolalrs.
- C. When the price is 50 dollars, the rate at which sales are decreasing is 200 items per 50 dollars.
- D. When the price is 50 dollars, the rate at which sales are decreasing is 200 items per dollar.
- E. 200 fewer items are sold for every dollar increase in price.
- F. At 51 dollars 200 fewer items are bought then at 50 dollars.
- G. 200 fewer items are sold for every 50 dollar increase in price.
- H. 50 fewer items are sold for every 200 dollar increase in price.

¡!-
Answer(s) submitted:

-
-
-

(incorrect)

3

Problem 6. **(1 point)** `local/setHW17/Cooper_8_5_5-revised.pg`

Cooper 8.5.5

The number of people who will develop an infectious disease depends on the percentage of people inoculated. If x is the percentage of people inoculated then $f(x)$ people get the disease.

(a) What does $f(0) = 10^6$ mean?

- A. When 1 million percent of people are inoculated, then no one gets the disease.
- B. When no one is inoculated, for each percentage of the population that gets an inoculation, the number of people who get an infection goes down by 1 million.
- C. When no people are inoculated then 1 million people will get the disease.
- D. For each additional 1 percent of the population that is not inoculated, 1 million more people get the disease.
- E. 1 million people will get infected regardless of what percent of the population is inoculated.

(b) What is the meaning of the statement that $f'(50) = -10^4$?

- A. 10,000 fewer infections occur for every increase of 50 percent in the inoculated population.
- B. At 49 percent inoculation 10,000 more infections occur.
- C. 10,000 fewer infections occur for every increase of 1 percent in the inoculated population.
- D. 50 fewer infections occur for every increase of 1 percent in the inoculated population.
- E. When 50 percent of the people are innoculated, the rate at which infections would decrease is 10,000 infections per inoculated percentage of the population.
- F. At 51 percent inoculation 10,000 fewer infections occur.

(c) What does $f^{-1}(100) = 85$ mean?

- A. When 85 percent of the people are inoculated, the number of infections decreases by 100 for every increase of 1 in the percentage of people inoculated.
- B. 85 people get the disease when 100 percent of the population is inoculated.
- C. 100 people get the disease when 85 percent of the population is inoculated.
- D. When 100 percent of the people are inoculated, the number of infections increases by 85 for every decrease of 1 in the percentage of people inoculated.

¡!-

Answer(s) submitted:

-

- •
- •

(incorrect)
Correct Answers:

- C
- E
- C

Problem 7. (1 point) `local/setHW17/Cooper_7_13_43-revised.pg`

Cooper 7.13.43

Some biologists at UCSB have carefully recorded the number of elephant seal births in the Channel Islands from aerial photographs since the 1950's. The table records this data. Using graph paper from the back of the textbook, draw a graph showing the logarithm of the data (on the *y*-axis) plotted against time (on the *x*-axis). Draw the best straight line you can through the data.

Elephant Seal Births in Channel Islands
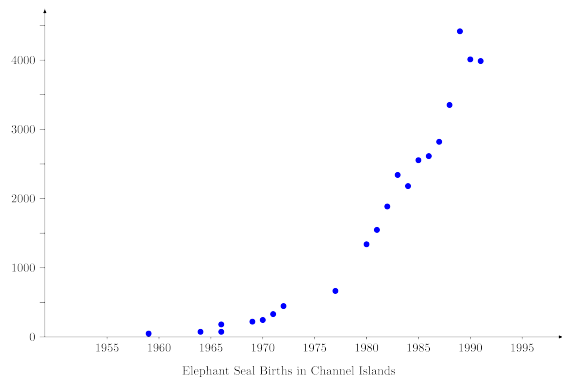
year	59	64	66	68	69	70	71	72	77	80	81
seal births	49	74	134	181	221	245	330	446	665	1339	1547

year	82	83	84	85	86	87	88	89	90	91
seal births	1885	2341	2180	2554	2613	2820	3352	4417	4011	3987

Based on your graph, how many seal births would you expect in 1997?

_____

¡!-
Answer(s) submitted:

- •

(incorrect)
Correct Answers:

- 15000

Problem 8. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_29.pg`

Cooper 3.2.29

There are 42 animals in a farmyard. Some are cows and some are chickens. In total there are 104 legs. How many chickens are there?

number of chickens= _____
¡!-
Answer(s) submitted:

- •

(incorrect)
Correct Answers:

- 2*42-52

Problem 9. (1 point) `local/setHW17/Cooper_3_2_32.pg`

Cooper 3.2.32

The number N of bacteria after t hours is $N(t) = A \cdot 2^t$. Initially there are 125 bacteria. How many are there after 3 hours?.

