Victim's Student Number: 000000

Academic

Grade 9 Assessment of Mathematics

Mock Assessment

Multiple-Choice Questions																
Question	**1.**	**2.**	**3.**	**4.**	**5.**	**7.**	**8.**	**9.**	**10.**	**12.**	**13.**	**14.**	**15.**	**16.**	**20.**	**21.**
Mark (0 or 10)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Total	160/160															

Open-Response Questions						
Question	**Mark (Circle Students' Mark)**					
6.	B (0)	I (0)	10	20	30	(40)
11.	B (0)	I (0)	10	20	30	(40)
17.	B (0)	I (0)	10	20	30	(40)
18.	B (0)	I (0)	10	20	30	(40)
19.	B (0)	I (0)	10	20	30	(40)
22.	B (0)	I (0)	10	20	30	(40)
Total	240/240					

Overall Total	400/400

Please note: The format of this booklet is different from that used for the assessment. The items themselves remain the same.

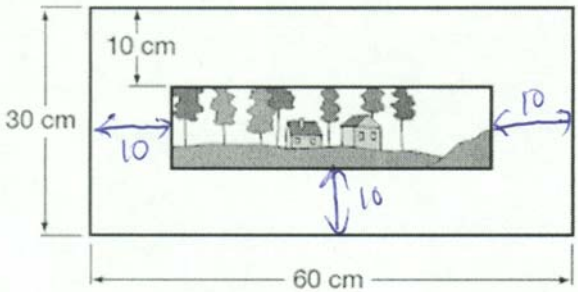
Education Quality and Accountability Office

EQAO

Excellent Work Mr. S!

S

1. The frame of a picture measures 60 cm by 30 cm. The border around the picture is 10 cm wide.



What are the dimensions of the **picture**?

(A) 40 cm × 10 cm
B 50 cm × 20 cm
C 50 cm × 30 cm
D 60 cm × 30 cm

Length = 60 − 10 − 10 = 40
width = 30 − 10 − 10 = 10

2. Tim shows the steps he took in simplifying the following algebraic expression:

$$\frac{(a^2)^3}{a^2 \times a^3}$$

$= \frac{a^5}{a^2 \times a^3}$ Step 1

$= \frac{a^5}{a^{2+3}}$ Step 2

$= \frac{a^5}{a^5}$ Step 3

$= 1$ Step 4

should be a^6

In which step did Tim make an **error**?

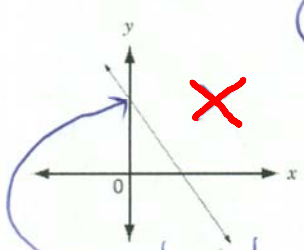
(F) Step 1
G Step 2
H Step 3
J Step 4

$(a^2)^3 = a^{2\times3} = a^6$

Power of a Power Rule
"To raise a power to an exponent, keep the base and MULTIPLY the exponents."

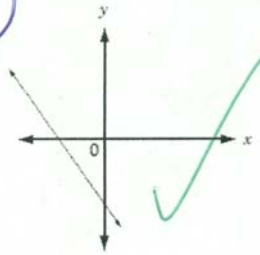
3. Which graph is the best match to a sketch of $y = -3x - 4$?

A



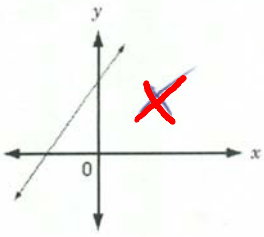
y-intercept is 4

(B)

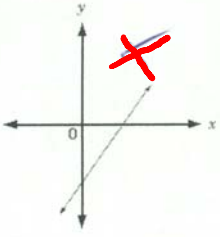


Both have positive slope

C



D



 slope of distance-time graph = speed **Multiple-Choice**

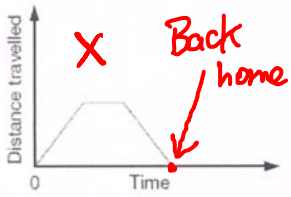
4. Nicole rides her bike to school in the morning. She stops at a store for about 5 min when she is halfway to school. Which graph below best describes this situation?

slope = speed

Can't be in 2 places at once!

slope = 0 ⇒ speed = 0 ∴ not moving

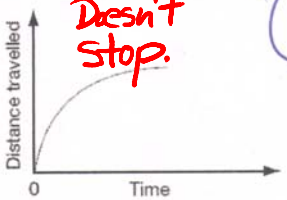
F



X Back home!

