

2008 Achievement Test Released Items

The items presented in this document are from the previously secured 2008 Grade 9 Mathematics Achievement Test. These items are released by Alberta Education for teacher and student use.

**Grade 9 Mathematics Achievement Test
Released Items**

2008

01. Item not released.

Use the following information to answer numerical-response question 1.

The following expressions are examples of powers.

$(2)^{-2} = \frac{1}{2^2} = \frac{1}{4}$	$-(2)^2 = -4$	$(-2)^2 = 4$	$-(2)^{-2} = \frac{1}{4}$
1	2	3	4

Numerical Response

1. Listed in order of **increasing** value, the expressions numbered above are 2, 4, 1, and 3.

(Record all **four digits** of your answer in the numerical-response section on the answer sheet.)

Items 2 and 3 not released.

4. What is the value of x in the equation $(2a^{-3})(6a^x) = 12a^{15}$?

- A. -18
 B. -12
 C. 12
 D. 18

~~$$\frac{6a^x}{2} = 12a^{15}$$~~

~~$$3a^x = 12a^{15}$$~~

~~$$x = 18$$~~

$$15 = x - 3$$

5. The estimated mass of one of the smallest living organisms is 1.0×10^{-16} g. How many of these organisms are needed to have a total mass of 1 g?

- A. 1×10^{16}
 B. 1×10^{15}
 C. 1×10^{-15}
 D. 1×10^{-16}

~~$$(1.0 \times 10^{-16}) \times ? = 1$$~~

~~$$10^{-16} \times ? = 1$$~~

~~$$-16 + 16 = 0$$~~

~~$$10^0 = 1$$~~

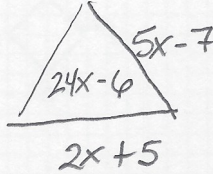
and $1 \times 1 = 1$

Use the following information to answer question 6.

The perimeter of a triangle is $24x - 6$. The lengths of two sides of the triangle are represented by the expressions $5x - 7$ and $2x + 5$.

6. Which of the following expressions represents the length of the third side of the triangle?

- A. $17x + 8$
- B. $17x - 8$
- C. $17x + 4$
- D. $17x - 4$



$$\begin{array}{r} 5x - 7 \\ 2x + 5 \\ \hline 7x - 2 \end{array}$$

$$24x - 6 = (7x - 2) + ? \rightarrow \begin{array}{r} 24x - 2 + \\ 7x - 2 \\ \hline 17x - 4 \end{array}$$

7. Ross conducts a survey to determine the demand for a skateboard park. Ross can best minimize the bias in his survey by surveying people

- A. at only one location
- B. who have skateboards
- C. who are different ages
- D. at the same time of day

9. Item not released.

Numerical Response

2. Item not released.

10. Which of the following calculator keystroke sequences would give the solution to $\frac{33+9}{6 \times (5-2)}$?

A. 33 $+$ 9 \div 6 \times 5 $-$ 2 $=$

B. (33 $+$ 9) \div 6 \times (5 $-$ 2) $=$

C. 33 $+$ 9 \div (6 \times (5 $-$ 2)) $=$

D. ((33 $+$ 9) \div (6 \times (5 $-$ 2))) $=$

$$\frac{(33+9)}{(6 \times (5-2))}$$

11. Item not released.

Use the following information to answer question 12.

Cailey earns \$15 an hour and her monthly expenses are \$1 150.

12. Which of the following inequalities can be used to determine the number of hours, t , that Cailey must work in one month to save at least \$200?

- A. $15t + 1150 \geq 200$
 B. $-15t + 1150 \leq 200$
 C. $15t - 1150 \geq 200$
 D. $15t - 1150 \leq 200$

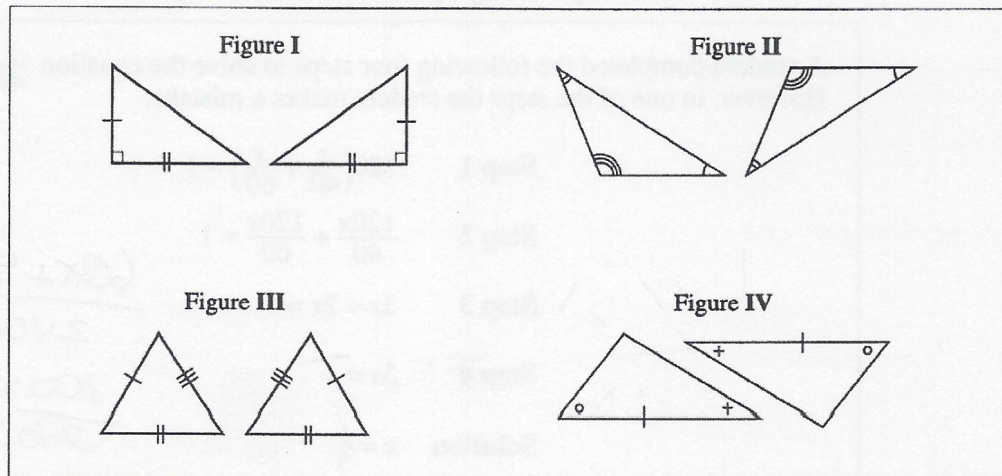
$$t = \frac{1150 - 200}{15}$$

$$15t \geq 1150 - 200$$

$$200 \quad 1150$$

She has to make more than her expenses

Use the following information to answer question 14.