N(3)= _____
¡!-
Answer(s) submitted:

- •

(incorrect)
Correct Answers:

- 125*2^3

Problem 10. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_33.pg`

Cooper 3.2.33

A manufacturer wishes to make tee-shirts for the band Dixie Chicks. They sell for $18 each. She must deliver all the tee-shirts in 20 days time. The manufacturer will first set up some machines. Once all machines are set up she will turn them on. Each machine takes one day to set up. A machine produces 200 shirts in one day. All the machines must be set up before any of them are turned on. Express the total amount of money M she will receive for the shirts in terms of the number n of machines she decides to set up (assuming she sells all the shirts she makes).

M(n)= $ _____
¡!-

Answer(s) submitted:

- •

(incorrect)
Correct Answers:

- 200*(20-n)*18*n

Problem 1. (1 point) `local/setHW18/new-tangent-line-approx.pg`

Suppose the tangent line to $y = f(x)$ at $x = 5$ is $y = 7x + 8$.

(a) Find the value of $f(5)$.
$f(5) =$ _____

(b) Find the value of $f'(5)$.
$f'(5) =$ _____

(c) Use the tangent line approximation to estimate $f(5.1)$.
$f(5.1) \approx$ _____

Answer(s) submitted:

-
-
-

(incorrect)

Correct Answers:

- 43
- 7
- 43.7

Problem 2. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_6_1.pg`

Cooper 8.6.1

If $f(3) = 7$ and $f'(3) = 4$, what does the tangent line approximation give as an approximation for

(a) f(3.1)

_____

(b) f(3.01)

_____

(c) Which of these answers would you expect to be more accurate?

- A. part (b)
- B. part (a)

¡!-

Answer(s) submitted:

-
-
-

(incorrect)

Correct Answers:

- 7.4
- 7.04
- A

Problem 3. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_6_2.pg`

Cooper 8.6.2

Use the graph of $y = 10^x$ at the back of the book. Find the tangent line approximation to $f(x) = 10^x$ at x=0.5. Use this approximation to calculate $10^{0.6}$.

f(0.6) $\approx$ _____

What is the percentage error?

_____%

¡!-

Answer(s) submitted:

-
-

(incorrect)

Correct Answers:

- 3.89041900018956
- 2.27709300536778

Problem 4. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_6_3.pg`

Cooper 8.6.3

You will see later that if $f(x) = \sqrt{x}$, then $f'(4) = 1/4$. Use this to find

(a) Use the tangent line approximation at x=4 to f(x) to approximate $\sqrt{4.4}$

$\sqrt{4.4} \approx$_____

(b) What is the percentage error in your answer to part (a)?

_____%

(c) Use the tangent line approximation at 4 to f(x) to approximate $\sqrt{9}$.

$\sqrt{9} \approx$_____

(d) What is the percantage error in your answer to part (c)?

_____%

¡!-

Answer(s) submitted:

-
-
-
-

(incorrect)

Correct Answers:

- 2.1
- 0.11357
- 3.25
- 8.33333333333333

Problem 5. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_6_5.pg`

Cooper 8.6.5

Suppose f(x) has derivative $f'(x)$. In this problem, we will discover the derivative of the function $C \times f(x)$, whenever C is some fixed constant.

(a) First, suppose that f(x)=ax+b. Find $f'(x)$ (Hint: derivative is slope).

—————————

(b) Using your answer to (a), find the derivative of $C \times f(x)$ if f(x)=ax+b.

—————————

(c) Now suppose f(x) is an arbitrary function. Based on your results to parts (a) and (b), what do you expect that the derivative of $C \times f(x)$ is (Enter all multiplications)?

—————————

¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- a
- C*a
- C*f'(x)

Problem 6. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_6_6.pg`

Cooper 8.6.6

If f(x)=ax+b and g(x)=cx+d, what is

(a) $f'(x)$ —————————

(b) $g'(x)$ —————————

(c) What is the derivative of f(x)+g(x) —————————
¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- a
- c
- a+c

Problem 7. (1 point) `local/setHW18/Cooper_3_2_50-revised.pg`

Cooper 3.2.50

A sports field is to have the shape shown: a rectangle with a semi-circle on each end. It must have a perimeter of 1400 meters. Express the area A enclosed in terms of the diameter d (in meters) of the semi-circular ends.

$A(d) = $ ————————— m^2
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `3.14159265358979*d**2/4+d*(1400-d*3.14159265358979)/2`

Problem 8. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_42.pg`

Cooper 3.2.42

What is the area of the largest square you can fit inside a circle of radius 10 ? (Hint: draw a diagram, think about the diagonal of the square.)

Area of square= _____
¡!-
Answer(s) submitted:

- •

(incorrect)
Correct Answers:

- 2*10**2

Problem 9. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_48.pg`

Cooper 3.2.48

A commuter railway has 800 passengers a day and charges each one 2 dollars. For each 2 cents the fare is increased, 5 fewer people will ride the train. Express the income I from the train in terms of the ticket price p (in dollars).

