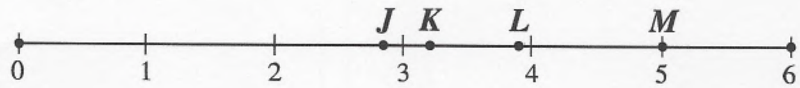
Solutions

Grade 9 Mathematics Pilot Achievement Test

2010

Use the following information to answer question 1.

The letters on the number line below represent rational numbers.



1. The approximate value of $\sqrt{15}$ is represented by the letter

A. J
B. K
C. L
D. M

Use the following information to answer question 2.

A truck heads north at a constant speed of 80 km/h. A car leaves 20 minutes later heading north along the same road and travelling at a constant speed of 90 km/h.

2. Which of the following equations could be used to determine how much time in hours, t, the car travels until it catches up to the truck?

A. $90t = 80\left(t - \frac{1}{3}\right)$

B. $90t = 80\left(t + \frac{1}{3}\right)$

C. $90t = 80(t - 20)$

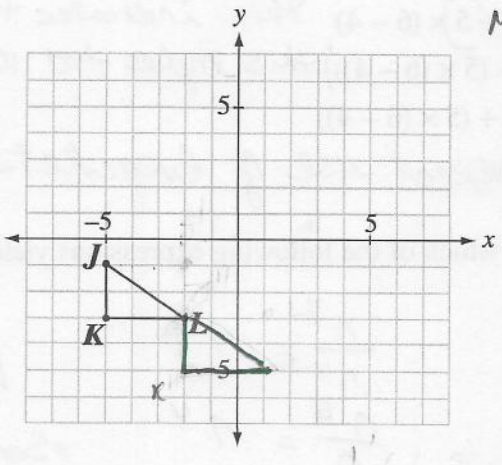
D. $90t = 80(t + 20)$

in an hour
Same distance → 1 km
$90t$ → $t = 1$ hour
$\left(t - \frac{1}{3}\right) = t - 20$
↳ $\frac{1}{3}$ (60 min) = 20 m

So if $t = 1$
$90t = 80\left(t - \frac{1}{3}\right)$

Use the following diagram to answer question 3.

The triangle *JKL* shown below undergoes the translation $(x, y) \rightarrow (x + 3, y - 2)$.



Move
x to the Right 3 units
y to the bottom −2 units

3
↓2

3. Which of the following rows represents the coordinates of the resulting image?

Row	J′	K′	L′
A.	(−2, −3)	(−2, −5)	(−1, 5)
B.	(−2, −3)	(−2, −5)	(1, −5)
C.	(−8, −3)	(−8, −1)	(−5, 1)
D.	(−8, −3)	(−8, −1)	(5, −1)

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

A piggy bank contains only quarters and nickels, and there is a total of 60 coins. The total value of the coins in the bank is $7.40.

$q = 0.25$ $n = 0.05$

Numerical Response

We know that ⇒ 60 coins = $q + n$
- From this, we know $q = 60 - n$

1. How many quarters are in the piggy bank?

Answer: 22

- then, $\$7.40 = 0.25q + 0.05n$
$7.40 = 0.25(60 - n) + 0.05n$

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

$60 = q + n$ $q = 60 - n$

$7.40 = 0.25q + 0.05n$

$7.40 = 0.25(60 - n) + 0.05n$

$7.40 = 15 - 0.25n + 0.05n$

$7.40 = 15 - 0.20n$ $0.20n = 15 - 7.40$ $n = \frac{7.6}{0.2}$

$15 - 7.40 = 0.20n$

$n = \frac{15.0 - 7.40}{0.20} = \frac{7.6}{0.2} = 38$

there are 38 nickels

↳ then, 22 quarters

4. Which of the following expressions is equivalent to $\frac{40 + 10}{5 \times (6 - 4)}$?

BEDMAS

A. $40 + (10 \div 5) \times 6 - 4$ this does not match when using Bedmas

B. $(40 + 10) \div 5 \times (6 - 4)$ this indicates that $(40+10) \div 5$ is done first

C. $40 + (10 \div (5 \times (6 - 4)))$ this implies that 10 divides $(5 \times (6-4))$

D. $(40 + 10) \div (5 \times (6 - 4))$

Correct use of brackets; Correct use of BEDMAS

5. If $n = 2$, then which of the following expressions yields the largest result?

A. $\frac{n^5 \times n^2}{n^4}$ $\frac{n^7}{n^4} = n^3$

B. $\frac{n^2 \times n^3}{n}$ $\frac{n^5}{n} = n^4$

C. $\frac{(n^2)^3}{n}$ $\frac{n^6}{n} = n^5$

D. $\frac{(n^5)^2}{n^4}$ $\frac{n^{10}}{n^4} = n^6$

Law of exponents

- Same base
  - ↳ multiply → add exponents
  - divide → subtract exponents

6. The solution to the inequality $6 - x > -1$ is

A. $x < 7$

B. $x > 7$

C. $x < -7$

D. $x > -7$

$\frac{-x}{-1} > \frac{-1-6}{-1}$ or $x < 1+6 \Rightarrow \boxed{x < 7}$

- the inequality sign is reversed because it is divided by (-1)

7. Which one of the following statements is correct?

A. $4^5 + 4^7 = 4^{12}$

B. $4^{12} - 4^4 = 4^8$

C. $4^2 \times 4^5 = 4^7$ ✓

D. $4^6 \div 4^3 = 4^2$
↳ 4^3

Law of exponents do not apply to subtraction and addition

• solve by isolating the variable

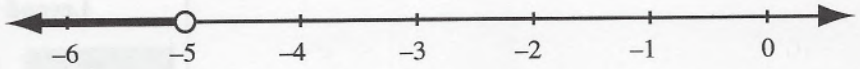
8. Which of the following number lines represents the solution to the inequality $5x - 3 \leq 7x + 7$? $5x-3 \leq 7x+7 \quad -3-7 \leq 7x-5x$

$-10 \leq 2x$

$-5 \leq x$

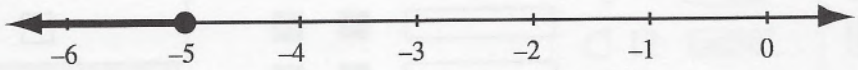
$x \geq -5$

A.



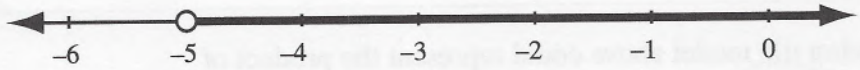
$x < 5$

B.