14. Which figure does **not** prove congruency?

- A. I
- B. II
- C. III
- D. IV

15. Francis has an equal number of nickels, dimes, and quarters. If she has \$4.40 in coins, then the total number of nickels that she has is

- A. 33
- B. 30
- C. 11
- D. 10

too high

←

too low

←

$$\$4.40 = 0.05n + 0.10d + 0.25q$$

$$A(33) = 0.05(33) + 0.10(33) + 0.25(33)$$

$$1.65 + 3.3 + 8.25$$

$$10 \rightarrow \$4.40 = 0.05(10) + 0.10(10) + 0.25(10)$$

$$0.5 + 1 + 2.5$$

Items 16 to 18 not released.

$$11 \rightarrow 0.05(11) + 0.10(11) + 0.25(11)$$

$$0.55 + 1.1 + 2.75 = \$4.40$$

Numerical Response

17+2 day 1
19+2 day 2
21+3 day 3

3. Cailey is training for a race. Each day she runs 2 km more than she did the previous day. If Cailey ran a total of 21 km in 3 days, then how many kilometres did she run on the first day?

Answer: 5 kilometres

$$21 = x + (x+2) + (x+2+2)$$

$$21 = 6 + 3x \Rightarrow 3x = 21 - 6$$


$$3x = 15$$


$$x = 5$$


(Record your answer in the numerical-response section on the answer sheet.)


Use the following algebra-tile legend and algebra-tile model to answer question 22.

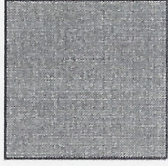
LEGEND:

 Shaded is positive

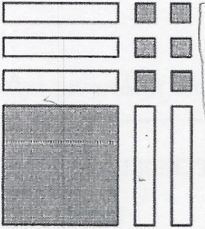
 Unshaded is negative

 = 1

 = x

 = x²

MODEL:



$x^2 - 5x + 6$

22. A factorization of the trinomial represented by the algebra-tile model above is

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

23. Item not released.

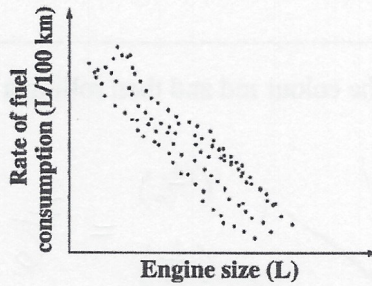
Numerical Response

4. Item not released.

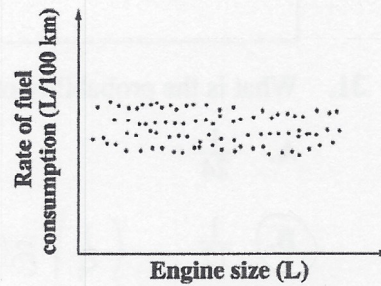
Items 28 and 29 not released.

30. Which of the following scatter plots **best** shows that at a constant speed, automobiles with smaller engines are more likely to have better fuel economy?

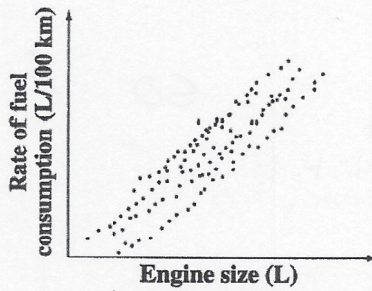
A.



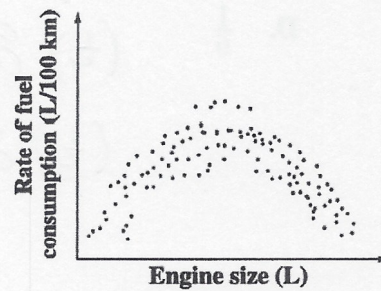
B.



C.



D.



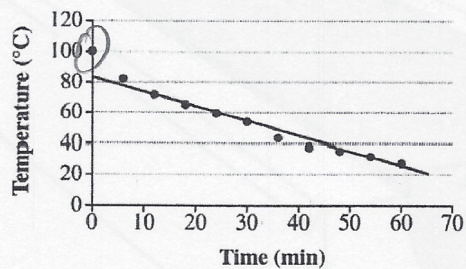
this graph indicates that the greater the engine size, the higher the rate fuel

Use the following information to answer question 32.