I(p)= $_____
¡!-
Answer(s) submitted:

- •

(incorrect)
Correct Answers:

- p*(800-5*100/2*(p-2))

Problem 10. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_3/Cooper_3_2_49.pg`

Cooper 3.2.49

A poster is to have a total area of 500 square centimeters. There is a margin around the edges of 10 cm at the top and 7 cm on the bottom and sides where nothing is printed. Express the printed area A in terms of the width w (in centimeters) of the bottom.

A(w)= _____ cm^2
¡!-
Answer(s) submitted:

- •

(incorrect)
Correct Answers:

- (w-2*7)*(500/w-(10+7))

Problem 1. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_7_1.pg`

Cooper 8.7.1

Find the derivatives of the following functions

(a) $f(x) = x^3$

_____

(b) $f(x) = 2x^4$

_____

(c) $f(x) = 7x^4 - 3x^2 + 1$

_____

(d) $f(x) = x^{-1}$

_____

¡!-
Answer(s) submitted:

-
-
-
-

(incorrect)
Correct Answers:

- `3*x**2`
- `8*x**3`
- `7*4*x**3-3*2*x`
- `-1/x**2`

Problem 2. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_7_2.pg`

Cooper 8.7.2

Find the derivatives of the following functions:

(a) $f(x) = 1 - 5x$

_____

(b) $f(x) = (2 + 3x)^2$

_____

(c) $f(x) = 17 + 2^3$

_____

¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- `-5`
- `18*x+12`
- `0`

Problem 3. (1 point) Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_7_3.pg

Cooper 8.7.3

Find the derivative of the following functions:

(a) $(x^2+1)^2$

_____

(a) $-3x^{-2}+3x$

_____

(c) x^3/x^7

_____

¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- 4*x**3+4x
- 6x**{-3} +3
- -4*x**{-5}

Problem 4. (1 point) Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_7_5.pg

Cooper 8.7.5

Find the derivative of the following function

$$1+x+\frac{x^2}{2!}+\frac{x^3}{3!}+\frac{x^4}{4!}+\frac{x^5}{5!}$$

Simplify your answer. (Remember how factorials like 5! work: see page 74)
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 1+x+x**2/2+x**3/6+x**4/24

Problem 5. (1 point) Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_7_7.pg

Cooper 8.7.7

The height of a missile at time t is given by $f(t)=-at^2+bt$, where a and b are constants. Find the function which gives the rate of change of the missiles height.

_____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- -2at+b

Problem 6. (1 point) Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_7_8.pg

Cooper 8.7.8

Find the equation of the tangent line to $f(x)=x^3+x^2+x+1$ at x=4.

y= _____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 85+(3*4**2+2*4+1)*(x-4)

Problem 7. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_7_9.pg`

Cooper 8.7.9

Suppose $f(x) = 3x^2 + 4$

(a) What is $f'(x)$

_____

(b) Now find $f''(x)$ by differentiating your formula for f' above. ($f''(x)$ is called the second derivative of $f(x)$).

_____

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 6x
- 6

Problem 8. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_7_10.pg`

Cooper 8.7.10

A sphere of radius r has volume $V(r) = \frac{4}{3}\pi r^3$. Find the rate of change of volume with respect to radius.

_____

What quantity for the sphere does the formula for $V'(r)$ give.

_____

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 4* pi* r^2
- surface area

Problem 9. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_7_14.pg`

Cooper 8.7.14

A grain storage silo is in the shape of a giant beer can 100m high and the base is a circle of radius 20m. The height of grain remaining in the silo after t days is $h(t) = 100 - (t^2/4)$.

(a) After how many days is the silo empty?

_____days

(b) How quickly is height increasing after 10 days?

_____meters per day

(c) Use your answer to (b) to say approximately how many cubic meters of grain were removed on day 10.

_____cubic meters

¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- 20
- -5
- 2000*pi

Problem 10. (**1 point**) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_7_16.pg`

Cooper 8.7.16

Find the equation of the tangent line with slope 5 to $y = 2x^2 - 3x$.