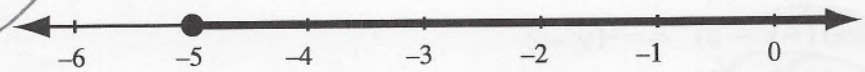
$x \leq -5$

C.



$x > -5$

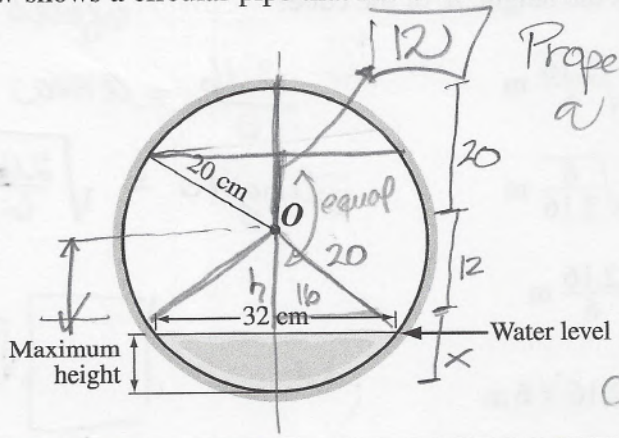
D.



$x \geq -5$

Use the following information to answer numerical-response question 2.

The diagram below shows a circular pipe that has O as its centre. The radius of the pipe is 20 cm.



12

Properties of a chord

$h = \sqrt{20^2 - 16^2}$

$= \sqrt{400 - 256}$

$= \sqrt{144}$

$h = 12$

equal

20

chords goes through the middle

Numerical Response

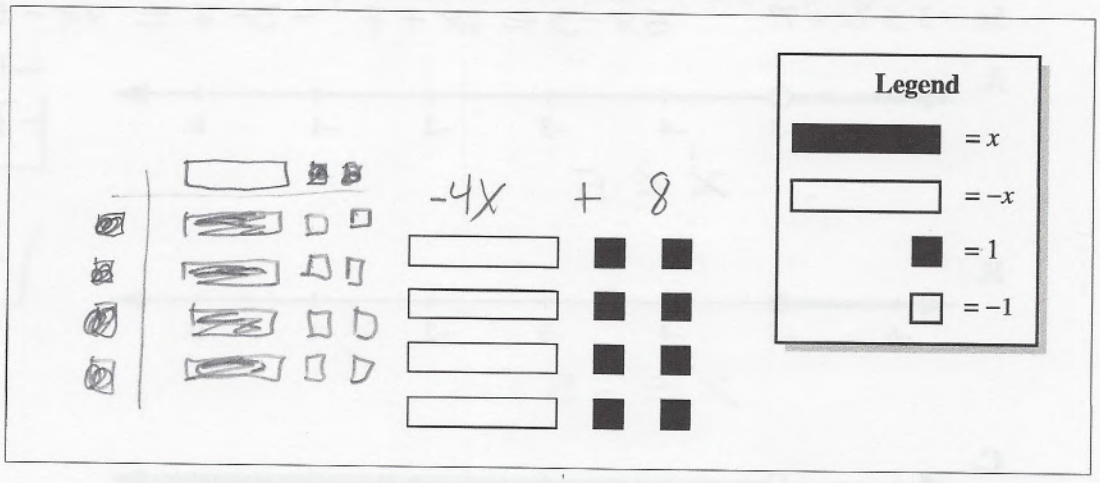
2. The maximum depth of the water in the pipe is 8 cm.

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

Since the diameter is 40 → height is 20 + 12 = 32

$x = 40 - 32 = 8$ cm

Use the following algebra-tile diagram to answer question 9.



9. The algebra tile model above could represent the product of

A. 2 and $(2x + 4)$ $= 4x + 8$

B. 2 and $(2x - 4)$

C. 4 and $(-x - 2)$ $= -4x - 8$

D. 4 and $(-x + 2)$ $= -4x + 8$

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10. If a cube has a surface area of 2.16 m^2, then which of the following equations represents the height, h, of the cube?

6 faces

$\frac{2.16}{6}$ = area of one face

length $= \sqrt{\frac{2.16}{6}}$

A. $h = \sqrt{\frac{2.16}{6}}$ m

B. $h = \sqrt{\frac{6}{2.16}}$ m

C. $h = \frac{2.16}{6}$ m

D. $h = 2.16 \times 6$ m

$\sqrt{\frac{2.16}{6}} \Rightarrow h$

$\sqrt{\frac{2.16}{6}}$

Use the following information to answer question 11.

An art store is having a sale. The table below shows the regular price, r, and the sale price, s, of several items.

Item	Regular Price (r)	Sale Price (s)
Glue	\$5.00	\$4.25
Brushes	\$7.00	\$5.95
Paper	\$10.00	\$8.50
Crayons	\$12.00	\$10.20

11. Which of the following equations was used to calculate the sale prices?

A. $s = 0.15r$

B. $s = 0.85r$

C. $s = r - 0.75$

D. $s = r - 0.85$

\$5.00 — 100%
\$4.25 — x

$x = \frac{425}{5} = 85\%$

So, sale is 100% - 85% = 15%

Sale is 15%

So B

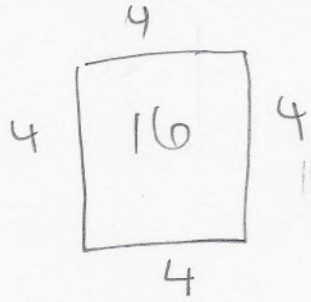
Use the following diagram to answer numerical-response question 3.

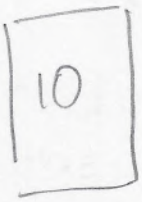
Sam draws two polygons that are similar. The first polygon has a perimeter of 16 cm and the second polygon has a perimeter of 10 cm.

Numerical Response

3. If the shortest side of the first polygon has a length of 4 cm, then the corresponding side of the second polygon has a length of 2.5 cm cm.

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





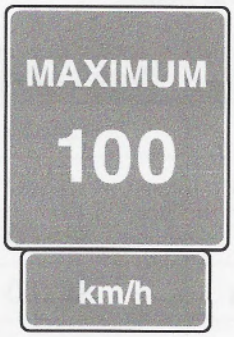
$\frac{16}{4} = \frac{10}{x}$

$16 — 4$
$10 — x$

$\frac{40}{16} = 2.5$

Use the following information to answer question 12.

Kristy received a speeding ticket for travelling above the posted limit.



12. The inequality that shows the speed, s, that Kristy was travelling at is

A. $s \leq 100$ km/h

B. $s < 100$ km/h

C. $s \geq 100$ km/h

D. $s > 100$ km/h

$s > 100$ km/h

• she can travel at 100 km.

