Pre-Algebra Word Problems

Worksheets (and detailed solutions)

Topics include fractions, decimals, percentages, order of operations, and more.

"Ambiguous Word Problem"

Michael eats 1/4 of a cheesecake, and later he eats 2/5 of the cheesecake.
What fraction remains?

Answer #1

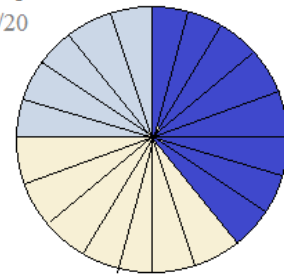Michael eats 1/4 of the cheesecake.   (there is 3/4 of cheesecake remaining)

Then, he eats 2/5 (of the original cheesecake pan size)

So, he's eaten   1/4 + 2/5 = 13/20... so, there is 7/20 remaining...

1st piece
5/20

2nd piece
8/20

Answer #2

Michael eats 1/4 of the cheesecake.   (there is 3/4 of cheesecake remaining)
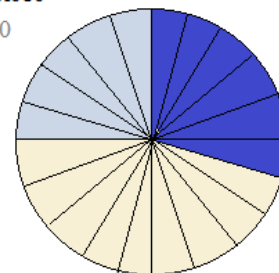
Then, he eats 2/5 (of the remaining cheesecake)

So, he eats 2/5 of 3/4 ---->   2/5 x 3/4 = 6/20

So, he's eaten 1/4   and   6/20 of the original cheesecake size.

1/4 + 6/20 = 11/20...   so, there is 9/20 remaining....

1st piece
5/20

2nd piece
6/20

A department store is having a 30% off sale on all shirts.
I find one that I like, so I go to the cashier and pay $25.
He gives me $2.67 in change, and I leave with my beautiful rainbow shirt.

If sales tax is 10% of the final purchase price, what was the
original price of the shirt?

Since I received $2.67 in change, the shirt cost me $22.33.

25 - 2.67 = 22.33

The sales price before tax?

shirt sales price + (.10)(shirt sales price) = $22.33

shirt sales price x (1.10) = $22.33

shirt sales price = $20.30

shirt sales price = original price − 30% discount

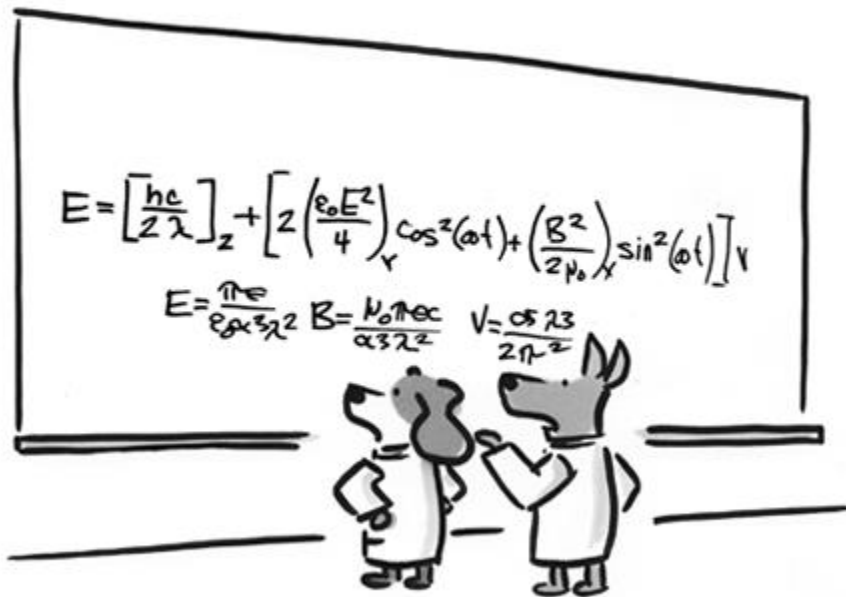$20.30 = original price − (.30)original price

$20.30 = .70(original price)

original price is 29 dollars

Dog Cartoon #6443

"There it is. You forgot to convert to dog years."

1) John took $30 to the shop.

   He spent half of his money on lunch.
   If he spends another $4 on the bus ride home,
   how much does he have left?

2) Jill is having a birthday party.
   She has 3 cakes and 2 pies. If she cuts each pie and each cake into 4 pieces, how many
   pieces does she make?

3) My 65 pound dog carries 3 bags on his back.
   Each bag is holding 8 pounds of snacks.
   If my dog steps onto a scale with the bags, how much will it weigh?