$y =$ _____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 5* (x-2) +2

Problem 1. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_7_4.pg`

Cooper 8.7.4

Find the derivatives of the following functions

(a) $(x+1)(x+2)(x+3)$

_____

(b) $f(x) = ax^2 + bx + c$

_____

(c) $f(x) = \frac{x^2+2x+1}{x+1}$ (Hint: Factor the numerator)

_____

¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- `3*x**2+12*x+11`
- `2*a*x+b`
- `1`

Problem 2. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_7_17.pg`

Cooper 8.7.17

Where does the tangent line to $y = e^x$ at $x = 1$ cross the y-axis?

at x = _____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `0`

Problem 3. (1 point) `local/setHW20/Cooper_8_8_1-revised.pg`

Cooper 8.8.1

If $f(x) = e^{5x}$ find

(a) $f'(x) = $ _____

(b) $f'(3) = $ _____

(c) $f'(0) = $ _____

(d) $f''(x) = $ _____
(This is the second derivative of $f(x)$. It is simply the derivative of the derivative; that is, it is the derivative of $f'(x)$.)
¡!-
Answer(s) submitted:

-
-
-
-

(incorrect)
Correct Answers:

- `5exp(5x)`
- `16345086.8623606`
- `5`
- `25exp(5x)`

Problem 4. (1 point) `local/setHW20/Cooper_8_8_2-revised.pg`

Cooper 8.8.2

Find the second derivative $\frac{d^2}{dx^2}(4e^{-5x})$. (This is the derivative of the derivative of $4e^{-5x}$; that is, it is the derivative of $\frac{d}{dx}(4e^{-5x})$.)

_____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- `1*4*5*5*exp(-1*5 * x)`

Problem 5. (**1 point**) `local/setHW20/Cooper_8_8_5-revised.pg`

Cooper 8.8.5

The two functions $s(x)$ and $c(x)$ are given by

$$s(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \frac{x^9}{9!} - \cdots$$

$$c(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \frac{x^8}{8!} - \cdots$$

What is the derivative of $s(x)$? (Enter the first 4 nonzero terms.)

$s'(x) = $ _____

What is the derivative of $c(x)$? (Enter the first 4 nonzero terms.)

$c'(x) = $ _____

Use the two derivatives you just found to figure out the second derivatives of $s(x)$ and $c(x)$. Again enter the first 4 nonzero terms. (Remember from earlier problems that the second derivative is the derivative of the derivative. For example, $s''(x)$ is the derivative of $s'(x)$.)

$s''(x) = $ _____

$c''(x) = $ _____
¡!-
Answer(s) submitted:

-
-
-
-

(incorrect)
Correct Answers:

- `1-x^2/2+x^4/24-x^6/(6*5*24)`
- `-x+x^3/6-x^5/120+x^7/(7*6*5*24)`
- `-x+x^3/6-x^5/120+x^7/(7*6*5*24)`
- `-(1-x^2/2+x^4/24-x^6/(6*5*24))`

Problem 6. (**1 point**) `local/setHW20/Cooper_8_8_6-revised.pg`

Cooper 8.8.6

Remember that in class we saw the formula

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \cdots + \frac{x^n}{n!} + \cdots$$

Use the first three terms of this formula to work out the following approximations.

(a) Approximate $e^{0.1}$.

_____

(b) Use the table in the back of your book (or a calculator) to work out the percentage error.

_____ %

(c) Approximate $e^{0.5}$.

_____

(d) Use the table in the back of your book (or a calculator) to work out the percentage error.

_____ %

(e) Approximate $e^{0.7}$.

_____

(f) Use the table in the back of your book (or a calculator) to work out the percentage error.

_____ %

¡!-
Answer(s) submitted:

-
-
-
-
-
-

(incorrect)
Correct Answers:

- `1.105`
- `0.0154653070264767`
- `1.625`
- `1.43876779669707`
- `1.945`

- 3.41415841257086

Cooper 8.8.11

The temperature in degrees Fahrenheit of a corpse t hours after death is $67 + 31e^{-t/24}$

(a) How quickly is the temperature decreasing after 2 hours?

_____degress Fahrenheit per hour

(b) What is the temperature of the surroundings of the corpse?

_____degrees Fahrenheit

(c) What was the temperature at the point of death?

_____degrees Fahrenheit

¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- 1.18839070222954
- 67
- 98

Cooper 8.10.3

(a) What is the slope of the graph $y = x^2$ at $x = 3$?

_____

(b) Find the equation of the tangent line to $y = x^2$ at $x = 3$

y = _____
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 6
- 2*3*x-3*3

Cooper 8.8.8

A bomb falls with velocity $v(t) = C(1 - e^{-kt})$ where C and k are constants

(a) What is the terminal velocity of the bomb; that is, what is the maximum velocity the bomb can reach regardless of the height of the bomber?
Hint: If the bomb has reached terminal velocity, what is the derivative $v'(t)$?

terminal velocity = _____

(b) Does the bomb ever reach its velocity?

- A. No
- B. Yes

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- C
- A

3

Problem 10. (1 point) `local/setHW20/Cooper_8_10_7-revised.pg`

Cooper 8.10.7

Let $f(x) = x^2 + 5x + 5$

(a) When is the rate of change of f(x) zero?