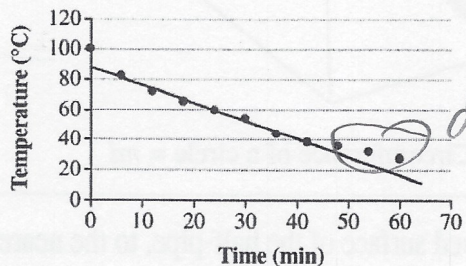
The temperature of a solution was taken over a 60-minute period. The results were graphed on a scatter plot.

32. Which of the following scatter plots shows the line of best fit for the temperatures of the solution over the 60-minute period?

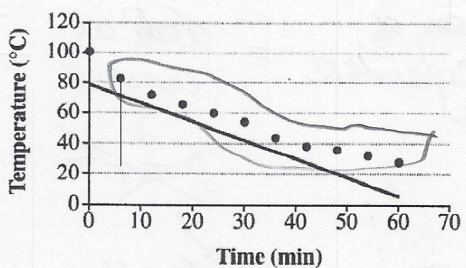
A.



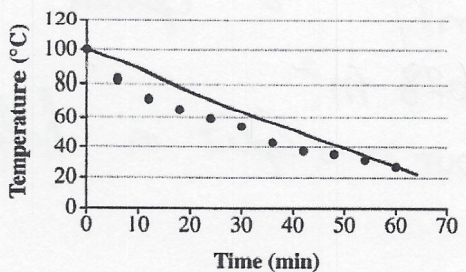
B.



C.



D.



Use the following expression to answer question 34.

$$2^{14-8} = 2^6 = \frac{2^{14}}{2^8} = \frac{2^{14}}{(2^2 \times 2^6)} = \frac{(2^3 \times 2^4)^2}{(2^2 \times 4^3)} \quad \text{Law of exponents}$$

34. Which of the following powers is equivalent to the expression above?

- A. 2^6
- B. 2^9
- C. 4^{16}
- D. 4^{18}




$$(2^3 \times 2^4) = 2^{3+4} = 2^7$$

$$(2^7)^2 = 2^{14}$$

$$4^3 = (2 \times 2)^3 = (2^2)^3 = 2^6$$

Use the following information to answer numerical-response question 5.

A student performs an experiment by throwing a paper cup into the air and observing how it lands. A tally chart of the results is shown below.

Possible Outcome	Number of Outcomes
Cup lands on its side 	
Cup lands upright 	
Cup lands upside down 	

$$\frac{20}{25} = 80\%$$

$$\left. \begin{array}{l} \text{Cup lands upright} \\ \text{Cup lands upside down} \end{array} \right\} 20\%$$

Numerical Response

5. According to the tally chart above, the probability of the cup **not** landing on its side, expressed as a percentage, is 20 %.

(Record your answer in the numerical-response section on the answer sheet.)

total % 25 tries

20 out of 25 → land in its side

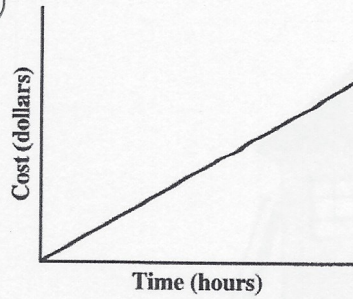
so: $\frac{5}{25}$ is the times cup does not land on its side

$$15 \Rightarrow \frac{5}{25} \times \frac{4}{4} = \frac{20}{100} = 20\%$$

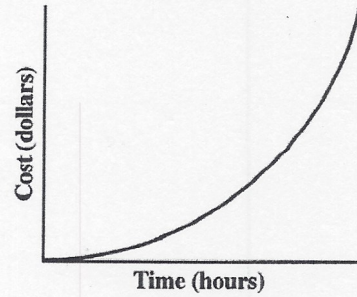
37. Movers from a particular moving company charge \$46.00/hr. Which of the following graphs represents the relationship between the number of hours that the movers work and the total cost of a move?

Linear Relation

A.



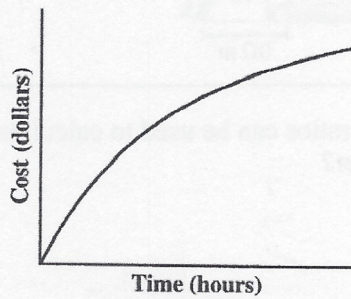
B.



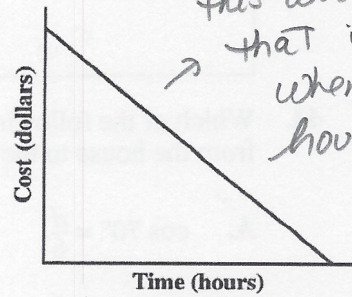
t	\$
1	46
2	46+46
3	46+46+46

Since the hourly rate does not change, it is constant as time passes

C.



