1. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_3_1.pg**

Cooper 1.3.1

Simplify the expression by finding a common denominator.
$\frac{x}{y} + \frac{x}{z}$=?

- A. $\frac{2x}{3yz}$
- B. $\frac{2xz}{yz}$
- C. $\frac{xz+y}{xz}$
- D. $\frac{2xz+2xy}{3yz}$
- E. $\frac{xz+xy}{yzx}$
- F. $\frac{xz+xy}{yx}$
- G. $\frac{z+xy}{yz}$
- H. $\frac{2xy}{xz}$
- I. $\frac{xz+zy}{yz}$
- J. $\frac{xz+xy}{yz}$

¡!-

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2. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_3_2.pg**

Cooper 1.3.2

Simplify the expression by finding a common denominator.

$\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$=?

- A. $\frac{yz+xz+yx}{xz}$
- B. $\frac{yz+xz+yx}{xyz}$
- C. $\frac{yz+xz+yx}{yz}$
- D. $\frac{yz+xz+2yx}{xyz}$
- E. $\frac{yz-xz+yx}{xyz}$
- F. $\frac{y+xz+yx}{xyz}$
- G. $\frac{yz+xz-yx}{xyz}$
- H. $\frac{yz+xz+zyx}{xyz}$
- I. $\frac{yz+xz+yx}{-xyz}$
- J. $\frac{yz+xz+y}{xyz}$
- K. $\frac{yz+x+yx}{xyz}$

¡!-

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3. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_3_4.pg**

Cooper 1.3.4

Solve $\frac{a+2}{3} = 8a + 7$
$a =$ _____
¡!-

---

4. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_3_6.pg**

Cooper 1.3.6

Convert the following percentages into fractions and simplify
$(a)20\%$ $(b)85\%$ $(c)300/x\%$
$a)$ _____
$b)$ _____
$c)$ _____
¡!-

---

5. **(1 pt) Cooper_oml/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 ?
$a) =$ \$ _____

$b) =$ \$ _____

$c) =$ _____ %
¡!-

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6. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_3_8.pg**

Cooper 1.3.8

(a) What is 17% of 13 added to 28% of 2 ?
(b) What is x% of 17 plus 7% of y ?
(c) What is x% of y% as a percentage ?
(a) _____
(b) _____
(c) _____ %
¡!-

---

7. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_3_9.pg**

Cooper 1.3.9

Initially there were 6 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) _____%
¡!-

8. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_3_10.pg**

Cooper 1.3.10

Express x% of 8 plus y% of 8 as a percentage of 11.
_____%
¡!-

9. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_3_11.pg**

Cooper 1.3.11

A manager starts with a salary of 70000 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 ?
$_____
¡!-

10. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_3_12.pg**

Cooper 1.3.12

Express the following as a power of a
(a) $a^4 \times a^5 \times a^7$
(b) $(a^5 \times a^{-7})^4$
(c)$(1/a^{-7})^{-5}$
(for each just put the exponent of a in the answer box)
$a)a$_____

$b)a$_____

$c)a$_____
¡!-

11. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_4_2.pg**

Cooper 1.4.2

Solve
$x+y-2z=0$

$3x+y=1$

$5x+3y+7z=2$
Hint: eliminate the unknowns one by one.
$x =$ ____
$y =$ ____
$z =$ ____

¡!-

12. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_4_3.pg**

Cooper 1.4.3

Solve
$2x+y=5$

$6x+4y=15$
$x =$ ____
$y =$ ____
¡!-

13. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_4_7.pg**

Cooper 1.4.7

Which of the following are solutions of
$2x-3y=1$
(write "y" for yes or "n" for no in the appropriate box).
(a) x=1, y=3 ____

(b) x=2, y=1 ____

(c) x=5, y=3 ____
¡!-

14. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_5_7.pg**
Cooper 1.5.7

Solve $\frac{8}{-3-7x} = -8$
$x =$ _____
¡!-

15. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_5_10.pg**
Cooper 1.5.10

Solve $(2x+5)(4x+2) = (8x+3)(x-4)$
$x =$ _____
¡!-

16. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_5_13.pg**

Cooper 1.5.13

Solve $xy = 63$ and
$x^2+4xy = 301$

First give the answer for positive x, and then give the answer for negative x.
$(x,y) =$ (___, ___)

$(x,y) = (\_\_\_,\_\_\_)$
¡!-

Cooper 1.5.14

17. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_5_14.pg**

Express x in terms of s and t if $(s^2-t^2)x = (s+t)(x+1)$ and simplify your answer
[hint: factor s^2-t^2].
$x =$ _____
¡!-