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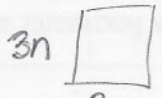
13. If the side length of a cube is tripled, then the surface area of the cube will increase by a factor of

A. 6

B. 9

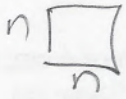
C. 12

D. 27



$= 9n^2 \times 6 = 54n^2$

$\frac{54}{6} = 9n^2$



$= n^2 \times 6 = 6n^2$

14. The expression $(3^2 \times 2)^3$ can be simplified to

A. $3^2 \times 2^3$

B. $3^6 \times 2$

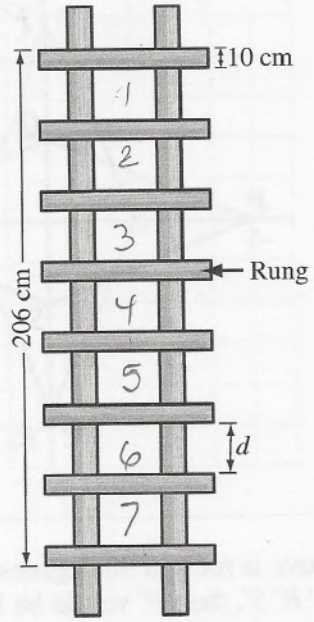
C. $3^5 \times 2^3$

D. $3^6 \times 2^3$

$3^6 \times 2^3$

Use the following diagram to answer question 15.

A ladder with equally spaced rungs is shown below.



* *d* represents distance between rungs

15. Which of the following equations can be used to calculate the distance, *d*, between each ladder rung?

A. $d = 206 - 8(10) \div 7$

B. $d = 206 - 8(10) \times 7$

C. $d = \dfrac{7}{206 - 8(10)}$

D. $d = \dfrac{206 - 8(10)}{7}$

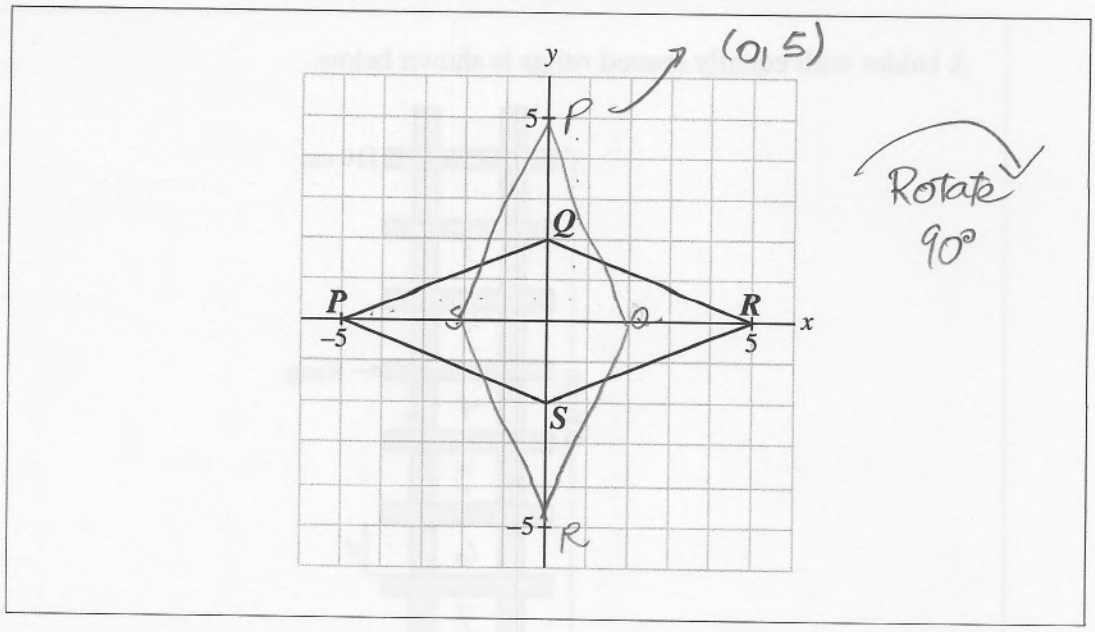
$206 = 7d + 8(10\text{ cm})$

$206\text{ cm} = 7d + 80\text{ cm}$

$206\text{ cm} - 80\text{ cm} = 7d$

$\dfrac{206 - 80}{7} = d$

Use the following diagram to answer question 16.



16. If the shape shown above is rotated 90 degrees clockwise about the origin to form the quadrilateral $P'Q'R'S'$, then P' would be located at

A. (5, 0)
B. (0, 5)
C. (0, –5)
D. (–5, 0)

Use the following information to answer numerical-response question 4.

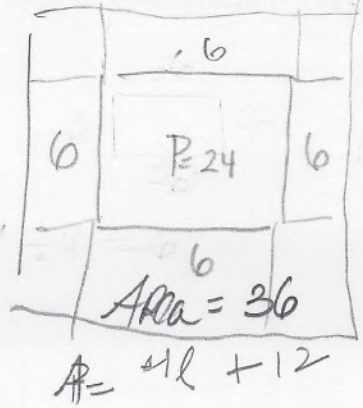
When a square piece of paper is folded in half, the resulting figure has a perimeter of 24 cm.

Numerical Response

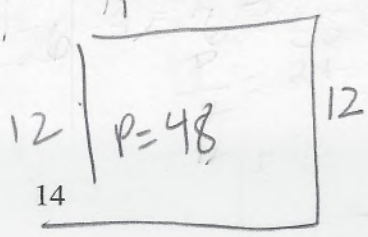
Use the Concept of Similar Polygons

4. The **area** of the square piece of paper before it is folded is _____ cm^2.

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



Double perimeter



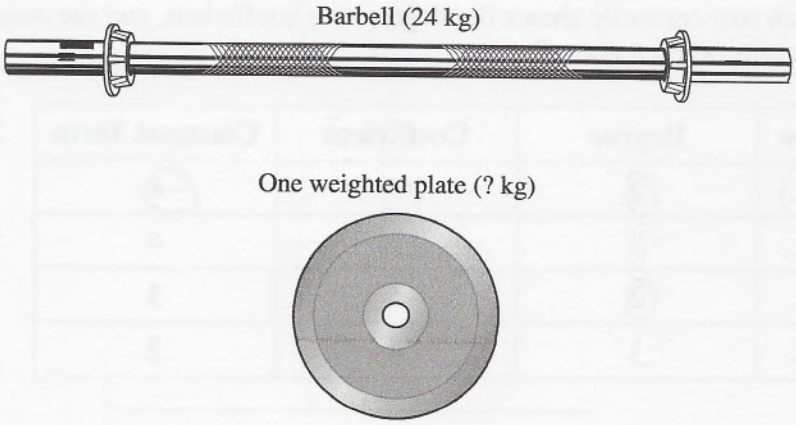
SF = $\frac{48}{24} = 2$

$36 - 12 = 4l$

$l = 6$

Use the following information to answer question 17.