4) Jim goes to the store. He buys 6 bags of candy bars, each containing
   5 candy bars. That night, he hands out all of the candy to 10 trick-or-treaters.
   How many candy bars does each trick-or-treater get?

5) John had 55 baseball cards. After he put aside 25 cards for himself, he shared the remaining
   with his 5 friends. If he divided the remaining cards equally, how many cards did each friend get?

Decimals/Percentages/Fractions Word Problems

Answer the following questions:

1) A box of pens cost $16.00
   If they are on sale for 20% off, how much is the new price?

2) Patti cuts a pie into 8 equal slices.
   If you have one piece of Patti's pie, what percentage of the pie did you eat?

3) At the local math store, a calculator costs $59.95, a ruler costs $2.85, and a compass costs $6.25.
   Sales tax is an additional 10%.
   If you buy 1 calculator, 4 rulers, and 3 compasses, how much money do you need?

4) Linus baked a chocolate cake. If Snoopy ate half the cake, Charlie ate one-eighth of the
   cake, and Lucy ate one-twelfth of the cake, how much was left for Linus?

5) Challenge: *After* a 15% discount, the price of a shirt is $20. What was the *original* price of the shirt?

6) Three people share a bag of 50 marbles. The first person takes out 20% of the marbles. Then, the next person takes out 3/5 of the remaining marbles. How many marbles are left for the third person?

7) You and four friends decide to split $80.20 equally. How much did each person get?

8) A birthday party has 7 red balloons, 14 white balloons, and 9 blue balloons. What percentage of balloons are blue?

9) A bank pays an annual (simple) interest rate of 6%. If you deposit $200, how much money will you have after 5 years?

10) Challenge: Three guys order a pizza. When they see the bill, each offers to pay their share. Percy pays 33%. Frank pays 1/3. And, Lefty pays the remaining amount. Did they pay the same amounts? If not, who paid the most? Who paid the least?

Word phrases Exercise

Identify the correct answer:

Example: "the product of eight and negative four"

$8 \times -4 = -32$ a) 4   b) 12   c) -12   **d) -32**   e) -48

1) "sum of fifty-seven and fourteen"

     a) 61   b) 65   c) 68   d) 71   e) 78

2) "150% of a dozen"

     a) 6   b) 9   c) 15   d) 18   e) 21

3) "Twenty-nine less the product of two & ten"

     a) 9   b) 17   c) 42   d) 48   e) 270

4) "number of seats in a room with eight rows and ten chairs in each row"

     a) 8   b) 10   c) 18   d) 40   e) 80

5) "the sum of seven and two minus the product of two and three"

     a) 2   b) 3   c) 4   d) 5   e) 6

6) "the difference between six squared and two cubed"

     a) -25   b) -6   c) 6   d) 18   e) 28

7) "the remainder if ten men are divided into three equal groups"

     a) 0   b) 1   c) 2   d) 3   e) 7

8) "number of individual squares in an eight by eight chessboard"

     a) 8   b) 16   c) 32   d) 64   e) 128

9) "any number M that is less than the product of seven and eight"

     a) $M < 15$ b) $M > 15$ c) $M < 56$ d) $M > 56$ e) $M < 8$

10) "one-fourth the sum of eleven and nine"   a) 3   b) 5   c) 10   d) 53   e) 80

11) "six added to n times five is sixty-one.   a) 6   b) 8   c) 11   d) 56   e) 71
     n is...."

12) "the sum of the product of 2 and 7 and   a) 22   b) 39   c) 44   d) 60   e) 75
     the product of 3 and 10"

13) "the difference between forty and the   a) 10   b) 15   c) 20   d) 25   e) 30
     product of two and fifteen"

14) "one hundred divided by the sum of   a) 4   b) 10   c) 15   d) 20   e) 25
     ten and fifteen"

15) "one hundred divided by ten added   a) 4   b) 10   c) 15   d) 20   e) 25
     to fifteen"

16) "eight subtracted from negative fourteen"   a) -22   b) -6   c) 6   d) 22   e) other

17) "the area of a rectangle with sides lengths   a) 13   b) 18   c) 20   d) 21   e) 40
     of 8 and five-halves"

18) "the product of 10 and six plus a number   a) 4   b) 6   c) 8   d) 10   e) 12
     is one hundred. The number is..."