Cooper 1.5.17

18. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_5_17.pg**

Newton's law of gravity says that the gravitational force, F, between two objects distance R apart, one with mass M and the other with mass m is

$$\boxed{F = \frac{GMm}{R^2}.}$$

Here G is the universal constant of gravity. Express the distance in terms of the other quantities. (Keep uppercase letters uppercase and lowercase letters lowercase in your answer)
$R =$ _____
¡!-

Cooper 1.5.18

19. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_5_18.pg**

(a) Use the quadratic formula to solve the distance formula

$$\boxed{s = ut + \frac{1}{2}at^2}$$

for t in terms of the other quantities. (The quadratic formula gives you two solutions, enter the larger one only.)
(b) Substitute $a = 6, t = 2$, and $u = 5$ into the above formula and find s.
(c) Now check your answer to (a) is correct by plugging in the values for s, a and u from (b) and seeing if your formula gives $t = 2$.
(a) t = _____
(b) s = _____
¡!-

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20. **(1 pt) Cooper_oml/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 8 times the other number. Enter the smaller number first. Hints: page 46 problem solving tips 1-12. Talk to a friend.

_____
_____
¡!-

Cooper 1.5.20

21. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_5_20.pg**

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).
$l =$ _____
¡!-

---

22. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_5_25.pg**
Cooper 1.5.25

Work out without a calculator

$$\left(-3+\left(\frac{2}{3}-\frac{3}{4}\right)^{-1}\right)^{-1}.$$

(Hint: Go one step at a time.)
_____
¡!-

Cooper 1.5.30

23. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_5_30.pg**

Ohm's law states that if a voltage of V volts is applied across a resistance of R ohms (the units that electrical resistance is measured in) and a current of I amps flows then

$$\boxed{V = IR}$$

(a) Express resistance in terms of voltage and current
(b) Express current in terms of voltage and resistance.

$R =$ _____
$I =$ _____
¡!-

Cooper 1.6.1

24. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_6_1.pg**

If $f(x) = -7x-3$ what is (a) $f^{-1}(5)$ (b) $f^{-1}(y)$ (Hint: what does x have to be to give an answer of 5, of y?)

Enter N into a blank if there is no solution.
$f^{-1}(5) =$ _____
$f^{-1}(y) =$ _____
¡!-

Cooper 1.6.2

25. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_6_2.pg**

If $f(x) = x^3$ what is
(a) $f^{-1}(125)$
(b) $f^{-1}(a)$

Enter N into a blank if there is no solution.
$f^{-1}(125) =$ _____ $f^{-1}(a) =$ _____
¡!-

Cooper 1.6.3

26. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_6_3.pg**

If $f(x) = \sqrt{x}$ what is

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

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

(c) $f^{-1}(-9)$

Enter N into a blank if there is no solution.
$f^{-1}(1) =$ _____

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

$f^{-1}(-9) =$ _____

¡!-

Cooper 1.6.9

27. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_6_9.pg**

IF $f(x) = \sqrt{x} + \frac{1}{x} + 3x^2$
Find

(a) $f(2) =$ _____

(b) $f(a) =$ _____

(c) $f(c^2) =$ _____

(d) $f(a+b) =$ _____

(e) $f(y+y^{-1}) =$ _____
¡!-

Cooper 1.6.11

28. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_6_11.pg**

Use the tax table on page 27 to
(a) find $f^{-1}(1860)$
(b) If someone paid 3000 what was their income?
a) _____ (lower limit)
b) _____ (lower limit)
¡!-

Cooper 1.7.5

29. **(1 pt) Cooper_oml/Cooper_1/Cooper_1_7_5.pg**

A rectangular box has dimensions 12 by 16 by 21. Find the length of the diagonal connecting a pair of opposite corners. (Hint: You will use Pythagoras' Theorem twice.)

_____

¡!-

Cooper 3.2.2

30. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_2.pg**

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 = _____
¡!-

Cooper 3.2.3

31. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_3.pg**

(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 $37 + w$ is typed into webwork as (37+w) raised to the power (1/3). ¡!-

32. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_4.pg**

Cooper 3.2.4

To do this problem you need to know that when speed is constant distance=speed · time.