A weight-lifter adds a certain number of equally weighted plates to the barbell shown below. The weighted plates are identical to one another.



17. If the total mass of the barbell and plates equals 60 kg, and if each side of the barbell has the same number of plates, then one weighted plate could have a mass of

A. 36 kg → 1 plate
B. 12 kg → 3 plates (not even)
C. 6 kg
D. 4 kg → 9 plates (not even)

24 kg + ? = 60 kg
? = 60 − 24 = 36
36 kg among weighted plates in both sides

$\frac{36}{6} = 6$ → 3 on each side

18. Marc has a certain number of coins that are dimes, d, and quarters, q. Which of the following expressions represents the value of Marc's money in cents?

A. $10d + 25q$
B. $35(d + q)$
C. $35d + q$
D. $d + q$

Money = d + q
1d = 10c
q = 25c
Money = 10d + 25q

Use the following information to answer question 19.

$3x^2 - 4$

19. Which row correctly shows the degree, the coefficient, and the constant term in the expression shown above?

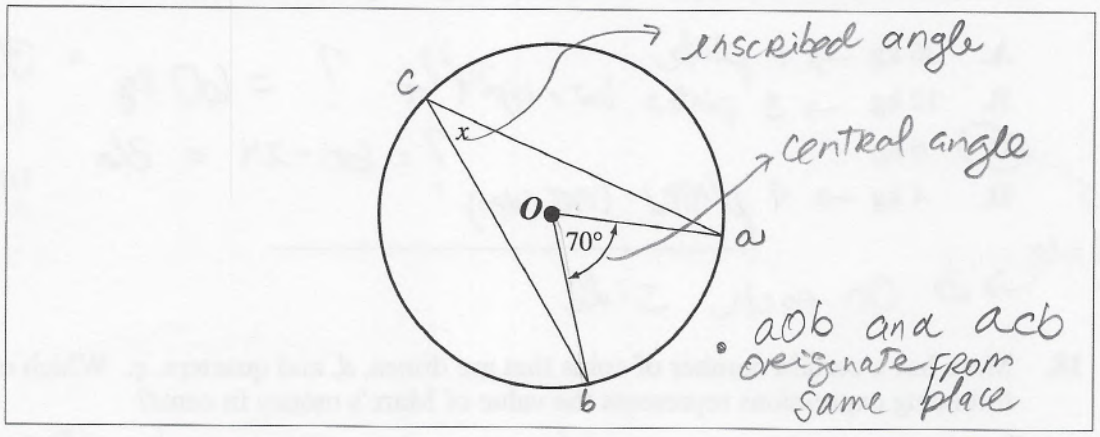
Row	Degree	Coefficient	Constant Term
A.	2	3	−4
B.	3	2	4
C.	2	−4	3
D.	3	4	2

Degree → highest exponent = 2

Coefficient → number with variable = 3

Constant Term = no variable = −4

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



Numerical Response

5. If O is the centre of the circle, the measure of x is 35 °.

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

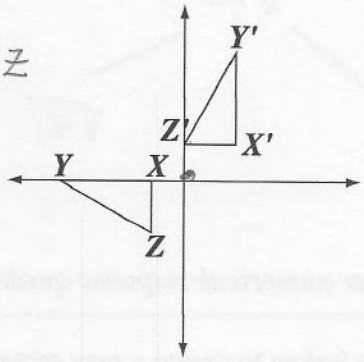
Inscribed angle = $\frac{\text{Central angle}}{2} = 35°$

counterclockwise

20. Which of the following diagrams illustrates a 90° rotation of triangle ***XYZ*** counter-clockwise about the origin?

A.

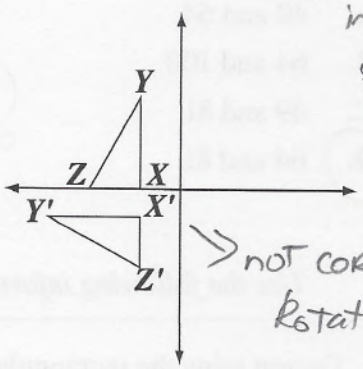
- original coordinates → XYZ
- new coordinates → X'Y'Z'



B.

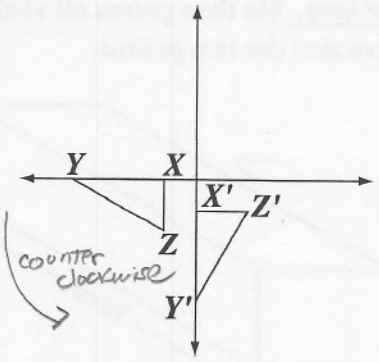
90° → ends up in following quadrant.

180° = across quadrant



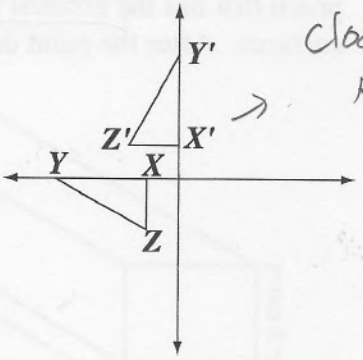
→ not correct rotation

C.



D.

clockwise rotation



21. When $x^2 - 9x - 4$ is subtracted from the sum of $5x^2 - 8x + 2$ and $2x^2 - 3x - 7$, the result is

A. $x^2 - 20x - 9$

B. $2x^2 + 4x + 13$

C. $6x^2 - 2x - 1$

D. $8x^2 - 20x - 9$

$5x^2 - 8x + 2 +$
$2x^2 - 3x - 7$
$7x^2 - 11x - 5$

- Subtract → add the opposite

$7x^2 - 11x - 5 +$
$-x^2 + 9x + 4$
$-6x^2 - 2x - 1$

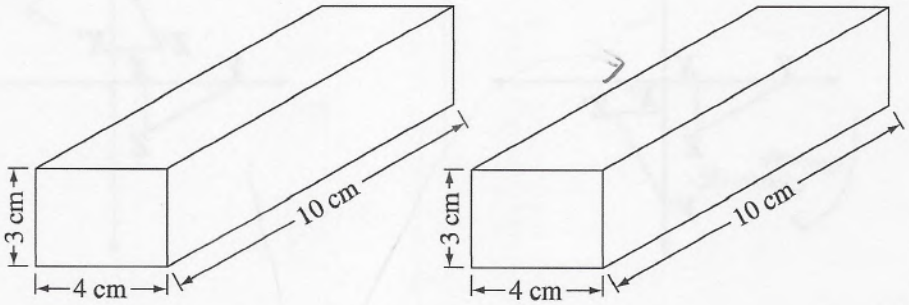
22. In estimating $\sqrt{70}$, which two perfect square numbers provide the **best** two benchmarks to estimate your answer?