D.



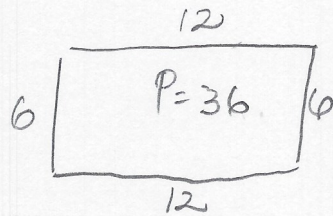
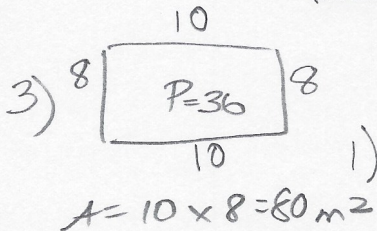
this would mean that it's cheaper when more hours are involved
↓
not true

Items 38 to 42 not released.

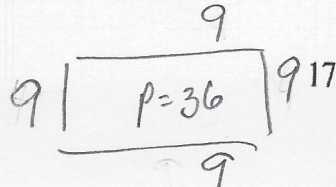
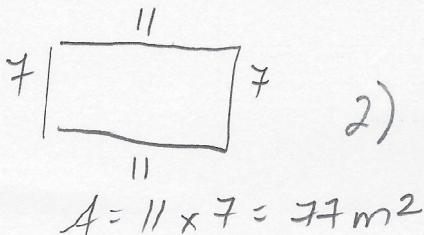
Numerical Response

6. Sidney wants to build a rectangular ice rink in her backyard. If she wants the ice rink to have the **greatest** possible area within a perimeter of 36 m, then she should make the length of one side of the ice rink 9 m.

(Record your answer in the numerical-response section on the answer sheet.)



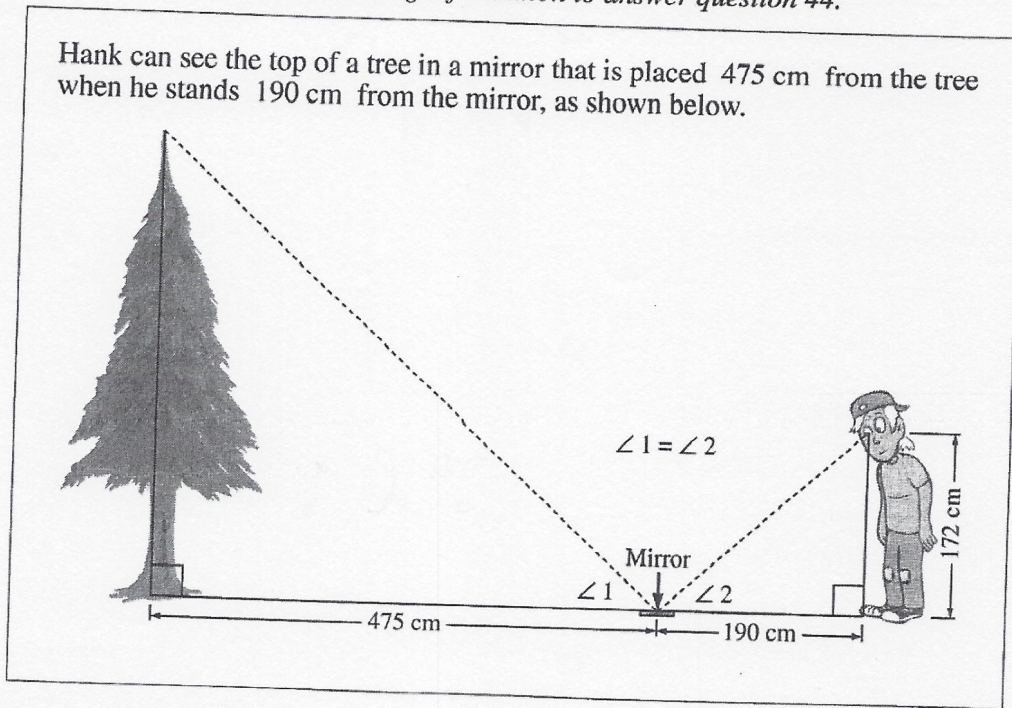
Perimeter = 36
Area = 12 x 6 = 60 m²



Perimeter = 36
Area = 9 x 9 = 81

Use the following information to answer question 44.

Hank can see the top of a tree in a mirror that is placed 475 cm from the tree when he stands 190 cm from the mirror, as shown below.



44. What is the height of the tree shown above?

- A. 256 cm
- B. 362 cm
- C. 430 cm
- D. 525 cm

$$\because \angle 1 = \angle 2$$

$$\frac{190}{430} = \frac{190 \text{ cm}}{172 \text{ cm}} = \frac{475 \text{ cm}}{h}$$

$$h = \frac{81,700 \text{ cm}^2}{190 \text{ cm}} = 430 \text{ cm}$$