$x =$ _____

(b) On what interval is the derivative positive? (Use I for infinity and -I for negative infinity.)

_____ $< x <$ _____

(c) On what interval does the graph $y = f(x)$ have positive slope? (Use I for infinity and -I for negative infinity.)

_____ $< x <$ _____
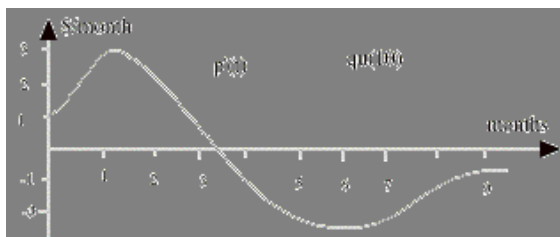
¡!-

Answer(s) submitted:

-
-
-
-
-

(incorrect)

Correct Answers:

- -2.5
- -2.5
- I
- -2.5
- I

Problem 1. (1 point) `local/setHW21/Cooper_8_10_10-revised.pg`

Cooper 8.10.10

The price of IBM stock t months after you buy is $p(t)$ dollars. Below is the graph of $p'(t)$, the derivative of $p(t)$. (It can also be found on page 141 of your textbook.) After how long should you sell for the most profit? (Hint: Your answer need not be an integer).

Warning! This is the graph of $p'(t)$, not $p(t)$.

_____months

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 3.33333333333333

Problem 2. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_12_1.pg`

Cooper 8.12.1

Find the second derivative of

(a) $3x + 7$

_____

(b) $2x^2$

_____

(c) $4x^3$

_____

(d) x^n when $n \geq 2$

_____

(e) x^{-1}

_____

(f) $4x^5 - 3x^3 + 4x^2 + 2x + 7$

_____

(g) $ax + b$ when a and b are constants.

_____

¡!-
Answer(s) submitted:

-
-
-
-
-
-
-

(incorrect)
Correct Answers:

- 0
- 4

- 6*4*x
- n*(n-1)x^(n-2)
- 2x^{-3}
- 80*x^3-18*x+2*4
- 0

Cooper 8.12.3

Let $f(x) = x^4 - 2x^2$

$f''(2) = $ _____

$f''(1) = $ _____
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 44
- 8

Cooper 8.12.4
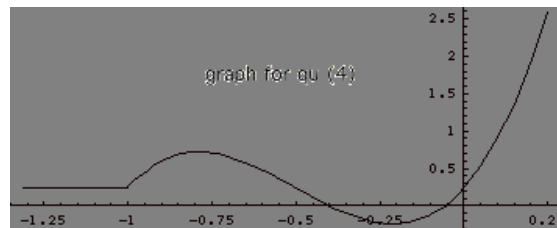
Refer to the graph above (or on page 145 of the text) for this problem.

(a) On what interval does the graph have positive second derivative? (Use I for infinity and -I for negative infinity.)

___ $< x <$ ___

(b) Where is $f'(x) = 0$? Enter your solutions in increasing order.

___ $< x <$ ___

$x = $ ___

$x = $ ___
¡!-
Answer(s) submitted:

-
-
-
-
-
-

(incorrect)
Correct Answers:

- -0.45
- I
- -I
- -1
- -0.8
- -0.2

Problem 5. (1 point) `local/setHW21/Cooper_8_12_5-revised.pg`

Cooper 8.12.5

The height of the water in the reservoir varies with time. After t days the height of the water is $h(t)$ meters. If you know that $h'(30) = 1$ and $h''(30) = -0.5$.

(a) If $h''(x)$ does not change, will the height of the water be rising or falling or stay constant on day 34?

- A. The water will be falling
- B. The water will be rising
- C. The water will stay constant

(b) If $h''(x)$ does not change, will the height of the water be rising or falling or stay constant on day 25?

- A. The water will stay constant
- B. The water will be falling
- C. The water will be rising

¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- A
- C

Problem 6. (1 point) `local/setHW21/Cooper_8_12_6-revised.pg`

Cooper 8.12.6

An object is dropped out of an airplane. The height of the object t seconds after being dropped is $h(t) = 2000 - 5t^2$ meters.

(a) What was the height of the plane when the object was dropped?

_____ meters

(b) What is the velocity of the object at $t = 3$?

_____ m/s

(c) What is the acceleration of the object at $t = 3$?

_____ m/s^2

(d) After how many seconds did the object hit the ground?

_____ seconds

(e) How fast was it going when it hit the ground? (Your answer should be NEGATIVE.)

_____ m/s

¡!-
Answer(s) submitted:

-
-
-
-
-

(incorrect)
Correct Answers:

- 2000
- -30
- -10
- 20
- -200

Problem 7.