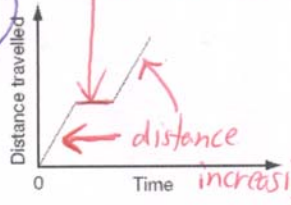
G X

H X



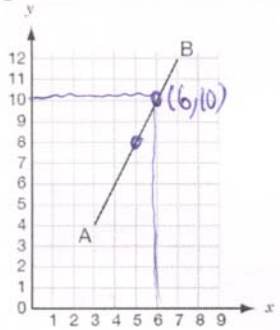
Doesn't stop.

J



distance increasing

5. If A is (3, 4) and B is (7, 12), which point is on the line segment AB?



X **A** (3, 5)

X **B** (4, 8)

X **C** (5, 9)

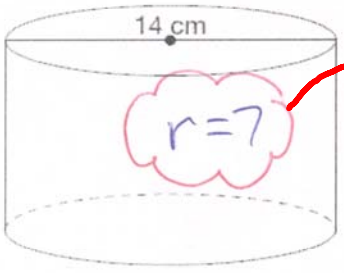
D (6, 10)

 Open-Response

6. How High Is It?

The cylinder pictured below has a surface area of 660 cm².

$A = 2\pi r^2 + 2\pi rh$



diameter = 14 ∴ radius = 7

$\therefore 660 = 2\pi(7)^2 + 2\pi(7)h$

$\therefore 660 = 98\pi + 14\pi h$

$\therefore 660 - 98\pi = 14\pi h$

$\therefore \frac{660 - 98\pi}{14\pi} = h$

Use the following formula to determine the height of the cylinder:

Surface area = $2\pi r^2 + 2\pi rh$

Show your work.

$\therefore h \doteq 8$

The cylinder has a height of about 8 cm.

Check: $2\pi(7)^2 + 2\pi(7)(8) = 98\pi + 112\pi = 210\pi \doteq 660$

7. Karina has a job at a video store. The total she is paid each week is made up of an hourly rate plus $14 for transportation. y-intercept must be 14

One week, she works 20 hours and is paid $215.

Which equation represents the relationship between Karina's total pay, P, in dollars, and the number of hours she works, n?

F $P = 10.75n + 14$ 215 − 14 = 201

X $P = 14n + 10.75$ X

H $P = 10.05n + 14$ $\frac{201}{20} = 10.05$

X $P = 14n + 10.05$ X

8. The table below represents a linear relation.

Time, t	Distance, D
0	5
1	15
2	25
3	35
4	45

→ y-intercept must be 5

Which equation represents this relation?

X $D = 5t$

X $D = 10t$

C $D = 10t + 5$ ← only equation with a y-intercept of 5

X $D = 5t + 10$

9. Juan shows the steps he took in rearranging a formula:

Given $P = 2(l + w)$

Step 1 $P = 2l + 2w$

Step 2 $P + 2l = 2w$ should be −

Step 3 $\frac{P + 2l}{2} = w$

Step 4 $\frac{P}{2} + l = w$

In which step did Juan make an error?