A. 49 and 64
B. 64 and 100
C. 49 and 81
D. 64 and 81

$\sqrt{70}$
$\sqrt{64}$ $\sqrt{81}$

Use the following information to answer numerical-response question 6.

Darren joins the rectangular prisms shown below to create a new rectangular prism that has the greatest possible surface area. He then paints all visible surfaces. After the paint dries, Darren separates the two prisms.



Numerical Response

Read carefully

6. The total area of both prisms that has **not** been painted is 24 cm^2.

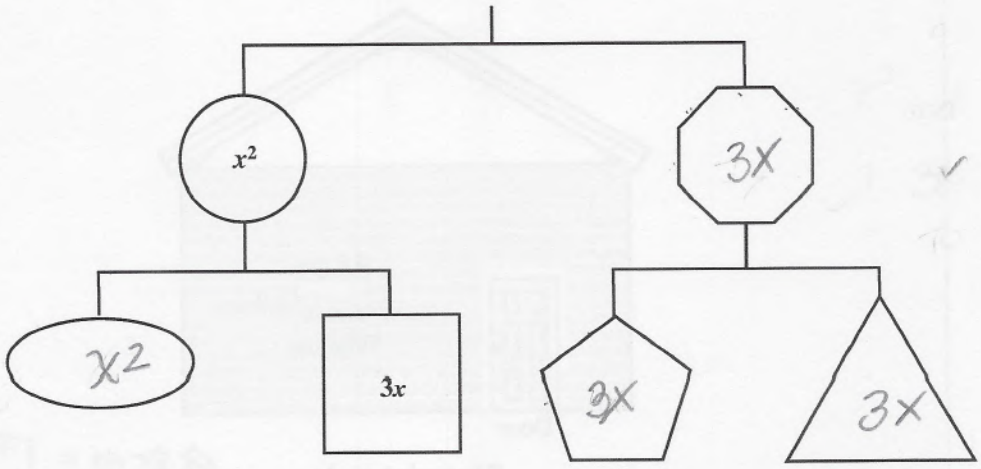
(Record your answer in the numerical-response section on the answer sheet.)

- greatest possible surface area
  - ↳ eliminate smallest areas

3 × 4 = 12 cm^2 × 2 = 24 cm^2

Use the following information to answer question 23.

The following diagram represents a balanced mobile.



23. The sum of all parts of the mobile is

non-poligons = x^2

poligons = 3x

A. $2x^2 + 12x$

B. $2x^2 + 9x$

C. $x^2 + 6x$

D. $x^2 + 3x$

$2x^2 + 12x$

Use the following equation to answer question 24.

$2.15x + 7.8 = 25$

24. Which of the following equations is equivalent to the equation shown above?

A. $215x + 780 = 2\,500$ $215x + 780 = 2500$

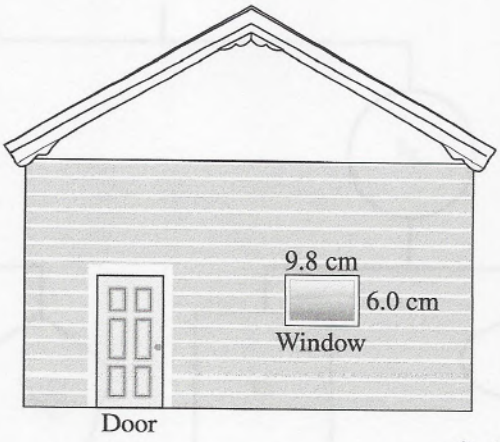
B. $215x + 780 = 250$

C. $215x + 78 = 2\,500$

D. $215x + 78 = 25$

Use the following information to answer question 25.

The diagram below shows the front elevation of a building on a blueprint.



Blueprint scale
1:18

9.8cm = 176.4 cm ≈ 1.8m
6 cm × 18 = 108 cm = 1.08m
↓
1.1

25. Based on the dimensions shown on the blueprint, the actual dimensions of the window, to the nearest tenth of a metre, will be

A. 0.5 m × 0.3 m
B. 1.0 m × 0.6 m
C. 1.8 m × 1.1 m
D. 1.8 m × 3.0 m

Use the following information to answer question 26.

The following survey question was given to a sample of Grade 9 students:

Do you prefer to use your television to play childish video games or to watch educational programs?

26. Data collected by this survey may be **most** influenced by a problem related to

A. ethics
B. privacy
C. use of language
D. cultural sensitivity

Use the following information to answer question 27.

Jim simplifies the expression $\frac{5(x+2)-(8-x)}{2}$ as shown below.

Step 1 $\frac{5x+10-8-x}{2}$

Step 2 $\frac{4x+2}{2}$

Step 3 $\frac{4x}{2}+\frac{2}{2}$

Step 4 $2x+1$

27. In which step did Jim make an error when simplifying the expression?

A. Step 1
B. Step 2
C. Step 3
D. Step 4

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28. Tim buys 2 kg of almonds at \$5.49/kg and 4 kg of cashews at a store that includes GST in its prices. If the cost of his purchase is \$25.50, then the price of 1 kg of cashews is

A. \$3.63
B. \$7.26
C. \$10.98
D. \$14.52

$2\text{ kg} \times \$5.49/\text{kg} = \$10.98$

4 kg

$\$25.50 = \$10.98 + \$(4\text{kg})$

$\$(4\text{kg}) = \$25.50 - \$10.98$

$\$(4\text{kg}) = \$14.52$

Price per kilo $= \frac{\$14.52}{4}$

Rea

Use the following information to answer question 29.

Sandy has a budget of $100 to spend on back-to-school clothes. The shirts she wants to buy are $12 each, and the pants she wants to buy are $25 each. All prices include tax.

29. Which of the following inequalities could be used to determine the maximum number of shirts, n, Sandy can buy if she also buys 2 pairs of pants?

A. $12n - 2(25) \leq 100$
B. $12n + 2(25) \leq 100$
C. $2(25) - 12n \geq 100$
D. $2(25) + 12n \geq 100$

• She can spend 100 or less
12n, (25)2
$12n + 25p \leq 100$
12n

Use the following information to answer numerical-response question 7.