Cooper 8.12.7

You are the mayor of a city. Last year the income taxes you collected increased by 2% from the previous year. You look at a graph showing the population of your city and see that it is concave down.

How do you expect the tax revenue to change this year?

- A. Tax revenue will increase by exactly 2 percent.
- B. Tax revenue will increase by more than 2 percent.
- C. Tax revenue will increase by less than 2 percent.

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- C

Problem 8.

Cooper 8.12.9

Let $f(x) = e^{-x}$.

Find $f'(x) =$ _____

Find $f''(x) =$ _____

Find $f'''(x) =$ _____

Find $f^{(4)}(x) =$ _____

Find $f^{(5)}(x) =$ _____

Find $f^{(6)}(x) =$ _____

Find $f^{(7)}(x) =$ _____

Find $f^{(8)}(x) =$ _____

Find $f^{(9)}(x) =$ _____

Find $f^{(10)}(x) =$ _____

¡!-
Answer(s) submitted:

-
-
-
-
-
-
-
-
-
-

(incorrect)
Correct Answers:

- -exp(-x)
- exp(-x)
- -exp(-x)
- exp(-x)
- -exp(-x)
- exp(-x)
- -exp(-x)
- exp(-x)
- -exp(-x)
- exp(-x)

Problem 9. (1 point) `local/setHW21/Cooper_8_12_10-revised.pg`

Cooper 8.12.10

Suppose that $f(x) = 2x^3 - 3x^2 - 36x + 2$.

(a) On which intervals is $f(x)$ increasing? (Use I for infinity and -I for negative infinity.) Enter the intervals in increasing order.

___ $< x <$ ___   and   ___ $< x <$ ___

Hint: When is $(x-3)(x-1)$ positive? The product of two numbers is positive if either they are both positive or else if they are both negative. They are both positive when $x > 3$ they are both negative when $x < 1$. Conclusion: Factor the derivative. It is something like this, but different.

(b) Where is $f(x)$ concave up?

___ $< x <$ ___
¡!-
Answer(s) submitted:
-
-
-
-
-
-

(incorrect)
Correct Answers:
- -I
- -2
- 3
- I
- 0.5
- I

Problem 10. (1 point) `local/setHW21/Cooper_8_12_11-revised.pg`

Cooper 8.12.11

I stood on the top of Cheadle Hall and threw an egg upwards. It landed on the ground after 4 seconds. The height of the egg above Cheadle Hall after t seconds is $h(t) = 12t - 5t^2$ meters.

(a) What is the speed of the egg when it hits the ground?

_____ m/s

(b) After how many seconds is the speed of the egg zero for the first time?

_____ seconds

(c) How high is Cheadle Hall?

_____ meters

(d) How high above the ground did the egg go?

_____ meters
¡!-
Answer(s) submitted:
-
-
-
-

(incorrect)
Correct Answers:
- 28
- 1.2
- 32
- 39.2

Problem 1. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_1` `3_1.pg`

Cooper 8.13.1

Find the maximum of $f(x) = 2 + 5x - x^2$

_____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 8.25

Problem 2. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_1` `3_2.pg`

Cooper 8.13.2

Find the minimum of $5x + 5x^{-1}$ for $x > 0$

_____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 10

Problem 3. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_1` `3_3.pg`

Cooper 8.13.3

A rectangular area is to be fenced in with 300 feet of chicken wire. Find the maximum area that can be enclosed.

_____ ft^2

What are the dimensions?

long side = _____ ft

short side = _____ ft
¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- 5625
- 75
- 75

Problem 4. **(1 point)** `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_1` `3_4.pg`

Cooper 8.13.4

Use calculus to find the largest possible area for a rectangular field that can be enclosed with a fence that is 400 meters long.

_____ m^2
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 10000

Problem 5. (1 point) `local/setHW22/Cooper_8_13_5-revised.pg`

Cooper 8.13.5

Consider $f(x) = 4ax - x^2$. Write down a formula in terms of a for the maximum of $f(x)$.

_____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- (4*a/2)**2

Problem 6. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_12_12.pg`

Cooper 8.12.12

The position of an object on the x-axis after t seconds is $x(t) = t^3 - 4t^2 - 7t + 4$ cm to the right of the origin. At time $t = 1$:

(a) Is the object moving left or right?
- A. The object is moving left
- B. The object is moving right

(b) Is the object speeding up or slowing down?
- A. The object is speeding up
- B. The object is slowing down

(c) Is the acceleration increasing of decreasing?
- A. The acceleration is increasing
- B. The acceleration is decreasing

¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- A
- B
- B

Problem 7. (1 point) `local/setHW22/Cooper_8_12_13-revised.pg`

Cooper 8.12.13

(a) At what point on the graph $y = x^4$ is the slope 32?

$x = $ _____

(b) What is the second derivative at this point?