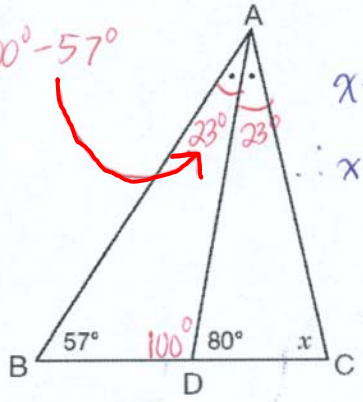
F Step 1

G Step 2

H Step 3

J Step 4

10. AD is the angle bisector of ∠BAC. ∠ABD = 57° and ∠ADC = 80°. What is the value of angle x?



180° − 100° − 57°

$x + 80° + 23° = 180°$

$\therefore x = 180° - 80° - 23°$

A 50°

B 57°

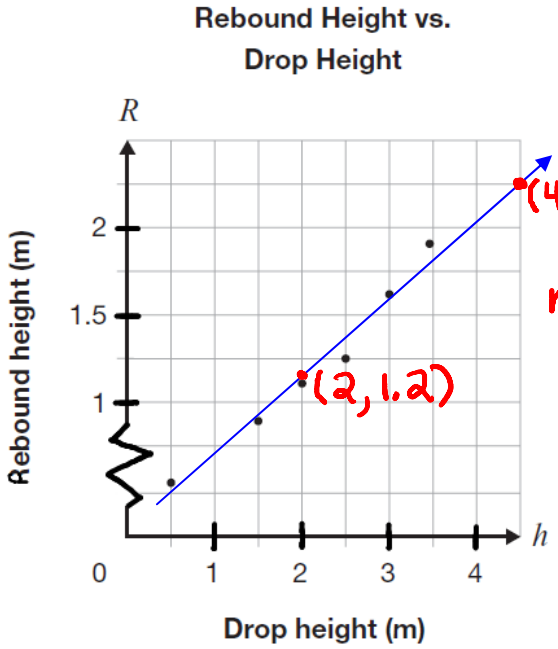
C 70°

D 77°

S

Follow the Bouncing Ball

This scatter plot shows the relationship between the rebound height of a ball and the height from which the ball is dropped.



$m = \frac{\Delta R}{\Delta h} = \frac{2.5-1.2}{4.5-2} = \frac{1.3}{2.5} = 0.52$

Draw a line of best fit for the data on the grid above.

Determine an equation for your line of best fit.

Show your work.

As shown above, $m = 0.52$. Therefore, the equation must take the form $R = 0.52h + b$. Since $(4.5, 2.5)$ lies on the line, its co-ordinates must satisfy the equation.

$\therefore 2.5 = 0.52(4.5) + b$

$\therefore 2.5 = 2.34 + b$

$\therefore b = 2.5 - 2.34 = 0.16$

Equation of line of best fit: $R = 0.52h + 0.16$

12. What is the equation of a line passing through the points (2, 5) and (4, 11)?

- ✗ $y = x - 3$
- ✗ $y = 2x - 1$
- (H) $y = 3x - 1$
- ✗ $y = 4x - 3$

$m = \frac{11-5}{4-2} = \frac{6}{2} = 3$

Only one with a slope of 3

Check: Substitute $x=2, y=5$

L.S.	R.S.
$y=5$	$3x-1$ $=3(2)-1=5$

13. Alex has \$150. She spends the same amount each week. After 6 weeks, she has \$30 remaining.

The relationship between the amount of money Alex has and the number of weeks is represented by a line. What is the slope of this line?

Slope must be negative because \$ decreases with time.

time, money

(0, 150) ← \$

weeks → (6, 30)

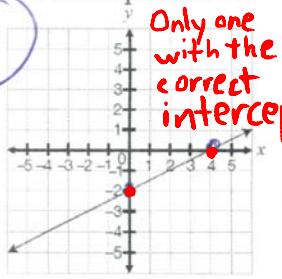
$m = \frac{30-150}{6-0} = \frac{-120}{6} = -20$

- a −25
- (b) −20
- ✗ 20
- ✗ 25

14. Which of the following represents the graph of the equation $2x - 4y = 8$?

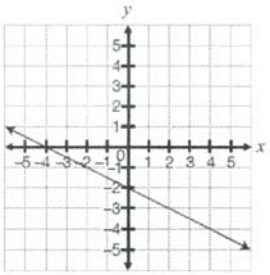
Intercepts: $x=0 \rightarrow -4y=8 \rightarrow y=-2$; $y=0 \rightarrow 2x=8 \rightarrow x=4$