(a) A car travels for 3 hours at 50 mph how far does it go? _____ miles

(b) A car travels 120 miles in 2 hours at constant speed. What was the speed? _____ mph

(c) A car travels at 60 mph. How long does it take to go 200 miles? _____ hours

(d) A car travels for t hours at 60 mph how far does it go? _____ miles

(e) A car travels at v mph. How long does it take to go 120 miles? _____ hours

(f) A car travels for t hours at v mph how far does it go? _____ miles

(g) A car travels x miles at v mph how long does it take? _____ hours

(h) A car travels y miles in t hours, what is its speed? _____ mph

(i) A car goes at v mph for a hours then goes in the opposite direction at u mph for b hours. How far is the car from where it started at the end? _____ miles

¡!-

Cooper 3.2.5

33. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_5.pg**

(a) A liter of paint covers an area of 10 square meters. It takes 3 liters of paint to paint a rectangular wall that is 10 meters high. How wide is the wall ?
(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 ?

(a) width of wall = _____ meters

(b) width of wall = _____ 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.

¡!-

Cooper 3.2.6

34. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_6.pg**

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

¡!-

Cooper 3.2.7

35. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_7.pg**

The first 7 Fibonacci numbers are 1,1,2,3,5,8,13,... each number in the sequence is the sum of the previous two numbers. Thus 13=8+5 and 8=5+3.
(a) What are the eighth and ninth Fibonacci numbers?
(b) What do you get if you subtract the 8th Fibonacci number from the 9th Fibonacci number?

a) eighth= _____ ninth= _____

b) You get the number _____ which is the _____th fibanacci number

¡!-

Cooper 3.2.8

36. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_8.pg**

I have x dollars. Veggie-burgers cost v dollars each and soda costs s dollars each. If I buy y veggie-burgers how many sodas can I buy?

number of sodas you can buy _____

¡!-

Cooper 3.2.9

37. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_9.pg**

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 4 mph the other walks at 3 mph. How long until they meet again?. A mile is 5280 feet.

Time from start _____ hours

¡!-

Cooper 3.2.10

38. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_10.pg**

I have milk that contains 1 percent fat and milk that contains 4 percent fat. A customer wants a double latte made with 1/3 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

¡!-

Cooper 3.2.11

39. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_11.pg**

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 3 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

¡!-

Cooper 3.2.12

40. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_12.pg**

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

¡!-

Cooper 3.2.13

41. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_13.pg**

When a car is driven at 55 mph or slower it goes 20 miles on one gallon of fuel. For every 5 mph faster than 55 mph that the car goes, the number of miles per gallon traveled is reduced by 3.

(a) How many gallons are used to go 200 miles at 80 mph? _____ gallons

(b) How many gallons are used to go x miles at 80 mph? _____ gallons

(c) How many gallons are used to go x miles at v mph (give one answer when $v \leq 55$ and another answer for when $v > 55$ mph)

_____ gallons if $v \leq 55$

_____ gallons if $v > 55$

¡!-

Cooper 3.2.14

42. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_14.pg**

An office block is 270 meters high and each floor has a height of 3 meters. The base of the office block is a square which is 50 meters on each side. Half way up, the office block becomes narrower, with a horizontal cross-section which is a square that is 30 meters on each side. Each office has floor area a square 5 meters by 5 meters. Make a sketch of the office block. How many offices are there?

number of offices= _____

¡!-

Cooper 3.2.15

43. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_15.pg**

(a) A cube has surface area $600m^2$. 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.

¡!-

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44. **(1 pt) Cooper_oml/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) _____

Cooper 3.2.17

45. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_17.pg**

(a) A right-angled triangle has a 45^o angle. If the area is 32 cm^2 what is the length of the perimeter?

(b) Same question, but this time the area is A cm^2

(a) perimeter= _____ cm

(b) perimeter= _____ cm

¡!-

Cooper 3.2.18

46. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_18.pg**

(a) A rectangle has the same area as a square. The long side of the rectangle is four times the length of the short side. The perimeter of the square has length 224 mm. How much longer is the perimeter of the rectangle than the perimeter of the square?
_____ mm

(b) Same question but this time the perimeter of the square is L mm and the long side of the rectangle is x times as long as the short side.

_____ mm
¡!-

Cooper 3.2.19

47. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_19.pg**

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 4 liters of paint which is half blue and half yellow.
amount of can A= _____ liters

amount of can B= _____ liters ¡!-

Cooper 3.2.20

48. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_20.pg**

(a) A highway patrolman traveling at the speed limit is passed by a car going 5 mph faster than the speed limit. After one minute, the patrolman speeds up to 70 mph. How long after speeding up until the patrolman catches up with the speeding car. The speed limit is 55 mph.
(b) Same question, but this time the patrolman speeds up to a speed of v mph (v¿60).
(a) _____ minutes

(b) _____ minutes
¡!-

Cooper 3.2.21

49. **(1 pt) Cooper_oml/Cooper_3/Cooper_3_2_21.pg**

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)
¡!-