Hugh receives mixed reviews from the math figures in attendance.
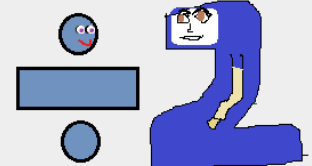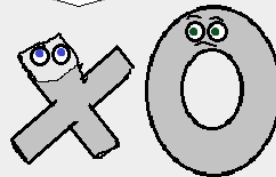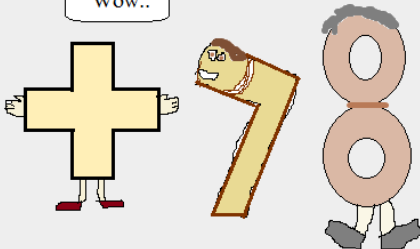
1) John took $30 to the shop.

He spent half of his money on lunch.
If he spends another $4 on the bus ride home,
how much does he have left?

$(30 / 2) - 4$ ⟹ $15 - 4 = 11$

2) Jill is having a birthday party.
She has 3 cakes and 2 pies. If she cuts each pie and each cake into 4 pieces, how many pieces does she make?

$(3 + 2) \times 4$ ⟹ 5 baked goods x 4 pieces each $= 20$

3) My 65 pound dog carries 3 bags on his back.
Each bag is holding 8 pounds of snacks.
If my dog steps onto a scale with the bags, how much will it weigh?

$65 + (3 \times 8)$ ⟹ 65 dog pounds + 24 snack pounds $= 89$

4) Jim goes to the store. He buys 6 bags of candy bars, each containing 5 candy bars. That night, he hands out all of the candy to 10 trick-or-treaters. How many candy bars does each trick-or-treater get?

$(6 \times 5) / 10$ ⟹ 30 candy bars divided by 10 trick-or-treaters $= 3$

5) John had 55 baseball cards. After he put aside 25 cards for himself, he shared the remaining with his 5 friends. If he divided the remaining cards equally, how many cards did each friend get?

$(55 - 25) / 5$ ⟹ 30 cards that John is sharing divided between his 5 friends $= 6$

Answer the following questions:

1) A box of pens cost $16.00
   If they are on sale for 20% off, how much is the new price?

$$\text{cost of pens} - \text{discount} = \text{new price} \qquad \$16 - (.20)(\$16) = \text{new price}$$

$$\text{discount} = (20\%)\text{pens} \qquad \$16 - \$3.20 = \boxed{\$12.80}$$

2) Patti cuts a pie into 8 equal slices.
   If you have one piece of Patti's pie, what percentage of the pie did you eat?

$$\text{portion of pie} = \frac{\text{pieces}}{\text{total}} = \frac{1}{8}$$

Then, to convert fraction into percentage: $\dfrac{1}{8} = \dfrac{x}{100}$

cross multiply $\quad 8x = 100$

divide by 8 $\quad x = 12.5$

move 2 decimal places $\quad \boxed{12.5\%}$
and add %

3) At the local math store, a calculator costs $59.95, a ruler costs $2.85, and a compass costs $6.25.
   Sales tax is an additional 10%.
   If you buy 1 calculator, 4 rulers, and 3 compasses, how much money do you need?

1 calculator: 59.95

4 rulers: 4 x 2.85 = 11.40

3 compasses: 3 x 18.75

total:
```
  59.95
  11.40
+ 18.75
  90.10
```

Then, find the sales tax: 10% of 90.10

.10 x 90.10 = $9.01

Total cost = items + tax

$$= \$90.10 + \$9.01 = \boxed{\$99.11}$$

4) Linus baked a chocolate cake. If Snoopy ate half the cake, Charlie ate one-eighth of the
   cake, and Lucy ate one-twelfth of the cake, how much was left for Linus?

portions: Snoopy $= \dfrac{1}{2}$

Charlie $= \dfrac{1}{8}$

Lucy $= \dfrac{1}{12}$

What portion of the cake is gone?

$$\frac{1}{2} + \frac{1}{8} + \frac{1}{12} =$$

(Least common denominator is 24) $\quad \dfrac{12}{24} + \dfrac{3}{24} + \dfrac{2}{24} = \dfrac{17}{24}$

Since $\dfrac{17}{24}$ is gone,

$\boxed{\dfrac{7}{24}}$ is left for Linus

5) Challenge: *After* a 15% discount, the price of a shirt is $20. What was the *original* price of the shirt?