F

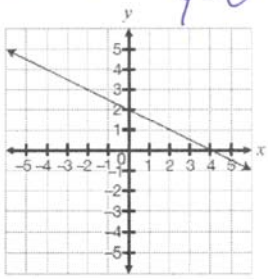


Only one with the correct intercepts

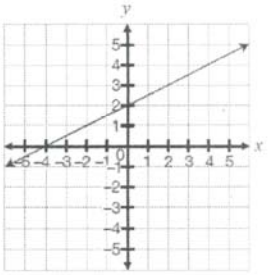
G



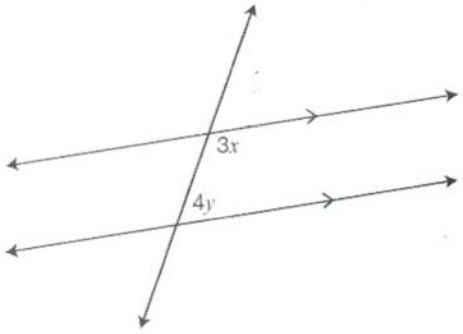
H



J



15. The relation shown below can be expressed as $3x + 4y - 180 = 0$.



Another way to write this relation is

- F $y = \frac{3}{4}x - 45.$
- (G) $y = -\frac{3}{4}x + 45.$
- H $y = -\frac{4}{3}x + 60.$
- J $y = \frac{4}{3}x - 60.$

$3x+4y-180=0$

$\therefore 4y = -3x + 180$

$\therefore y = -\frac{3}{4}x + \frac{180}{4}$

$\therefore y = -\frac{3}{4}x + 45$

16. How would the graph of the relation $y = 3x - 2$ change if the 3 and −2 were both doubled?

$y = 3x - 2$

$y = 6x - 4$

steeper slope; lower y-intercept

The graph would be

- (a) steeper and have a lower y-intercept.
- b steeper and have a higher y-intercept.
- ✗ less steep and have a lower y-intercept.
- ✗ less steep and have a higher y-intercept.

17. Excellent Equations

A line is perpendicular to the line $y = 2x + 3$ and has the same ***x*-intercept** as $x + 3y + 10 = 0$.

Find the equation of this line. Express your answer in the form $y = mx + b$.

Justify your answer.

(1) Slope of $y = 2x + 3$ is 2

(2) x-intercept of $x + 3y + 10 = 0$:

$y = 0$ (since all points on the x-axis have y-co-ordinate 0)

$\therefore x + 3(0) + 10 = 0$

$\therefore x + 10 = 0$

$\therefore x = -10$

(3) Required Line

(a) slope must be $m = -\frac{1}{2}$ since this line is perpendicular to $y = 2x + 3$

(b) must pass through the point $(-10, 0)$ since it has the same x-intercept as $x + 3y + 10 = 0$