Alan, Bob, and Charles worked together on a job and earned a combined total of $380. Alan earned $40 less than Bob. Charles earned twice as much as Alan.

Numerical Response

7. How much did Alan earn?

Answer: $ 85

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

(85) (125) (170)
Alan + Bob + Charles = 380
$x - 40 + x + 2(x-40)$
$x - 40 + x + 2x - 80 = 380$
$2x - 40 + 2x - 80 = 380$
$4x - 120 = 380$
$4x = 380 + 120$
$4x = 500$
$x = \frac{500}{4} = 125$

alan earned
$x - 40 = 125 - 40$
$= \$85$

Use the following information to answer question 31.

> Ben was earning a monthly salary of $5 000 before he changed jobs. At his new job he earns 10% less than he did at his old job.

31. If after one year at his new job Ben receives a pay increase of 15%, how much will he then be earning per month?

A. $4 725
B. $4 750
C. $5 175
D. $5 250

10% = 500
New salary = $5000 − $500
= $4500

$4500 — 100%
x — 15% x = $675 increase

total new = 4500 + 675 = $5175

32. Jenny notices that a music store is having a "No GST and 40% off the regular price" sale. If the regular price of a CD is $15.99, then what is the maximum number of sale-priced CDs that Jenny can buy with her $80 gift card?

A. 8
B. 9
C. 11
D. 13

$15.99 — 100%
x — 40% $ = 6.396

Discounted price = $15.99 − 6.396
$9.594

$80 / $9.594 = 8.33
↳ 8

Numerical Response

8. At a picnic for 49 people, 4 families each brought an equal number of lawn chairs. If 5 more lawn chairs were still needed, then how many chairs did each family bring?

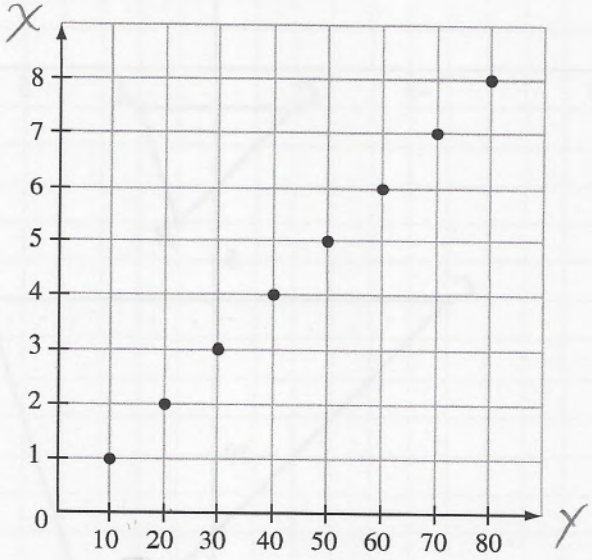
Answer: 11 chairs

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

$49 = 4x + 5$
$49 - 5 = 4x \rightarrow 44 = 4x$
$x = \frac{44}{4} = 11$ chairs

Use the following information to answer question 33.

Various points have been plotted on the graph below. The title of the graph and the labels of the axes have been omitted.



33. Which of the following statements is a possible interpretation of the graph above?

A. Nicole earns $20 for each hour she works.

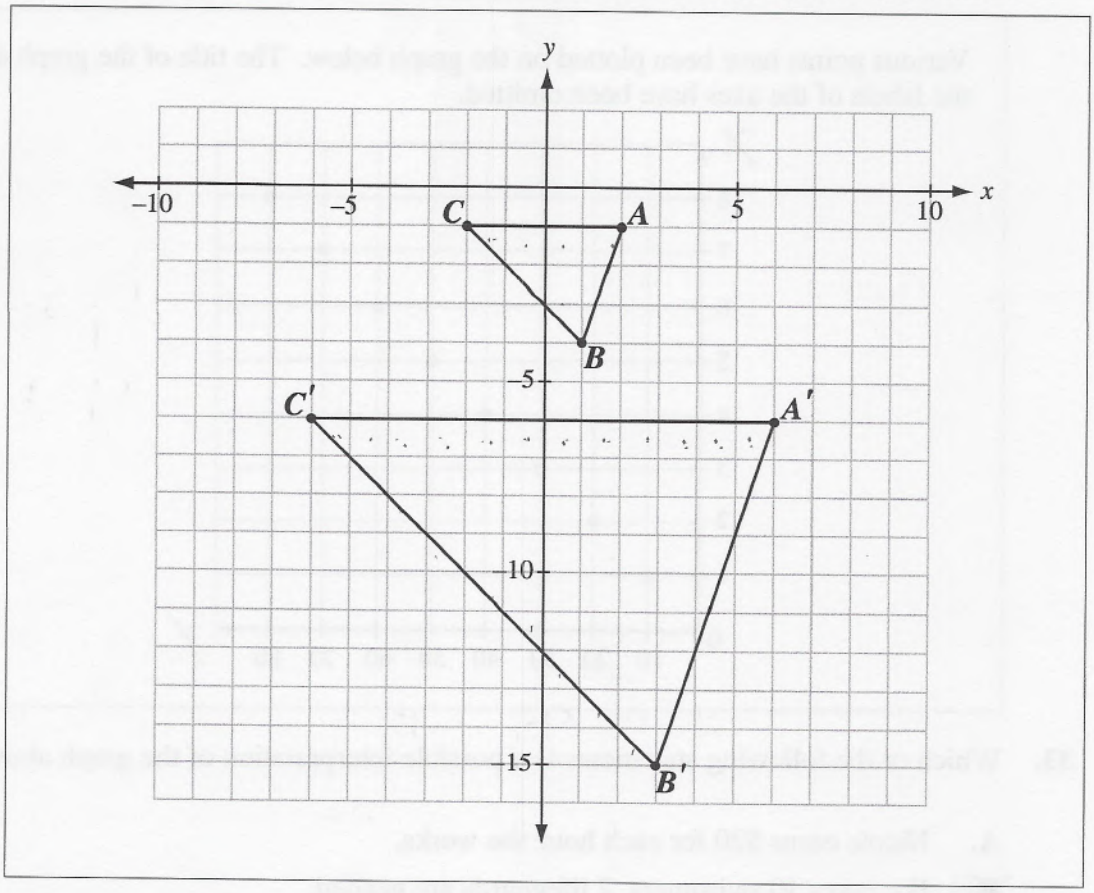
B. For every 10 swimmers, 2 lifeguards are needed.

