

Name: _____

2005, Mathematics - Grade 10

Question 3: Multiple Choice

Patterns, Relations, and Algebra

A fast-growing strain of bacteria doubles in population every 20 minutes. A laboratory has a culture of 200 of these bacteria cells. The function below can be used to find p , the number of bacteria cells in this culture after t hours.

$$p = 200(8^t)$$

Which of the following is closest to the total number of bacteria cells after 2 hours?

- A. 3,200
- B. 12,800
- C. 51,200
- D. 2,560,000



2004, Mathematics - Grade 10

Question 38: Multiple Choice

Patterns, Relations, and Algebra

Which of the following expressions is equivalent to the one shown below?

$$(b^3 + 5b^2 - 2b) - (b^3 + b - 1)$$

- A. $5b^2 - b$
- B. $5b^2 - 3b + 1$
- C. $4b^2 - b$
- D. $5b^2 - 3b - 1$



2003, Mathematics - Grade 10

Question 13: Multiple Choice

Patterns, Relations, and Algebra

The volume of a rectangular prism is $(6n^3 - 4n)$. The height of the prism is $(-2n)$. What is the area of the base of the prism?

- A. $3n^2 - 2$
- B. $-3n^2 + 2$
- C. $-3n^2$
- D. $3n^2$



Name: _____

2002, Mathematics - Grade 10

Question 37: Multiple Choice

Number Sense and Operations

Aircraft design engineers use the formula

$$V = \sqrt{\frac{841L}{CS}}$$

to determine the safe landing speed of aircraft where

- V = safe landing speed in feet per second
- L = gross weight of the aircraft in pounds
- C = coefficient of lift
- S = wing surface area in square feet.

What is the approximate safe landing speed for an aircraft with a gross weight of 9000 pounds and a wing surface area of 225 square feet, when the coefficient of lift is 2.8?

- A. 4 feet per second
- B. 110 feet per second
- C. 414 feet per second
- D. 22,000 feet per second



2002, Mathematics - Grade 10

Question 28: Multiple Choice

Number Sense and Operations

Let x and y be real numbers with $x < y < 1$. Which of the following is **always** a real number that lies between x and y ?

- A. $x - y$
- B. $x + y$
- C. $\frac{x - y}{2}$
- D. $\frac{x + y}{2}$



Name: _____

2002, Mathematics - Grade 10

Question 24: Multiple Choice

Patterns, Relations, and Algebra

An important formula in statistics is $z = \frac{(x - \mu)}{\sigma}$.



Which of the following represents this equation solved for x in terms of z , μ , and σ ?

A. $x = z\sigma + \mu$

B. $x = z\sigma - \mu$

C. $x = \frac{z + \mu}{\sigma}$

D. $x = \frac{z - \mu}{\sigma}$

2002, Mathematics - Grade 10

Question 18: Short Answer

Patterns, Relations, and Algebra

What is the simplest form of the expression $\frac{2x^4y^2}{x^2y^2}$, $x \neq 0$, $y \neq 0$?



2002, Mathematics - Grade 10

Question 15: Short Answer

Patterns, Relations, and Algebra

Solve the following equation for x .

$$3x - (2x - 3) = 2x + 9$$



Name: _____

2001, Mathematics - Grade 10

Question 31: Multiple Choice

Patterns, Relations, and Algebra

The following formula can be used to calculate the monthly payment, M , on a loan:

$$M = \frac{P(rt + 1)}{12t}$$

where P is the principal, r is the annual rate, and t is the length of the loan in years.

Based on this formula, what is the monthly payment on a 2-year loan for \$3,000 at an annual rate of 8%?

- A. \$605
- B. \$145
- C. \$480
- D. \$125



2001, Mathematics - Grade 10

Question 29: Multiple Choice

Patterns, Relations, and Algebra

The expression $4x^2 + 2x - 6 - x(3 - x)$ is equivalent to

- A. $5x^2 - x - 6$.
- B. $4x^2 - 2x - 6$.
- C. $3x^2 + 2x - 6$.
- D. $5x^2 - 6$.



2001, Mathematics - Grade 10

Question 19: Multiple Choice

Number Sense and Operations

Use the expression below to answer question 19.

$$2x - 3(5x - 8)$$

Which could be the first step in simplifying the expression above?

- A. $2x - 15x + 8$
- B. $2x - 15x - 24$
- C. $2x - 15x - 8$
- D. $2x - 15x + 24$



Name: _____

2001, Mathematics - Grade 10

Question 7: Multiple Choice



Patterns, Relations, and Algebra

The sophomore class plans to sell T-shirts with the school's name on them. The cost of each T-shirt alone is \$3.50, and the printing cost of each is \$0.75. If the class plans on selling each printed T-shirt for \$11, what expression can you use to calculate the class profit for selling n printed T-shirts?

- A. $11.00 - (3.50 + 0.75)n$
 - B. $11.00n - (3.50 + 0.75)$
 - C. $11.00 - 3.50 - 0.75n$
 - D. $(11.00 - 3.50 - 0.75)n$
-

2000, Mathematics - Grade 10

Question 24: Multiple Choice



Patterns, Relations, and Algebra

Which of the following is true for all possible values of x ?