Note: the answer is NOT $23
You cannot simply add 15% to $20

Let $\quad X = \text{original price}$

discount $= 15\%$ of X $\to$ (.15)X

$$\text{original price} - \text{discount} = \text{final price}$$

$$X - (.15)X = \$20$$

$$.85X = \$20$$

$$1.00X - .15X = .85X$$

$$X = \frac{\$20}{.85} = \boxed{\$23.53}$$

or, $\$20 \cdot \dfrac{20}{17} = \dfrac{\$400}{17}$

6) Three people share a bag of 50 marbles. The first person takes out 20% of the marbles. Then, the next person takes out 3/5 of the remaining marbles. How many marbles are left for the third person?

50 marbles $\longrightarrow$ 40 marbles $\longrightarrow$ 16 marbles

20% of 50:
.20 x 50 = 10

3/5 of 40:
.60 x 40 = 24

$$\frac{3}{5} \cdot \frac{40}{1} = 24$$

1st person: 10
2nd person: 24
3rd person: 16
total: 50

7) You and four friends decide to split $80.20 equally. How much did each person get?

There are 5 people, so each person will get 1/5 of $80.20

$16.04

8) A birthday party has 7 red balloons, 14 white balloons, and 9 blue balloons. What percentage of balloons are blue?

7 + 14 + 9 = 20 total balloons

x5

$$\frac{9 \text{ blue}}{20 \text{ total}} = \frac{x}{100}$$

x 5

x = 45

45%

0.450
20 ⟌ 9.000
−8.0
1.00
−1.00
000

move decimal 2 places and add a %

45%

9) A bank pays an annual (simple) interest rate of 6%. If you deposit $200, how much money will you have after 5 years?

Each year, you receive 6% of $200:

.06 x $200 = $12....

So, after 5 years, you will earn $60 in interest...

And, you will have $260

10) Challenge: Three guys order a pizza. When they see the bill, each offers to pay their share. Percy pays 33%. Frank pays 1/3. And, Lefty pays the remaining amount. Did they pay the same amounts? If not, who paid the most? Who paid the least?

They did not pay the same amounts.
To compare, we can change each portion to a decimal expression.

Percy -- 33% = .33

Frank -- 1/3 = .3̄3̄

Lefty -- 1.00 − .33 − .3̄3̄ = .67 + .3̄3̄ = .33̄66̄

.67000..
− .33333..
.33666...

Lefty paid the most..
Percy paid the least..

| Word phrases Exercise | Answers |

Identify the correct answer:

Example: "the product of eight and negative four"

$8 \times -4 = -32$ a) 4   b) 12   c) -12   **d) -32**   e) -48

1) "sum of fifty-seven and fourteen"   a) 61   b) 65   c) 68   **d) 71**   e) 78

$57 + 14 = 71$

2) "150% of a dozen"   a) 6   b) 9   c) 15   **d) 18**   e) 21

100% of 12 is 12....
so, 150% of 12 is 18

3) "Twenty-nine less the product of two & ten"

$29 - (2 \times 10) = 9$ **a) 9**   b) 17   c) 42   d) 48   e) 270

4) "number of seats in a room with eight rows and ten chairs in each row"

8 rows x 10 chairs/row = 80 seats   a) 8   b) 10   c) 18   d) 40   **e) 80**

5) "the sum of seven and two minus the product of two and three"

$(7 + 2) - (2 \times 3) = 3$ a) 2   **b) 3**   c) 4   d) 5   e) 6

6) "the difference between six squared and two cubed"

$6^2 - 2^3 = 36 - 8 = 28$ a) -25   b) -6   c) 6   d) 18   **e) 28**

7) "the remainder if ten men are divided into three equal groups"

$10 \div 3 = 3$ remainder 1   a) 0   **b) 1**   c) 2   d) 3   e) 7

8) "number of individual squares in an eight by eight chessboard"

$8 \times 8 = 64$ a) 8   b) 16   c) 32   **d) 64**   e) 128

9) "any number M that is less than the product of seven and eight"

$M < (7 \times 8)$ $M < 56$ a) $M < 15$ b) $M > 15$ **c) $M < 56$**   d) $M > 56$ e) $M < 8$

10) "one-fourth the sum of eleven and nine"   a) 3   b) 5   c) 10   d) 53   e) 80

$$\frac{1}{4}(11 + 9) = 5$$

11) "six added to n times five is sixty-one.   a) 6   b) 8   c) 11   d) 56   e) 71
n is...."
$$6 + (5n) = 61$$
$$5n = 55$$
$$n = 11$$