C. For every 10 pieces of candy Simone buys, she pays $1.

D. A runner runs at a constant speed of 2 km every 30 minutes.

Multiple-choice question 34 is not being released at this time.

Use the following information to answer numerical-response question 9.



Numerical Response

$\frac{C'A'}{CA} = \frac{12}{4} = 3$

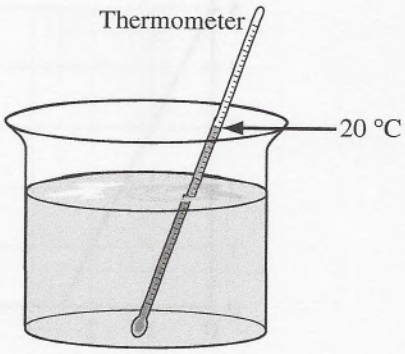
9. What is the scale factor of the enlargement?

Answer: 3

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

Use the following information to answer question 35.

In a science experiment, a solution has an initial temperature of 20 °C, as shown below.



35. If the temperature, T, of the solution drops 2.8 °C/h, then which of the following equations can be used to calculate the temperature of the solution after 4 hours?

A. $T = 20\ °C - (2.8\ °C/h \times 4\ h)$ Initial = 20 °C

B. $T = 20\ °C + (2.8\ °C/h \times 4\ h)$ → temperature decrease → increase

C. $T = (20\ °C - 2.8\ °C/h) \times 4\ h$

D. $T = (20\ °C + 2.8\ °C/h) \times 4\ h$

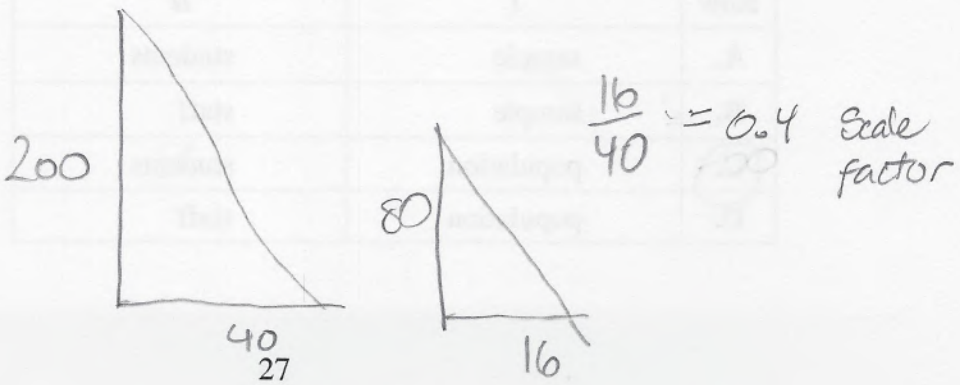
Use the following information to answer numerical-response question 10.

A person who is 200 cm tall casts a shadow that is 40 cm long. At the same time of day, a nearby post casts a shadow that is 16 cm long.

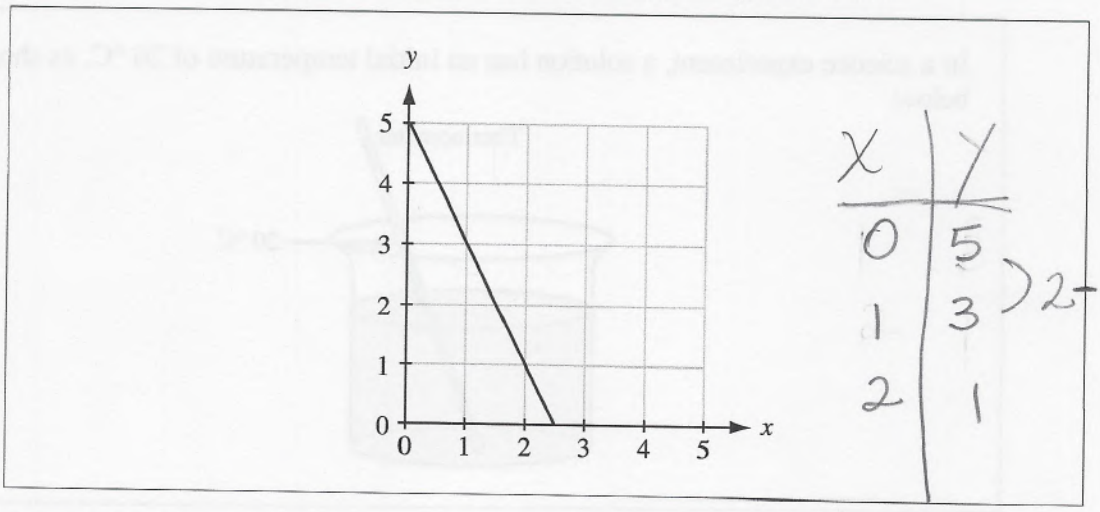
Numerical Response

10. The height of the post is 80 cm.

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



Use the following information to answer question 36.



X	Y
0	5
1	3
2	1

)2-

36. Which of the following equations represents the relationship between the variables x and y in the graph shown above?

A. $y = 5 - 2x$

B. $y = 2x - 5$

C. $y = 5 - x$

D. $y = x - 5$

$2X \Rightarrow (2\times0) = 0$ to 5 $+5$

$-2X + 5$

$5 - 2X$

Use the following information to answer question 37.

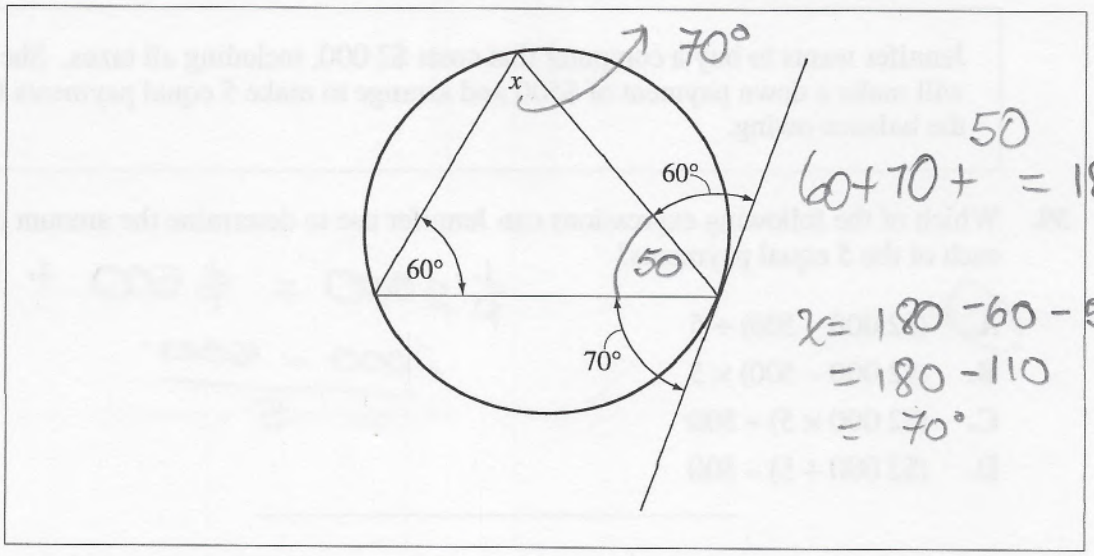
A school principal asks every student and staff member (Population) in the school if they like the idea of school uniforms. The school has 450 students and 30 staff members.