The second derivative is _____
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 2
- 48

Problem 8. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_10_4.pg`

Cooper 8.10.4

The price of a certain computer stock t days after it is issued for sale is $p(t) = 100 + 20t - 6t^2$ dollars. The price of the stock initially rises, but eventually begins to fall. During what period of time does the stock price rise?

$0 \leq t \leq$ _____

If you owned the stock, after how many days would you sell it?

_____days
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- 1.66666666666667
- 1.66666666666667

Problem 9. (1 point) Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_1 0_5.pg

Cooper 8.10.5

A circular cloud of poison gas from a factory explosion is expanding so that t hours after the explosion the radius of the cloud is $R(t) = 50 + 20t$ meters. How fast is the area of the cloud increasing 5 hours after the explosion?

_____square meters per hour

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 18849.5559215388

Problem 10. (1 point) local/setHW22/Cooper_8_10_6-revised.pg

Cooper 8.10.6

Air is pumped into a spherical balloon, so the balloon expands. The volume of a sphere of radius R is $4\pi R^3/3$. If the radius of the sphere after t seconds is $2t$ centimeters, at what rate is air being pumped in when $t = 4$?

Hint: The rate air is pumped in equals the rate that the volume of the sphere increases.

_____ cubic centimeters per second

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 32*pi*4*4

Problem 1. (1 point) `local/setHW23/Cooper_8_13_8-revised.pg`

Cooper 8.13.8

A farmer wants to make a rectangular field with a total area of 200 m². It is surrounded by a fence. It is divided into 3 equal areas by fences. What is the shortest total length of fence with which this can be done?

_____ meters

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 80

Problem 2. (1 point) `Cooper_oml/Cooper_oml.v2/Cooper_8/Cooper_8_1 3_9.pg`

Cooper 8.13.9

A manufacturer wishes to make tee-shirts for the band Indigo Girls. They sell for 19 dollars each. She must deliver all the tee-shirts in 20 days time. The manufacturer will first set up some machines. Once all machines are set up she will turn them on. Each machine takes one day to set up. A machine produces 200 tee-shirts in one day. All the machines must be set before any of them are turned on.

(a) Express the amount of money she will receive for the shirts in terms of the number of machines m she decides to set up.

$_____

(b) Use calculus to find out how many machines she should set up to obtain the most money.

$m = $ _____
¡!-
Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- `19*200*m*(20-m)`
- `10`

Cooper 8.13.10

An airline sells all tickets for a certain route at the same price. If it charges 250 dollars per ticket it sells 5000 tickets. For every 10 dollars the ticket price is reduced, an extra 1000 tickets are sold. It costs the airline a hundred dollars to fly a person.

What price will generate the greatest profit for the airline?

$_____

¡!-

Answer(s) submitted:

-

(incorrect)

Correct Answers:

- 200

Cooper 8.13.11

A commuter railway has 800 passengers per day and charges each one two dollars per day. For each 4 cents that the fare is increased, 5 fewer people will go by train. What is the greatest profit that can be earned?

$_____

¡!-

Answer(s) submitted:

-

(incorrect)

Correct Answers:

- 2205

Cooper 8.13.12

A poster is to have a total area of 125 cm^2. There is a margin round the edges of 6 cm at the top and 4 cm at the sides and bottom where nothing is printed.

What width should the poster be in order to have the largest printed area?

_____ cm

¡!-

Answer(s) submitted:

-

(incorrect)

Correct Answers:

- 10

Cooper 8.13.15

On a certain island there are two populations of deer. After t years the numbers of deer in the two populations are $p(t) = 200e^t$ and $q(t) = 1000e^{-t}$. When is the total population smallest?

t=_____

¡!-

Answer(s) submitted:

-

(incorrect)

Correct Answers:

- 0.80471895621705

Problem 7. (**1 point**) `local/setHW23/Cooper_8_13_16-revised.pg`

Cooper 8.13.16

A cylindrical metal can is to have no lid. It is to have a volume of 64π in^3. What height minimizes the amount of metal used?

_____ in

Answer(s) submitted:

- •

(incorrect)
Correct Answers:

- • 4

Problem 8. (**1 point**) `local/setHW23/Cooper_8_13_17-revised.pg`

Cooper 8.13.17

A farmer can get 2 dollars per sack of potatoes on the first of July and after that the price drops by 2 cents per sack per day. On July first, the farmer has 80 sacks of potatoes in the ground. She estimates that the crop is increasing by 1 sack per day.

When should she harvest to get the most money? (Express your answer as the number of days after the first of July.)

