MATHS

BOOKS - INDEPENDENTLY PUBLISHED MATHS (ENGLISH)

PROBLEMS IN CONTEXT

Example

1. Mrs. Teukolsky gave a test that was so difficult that she decided to scale the grades

upward. She raised the lowest score , 42 to 60 , and the highest score, 77 to 90 . A linear function that gives a fair way to convert any other test score x to the new score y is

A. $y = -\dfrac{7}{6}x + 11$

B. $y = -\dfrac{6}{7}x + 24$

C. $y = \dfrac{6}{7}x + 24$

D. $y = \dfrac{7}{6}x + 11$

Answer: C

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2. A solid white cube with an edg of 8 inches is painted red . The cube is then sliced into 512 1-inch cubes . How many of these cubes have exactly 2 red faces ?

A. 48

B. 72

C. 80

D. 96

Answer: B

3. Lauren rode her bike from her house to a friend's house $3\frac{1}{2}$ miles away. On the first leg of her trip , she rode uphill at 3 miles per hour. The second part of the trip covered a larger distance but was downhill, and Lauren rode at 5 miles per hour. If the downhill part of the ride took half an hour, how many minutes did the uphill part take ?

4. Amelia wants to buy a bare bones car and has narrowed her choice to two models . Model A sells for $12,500 , gets 25 miles to the gallon, and costs $350 per year for insurance. Model B sells for $16,100 , gets 48 miles to the gallon and costs $425 per year for insurance .

1) Suppose Amelia drives 36,000 miles per year and gas costs $ 3.50 gallon. within how many year, to the nearest hundredth of a year, to the nearest hundredth of ayear. does it become cheaper for amelia to own model B?

1. Mika is doing an experiment with bacteria .She finds that , provided there is enough space and food , the population doubles every 2 hours. The population in hour y+10 will be how many times the population in hour y ?

   A. 5

   B. 10

C. 16

D. 32

Answer: D

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2. Ian has a job that pays him p dollars everyday. From this amount he pays out $\frac{p}{5}$ dollars per day for supplies .He also spends an additional $\frac{1}{3}$ of what's left for lunch everyday.

He saves the rest of the money . In terms of p , how many days will it take Ian to save $1,000 ?

A. $\dfrac{3,750}{p}$

B. $\dfrac{1,875}{p}$

C. 1,000 p

D. $\dfrac{800p}{3}$

Answer: B

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3. Adam delivered n pizzas on Monday , 5 times as many pizzas on Tuesday as on Monday , 3 fewer pizzas on Wednesday than on Tuesday, and 7 more pizzas on Thursday than on Tuesday. What is the average (arithmetic mean) number of pizzas he delivered per day over the 4 days ?

   A. 3n+1

   B. 3n+4

   C. 4n+1

D. $\dfrac{3n + 5}{2}$

Answer: C

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4. A charter company will provide a plane for a fare of $300 per person if there are between 50 and 100 passengers . If there are more than 100 passengers , then, for each additional passenger over 100, the fare will be reduced by $2 for every passenger. How much revenue will

the company make if 120 passengers take the

trip ?

A. $16, 400

B. $24, 000

C. $31, 200

D. $35, 200

Answer: C

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5. The ratio of girls to boys at a certain school is 4:3. Which of the following could not be the number of students at the school ?

    A. 1430

    B. 1477

    C. 1547

    D. 2107

Answer: A

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6. A can contains $\dfrac{1}{4}$ pound of cashews.

The can is then filled with a mixture that has equal weights of cashews , pecans , and walnuts . If the final weight is 1 pound , what fraction of the final nut mixture is cashews ?

A. $\dfrac{1}{4}$

B. $\dfrac{1}{3}$

C. $\dfrac{1}{2}$

D. $\dfrac{2}{3}$

Answer: C

7. The Mayflower Diner has a rule that dessert pies must be sliced so that the angle at the tip of a piece of pie (where the tip is at the center of the pie) lies between 20 and 30 degrees . Which of the following inequalities can be used to determine whether an angle a at the tip of a pie slice satisfies the rule ?

A. $|a - 25|$ lt 5

B. $|a-25|$ lt 20

C. |a-25| lt 30

D. |a| lt 30

Answer: A

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8. When an elastic object , such as a coil spring

or rubber band, is subjected to a force f, an

increase in length , called a strain , occurs .

Hooke's law states that force f is directly

porportional to strain s. Suppose that a coil

spring has a natural length of 4 feet and that a force of 60 pounds stretches the length to 6 feet. What magnitude of force , in pounds , would stretch the spring to a length of 7 feet ?

A. 40

B. $51\dfrac{3}{7}$

C. 70

D. 90

Answer: D

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9. A house has an old gas furnace that is only 70% efficient . This means that only 70% of the heat produced by the gas goes into heating the house , while 30% of the least is lost . There is a constant charge per unit of gas , and the owner's gas bill is $1,200 per year .

The owner is considering replacing the furnace with a new one that is 90 percent energy efficient . To the nearest dollar , what would the gas bill be per year, assuming that

the same amount of heat is required for the

house ?

A. 896

B. 901

C. 933

D. 947

Answer: C

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10. A house has an old gas furnace that is only 70% efficient . This means that only 70% of the heat produced by the gas goes into heating the house , while 30% of the least is lost . There is a constant charge per unit of gas , and the owner's gas bill is $1,200 per year .

Instead of replacing the furnace , the owner keeps the old furnace but doubles the thickness of insulation under the roof , thus cutting the heat loss by a factor of two . Assume that most of the heat supplied by the furnace goes into replacing the heat lost

through the roof . If it costs $2,000 to install

the insulation, how many years is the payback

period , namely , after how many years would

the cost of insulation equal the savings on the

gas bill ? Round your answer to the nearest

tenth.

    A. 2.7

    B. 3.6

    C. 3.3

    D. 4.3

Answer: C

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