37. *The survey above uses a* ___*i*___, *and* ___*ii*___ *would have the most influence on the data.*

The statement above is completed by the information in row

Row	*i*	*ii*
A.	sample	students
B.	sample	staff
C.	population	students
D.	population	staff

Use the following information to answer question 38.



60+70+50 = 180

x = 180 - 60 - 50
= 180 - 110
= 70°

38. The measure of x in the diagram above is

A. 50°

B. 60°

C. 65°

D. 70°

Use the following information to answer question 39.

Jennifer wants to buy a computer that costs $2 000, including all taxes. She will make a down payment of $500 and arrange to make 5 equal payments for the balance owing.

39. Which of the following expressions can Jennifer use to determine the amount of each of the 5 equal payments?

$2000 = $500 + 5x

$\frac{2000 - 500}{5}$

A. ($2 000 – 500) ÷ 5

B. ($2 000 – 500) × 5

C. ($2 000 × 5) – 500

D. ($2 000 ÷ 5) – 500

Use the following information to answer question 40.

The following list shows Rick's yearly vehicle expenses.

- Insurance: $1 200
- Gasoline: $1 300
- Repairs: $850

40. If Rick works 8 hours/day, 5 days/week, and takes home $10/hour, then what is the **least** number of complete weeks he must work in order to pay for all his yearly vehicle expenses?

5 x 8 = 40 hours

40 hours x $10 = $400

A. 6 weeks

B. 7 weeks

C. 8 weeks

D. 9 weeks

$1200 + $1300 + $850 = $3350

$\frac{\$3350}{\$400} = 8.37 \rightarrow 9$

You have now completed the test.
If you have time, you may wish to check your answers.

Additional Information

The table below provides additional information about 49 of the 50 items that appeared on the 2010 Grade 9 Pilot Mathematics Achievement Test.

Item	Key	Correct Response %	Item Complexity	Strand	Specific Outcome	Item Description
MC 1	C	85.1	L	N	6	Determine the approximate square root of a rational number that is not a perfect square.
MC 2	B	18.2	M	PR	3	Represent a word problem as a single-variable linear equation.
MC 3	B	71.1	L	SS	5	Determine the resulting coordinates of an image that undergoes a translation on the Cartesian plane.
MC 4	D	43.2	M	N	4	Apply knowledge of order of operations to determine which expressions are equivalent.
MC 5	D	71.0	M	N	2	Perform operations on expressions containing powers with integral bases and whole number exponents.
MC 6	A	38.3	M	PR	4	Solve a single-variable linear inequality with rational coefficients.
MC 7	C	69.8	L	N	2	Determine the sum, difference, product, and quotient of given powers with integral bases and whole number exponents.
MC 8	D	42.5	H	PR	4	Solve a single-variable linear inequality with rational coefficients and represent the solution on a number line.
MC 9	D	65.3	M	PR	7	Represent the product of a monomial and a binomial with an algebra tile model.
MC 10	A	47.5	M	SS	2	Determine the equation that represents the height of a rectangular prism when given the surface area of the prism.
MC 11	B	59.5	L	PR	1	Represent a pattern shown in a table of values as a single-variable linear equation.
MC 12	D	70.3	L	PR	4	Represent a given context as a single-variable linear inequality with a rational coefficient.
MC 13	B	50.0	M	SS	2	Determine the change in surface area of a rectangular prism after one of its dimensions is increased by a certain factor.
MC 14	D	53.2	L	N	2	Simplify a two-term expression contained within parentheses by applying the exponent laws of powers with integral bases and whole number exponents.
MC 15	D	48.9	H	N	4	Determine the equation that represents the solution to a word problem involving the order of operations.

Item	Key	Correct Response %	Item Complexity	Strand	Specific Outcome	Item Description
MC 32	A	57.2	M	N	4	Solve a word problem by applying knowledge of order of operations on rational numbers expressed as percentages.
MC 33	C	89.0	H	SP	3	Identify the statement that represents a possible interpretation for a given graph.
MC 35	A	67.0	M	PR	2	Represent the solution to a given problem with a linear equation.
MC 36	A	53.4	M	PR	2	Match a given linear equation to its corresponding graph.
MC 37	C	79.0	M	SP	2	Determine whether or not a sample of a population or a population was used to answer a question and how that decision may have influenced the results.
MC 38	D	55.4	L	SS	1	Use properties of circles to determine the measure of an angle in a triangle that is inscribed in a circle.
MC 39	A	68.4	M	N	4	Determine the expression that represents the solution to a word problem involving order of operations.
MC 40	D	66.8	M	N	3	Solve a word problem involving arithmetic operations on rational numbers.
NR 1	22	38.5	H	PR	3	Represent and solve a given money problem using a linear equation.
NR 2	8	44.4	H	SS	1	Solve a problem involving a circle property whereby the perpendicular from the centre of a circle to a chord bisects the chord.
NR 3	2.5	51.2	M	SS	3	Use the properties of similar polygons to solve a word problem.
NR 4	64	16.1	M	SS	3	Solve a word problem involving perimeter and area of similar polygons.
NR 5	35	71.2	L	SS	1	Solve a problem involving a circle property whereby the measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc.
NR 6	24	20.0	H	SS	2	Create a composite 3-D object with the largest surface area possible by joining together two identical 3-D objects and find the shared area that is common to both 3-D objects.
NR 7	85	37.6	H	PR	3	Represent and solve a given problem using single-variable linear equations.
NR 8	11	74.0	M	PR	4	Represent and solve a given problem using a single-variable linear equation.
NR 9	3	63.1	L	SS	4	Determine the scale factor used to create an image of a 2-D shape on the Cartesian plane.
NR 10	80	66.2	M	SS	4	Use the properties of similar triangles to solve a word problem.