12) "the sum of the product of 2 and 7 and   a) 22   b) 39   c) 44   d) 60   e) 75
the product of 3 and 10"

$$(2 \times 7) + (3 \times 10) = 44$$

13) "the difference between forty and the   a) 10   b) 15   c) 20   d) 25   e) 30
product of two and fifteen"

$$40 - (2 \times 15) = 10$$

14) "one hundred divided by the sum of   a) 4   b) 10   c) 15   d) 20   e) 25
ten and fifteen"
$$\frac{100}{(10 + 15)} = 4$$

15) "one hundred divided by ten added   a) 4   b) 10   c) 15   d) 20   e) 25
to fifteen"

$$100/10 + 15 = 25$$

16) "eight subtracted from negative fourteen"   a) -22   b) -6   c) 6   d) 22   e) other

$$-14 - 8 = -22$$

17) "the area of a rectangle with sides lengths   a) 13   b) 18   c) 20   d) 21   e) 40
of 8 and five-halves"

5/2 or 2.5 $8 \times 5/2 = 20$

8

18) "the product of 10 and six plus a number   a) 4   b) 6   c) 8   d) 10   e) 12
is one hundred. The number is..."

$$10 \times (6 + n) = 100$$
$$6 + n = 10$$
$$n = 4$$

Thanks for visiting! Hope it helps.

If you have questions, suggestions, or requests, let us know.

Cheers,
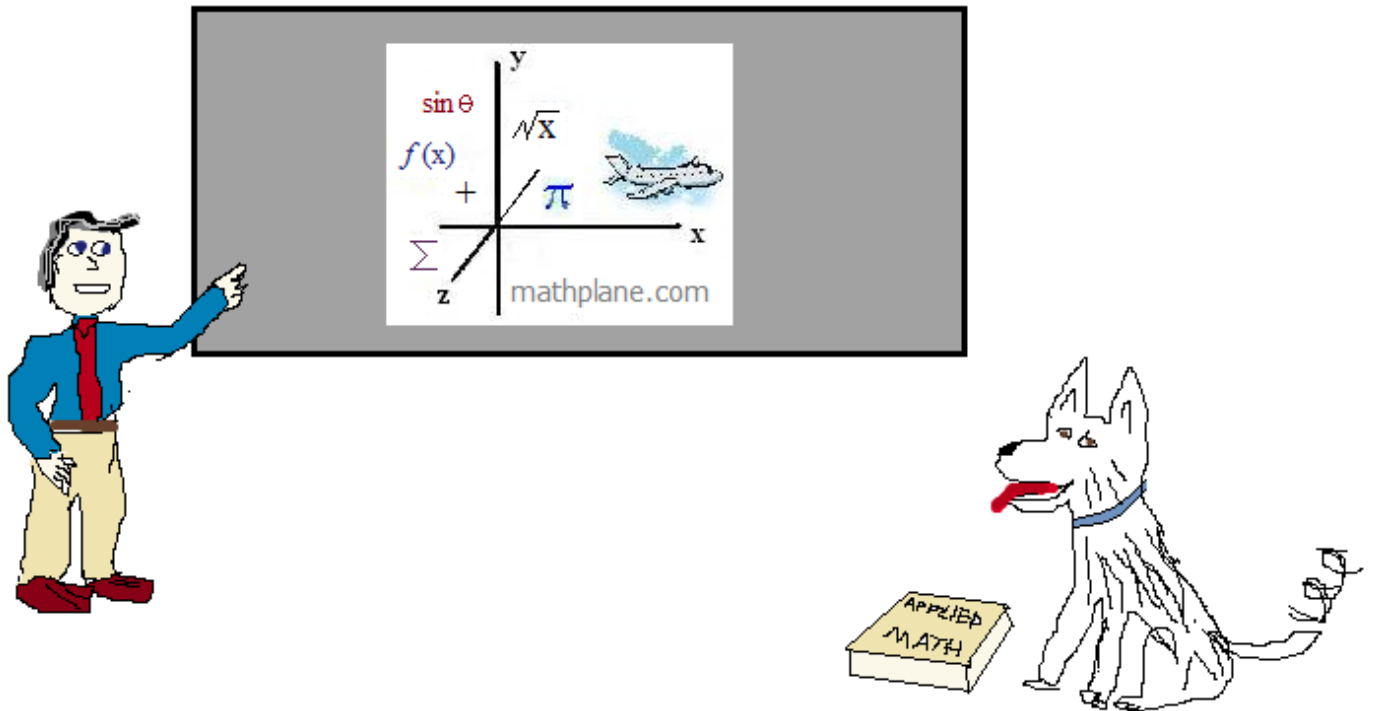
Also, Mathplane *Express* at mathplane.org for mobile and tablets

And, our store at TeachersPayTeachers.com