_____ days

Answer(s) submitted:

- •

(incorrect)
Correct Answers:

- • 10

Problem 9. (**1 point**) `local/setHW23/Cooper_8_13_18-revised.pg`

Cooper 8.13.18

A wise old troll wants to make a small hut. Roofing material costs 5 dollars per square foot and wall materials cost 3 dollars per square foot. According to ancient troll customs the floor must be square, but the height is not restricted.

(a) Express the cost of the hut in terms of its height h and the length x of the side of the square floor.

$ _____

(b) If the troll has only 2535 dollars to spend, what is the biggest volume hut he can build?

_____ ft^3

Answer(s) submitted:

- •
- •

(incorrect)
Correct Answers:

- • 12*x*h+5*x**2
- • 1830.83333333333

Problem 10. (**1 point**) `local/setHW23/Cooper_8_13_20-revised.pg`

Cooper 8.13.20

A rectangular field will have one side made of a brick wall and the other three sides made of wooden fence. Brick wall costs 10 dollars per meter and wooden fence costs 25 dollars for 5 meters. The area of the field is to be 3750 m^2.

What length should the brick wall be to give the lowest total cost of wall plus fence?

_____ meters

Answer(s) submitted:

- •

(incorrect)
Correct Answers:

- • 50

Problem 1. **(1 point)** `Cooper_oml/Cooper_8/Cooper_8_13_1.pg`

Cooper 8.13.1

Find the maximum of $f(x) = 2 + 4x - x^2$

_____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 6

Problem 2. **(1 point)** `Cooper_oml/Cooper_8/Cooper_8_13_3.pg`

Cooper 8.13.3

A rectangular area is to be fenced in with 400 feet of chicken wire. Find the maximum area that can be enclosed.

_____ ft^2

What are the dimensions?

long side = _____ ft

short side = _____ ft
¡!-
Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- 10000
- 100
- 100

Problem 3. **(1 point)** `Cooper_oml/Cooper_8/Cooper_8_13_5.pg`

Cooper 8.13.5

Consider $f(x) = 2ax - x^2$. Write down a formula in terms of a for the maximum of f(x).

_____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- (2*a/2)**2

Problem 4. **(1 point)** `Cooper_oml/Cooper_8/Cooper_8_13_6.pg`

Cooper 8.13.6

A rectangular field is to have an area of 1100 m^2 and is to be surrounded by a fence. The cost of the fence is 14 dollars per meter of length. What is the minimum cost this can be done for?

$_____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 1857.30988259902

Problem 5. **(1 point)** `Cooper_oml/Cooper_8/Cooper_8_13_7.pg`

Cooper 8.13.7

A box, with rectangular sides, base and top is to have a volume of 4 cubic feet. It has a square base. If the material for the base and top costs 10 dollars per square foot and that for the sides costs 20 dollars per square foot, what is the least cost it can be made for?

$_____
¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 240

Problem 6. (**1 point**) `Cooper_oml/Cooper_8/Cooper_8_13_8.pg`

Cooper 8.13.8

A farmer wants to make a rectangular field with a total area of $800m^2$. It is surrounded by a fence. It is divided into 3 equal areas by fences. What is the shortest total length of fence with which this can be done?

_____meters

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 160

Problem 7. (**1 point**) `Cooper_oml/Cooper_8/Cooper_8_13_10.pg`

Cooper 8.13.10

An airline sells all tickets for a certain route at the same price. If it charges 250 dollars per ticket it sells 5000 tickets. For every 10 dollars the ticket price is reduced, an extra 1000 tickets are sold. It costs the airline a hundred dollars to fly a person.

What price will generate the greatest profit for the airline?

$_____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 200

Problem 8. (**1 point**) `Cooper_oml/Cooper_8/Cooper_8_13_19.pg`

Cooper 8.13.19

A manufacturer sells lamps at six dollars each and sells 3000 each month. for each one dollar that the price is increased, 1000 fewer lamps are sold each month. It costs 3 dollars to make one lamp.

What price should lamps be sold at to maximize profit?

$_____

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 6

Problem 9. (**1 point**) `Cooper_oml/Cooper_8/Cooper_8_13_13.pg`

Cooper 8.13.13

A sports field is to have the shape of a rectangle with semi-circles put on the two ends. It must have a perimeter of 900 meters. What is the maximum area possible for the rectangular part.

_____m^2

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 900*900/(8*pi)

Problem 10. (**1 point**) `Cooper_oml/Cooper_8/Cooper_8_13_17.pg`

Cooper 8.13.17

A farmer can get two dollars per sack of potatoes on the first of July and after that the price drops by 1 cents per sack per day. On July 1st the farmer has 80 sacks of potatoes in the ground. She estimates that the crop is increasing by one sack per day.

When should she harvest to get the most money (express your answer as the number of days after the first of July) ?

_____days

¡!-
Answer(s) submitted:

-

(incorrect)
Correct Answers:

- 60