- A. $3(x+1) = 3x+1$
 - B. $2(x+3) = 2x+6$
 - C. $4(2x+1) = 6x+5$
 - D. $5(3x-2) = 15x-7$
-

2001, Mathematics - Grade 10

Question 2: Multiple Choice



Number Sense and Operations

If $4 + 2(3x - 4) = 8$, then $3x - 4$ equals

- A. 4.
 - B. 2.
 - C. 8.
 - D. 6.
-

2000, Mathematics - Grade 10

Question 11: Short Answer



Patterns, Relations, and Algebra

Solve the following equation for x .

$$0.5(x - 8) = 0.2x + 11$$

Name: _____

2000, Mathematics - Grade 10

Question 7: Multiple Choice

Patterns, Relations, and Algebra



Haynes High School chartered buses for 60 students to go on a field trip. Valley High School chartered buses for 80 students.

- The total cost of the buses was the same for the two schools.
- Students from Valley High School paid \$5 less than students from Haynes High School.

What was the cost per student for Haynes High School?

- A. \$5
- B. \$15
- C. \$20
- D. \$40

2000, Mathematics - Grade 10

Question 3: Multiple Choice

Number Sense and Operations



If $3(2r - 5) = 27$, then $2r - 5$ equals

- A. 30.
- B. 24.
- C. 81.
- D. 9.

1999, Mathematics - Grade 10

Question 38: Multiple Choice

Patterns, Relations, and Algebra



The athletic club is raising money for a class trip. They plan to sell banners with the school's name on them. The cost of each banner is \$3.50 and the printing cost of each is \$0.75. If the club plans on selling each banner for \$11, what is the **fewest** number of banners that the athletic club needs to sell to make at least a \$500 profit?

- A. 46
- B. 67
- C. 75
- D. 118

Name: _____

1999, Mathematics - Grade 10

Question 36: Multiple Choice

Patterns, Relations, and Algebra



Which of the following functions will yield the largest value for $x = 50$?

- A. $f(x) = 5 + x$
 - B. $f(x) = 5x$
 - C. $f(x) = x^2$
 - D. $f(x) = 5^x$
-

1999, Mathematics - Grade 10

Question 27: Multiple Choice

Patterns, Relations, and Algebra



A manufacturing company has 750 employees. It plans to increase its work force by 15 employees per month until it has doubled in size.

Which of the equations below will help you determine the number of months, m , it will take the company to **double** in size?

- A. $750 + 15 = 2m$
- B. $2(750) = 15m$
- C. $(750 + 15)2 = m$
- D. $750 + 15m = 2(750)$

Name: _____

1999, Mathematics - Grade 10

Question 21: Open Response

Patterns, Relations, and Algebra

Use the information below to answer question 21.

CD CLUB #1: You will receive **four** free CDs for joining the club. You must purchase at least four CDs within the next year at the club price. The club price for each CD is \$11.99.

CD CLUB #2: You will receive **five** free CDs for joining the club. You must purchase at least four CDs within the next year at the club price. The club price for each CD is \$13.99.

- Suppose you plan to get a total of nine CDs from one of the clubs by the end of the year.
 - What would be the total cost if you got the nine CDs from Club #1?
 - What would be the total cost if you got the nine CDs from Club #2?
- Copy and complete the table below in your Student Answer Booklet.

Total number of CDs	Total Cost for Club #1	Total Cost for Club #2
10		
11		
12		

- Represent the data from your completed table for the two CD clubs by plotting a graph on the grid in your Student Answer Booklet.
- Compare the two offers and explain which is the most economical.

1999, Mathematics - Grade 10

Question 20: Multiple Choice

Patterns, Relations, and Algebra

Ticket sales at the First Run Theater total **at least** \$7,600 per week. An adult's ticket costs \$7.50 and a child's ticket costs \$4.00. If a represents the number of adult tickets sold in a week and c represents the number of child tickets, which algebraic sentence represents the money received each week from ticket sales?

- $7.50a + 4.00c = 7,600$
- $7.50a + 4.00c \geq 7,600$
- $7.50a + 4.00c > 7,600$
- $7.50a + 4.00c < 7,600$

1998, Mathematics - Grade 10

Question 16: Multiple Choice

Patterns, Relations, and Algebra

Which of the following could be the next step in solving the equation $3(x + 2) = 3 - (x + 1)$?

- $3x + 6 = 3 - x - 1$
- $3x + 2 = 3 - x - 1$
- $3x + 6 = 3 - x + 1$
- $3x + 5 = 3 - x + 1$

Name: _____

1998, Mathematics - Grade 10

Question 10: Multiple Choice



Patterns, Relations, and Algebra

A repair service charges \$25 to send a service person on a call and \$30 per hour for labor. If h stands for the number of hours of labor, which expression below can the company use to compute the charge for the service call?

A. $25h + 30$

B. $55h$

C. $\frac{25}{30h}$

D. $25 + 30h$