Therefore, the equation of the required line takes the form

$$y = -\frac{1}{2}x + b.$$

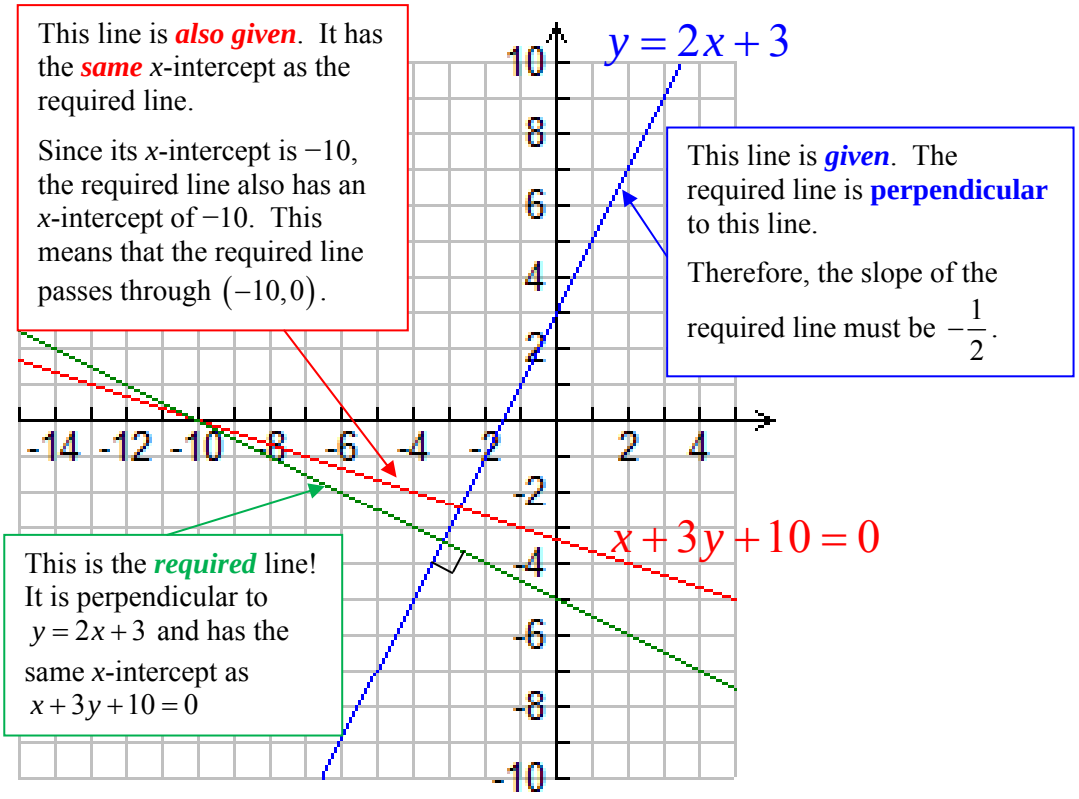
Since the line passes through $(-10, 0)$, the co-ordinates of this point must satisfy the equation.

$\therefore 0 = -\frac{1}{2}(-10) + b$

$\therefore 0 = 5 + b$

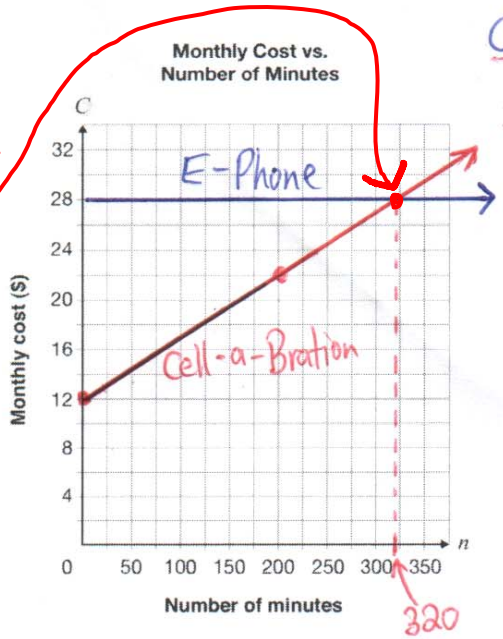
$\therefore b = -5$

The slope-y-intercept equation of the line is $y = -\frac{1}{2}x - 5$



18. Cellphone Plans

Serge is choosing a cellphone plan and wants the lowest cost. Cell-a-Bration charges \$12 per month plus \$0.05 per minute for cellphone service. E-Phone charges \$28 per month for unlimited minutes.



Point of Intersection: (320, 28)

Cell-a-Bration: $C = 0.05n + 12$

E-Phone: $C = 28$

Cell phone companies charge the same amount when

$0.05n + 12 = 28$

$\therefore 0.05n = 16$

$\therefore n = \frac{16}{0.05}$

$\therefore n = 320$

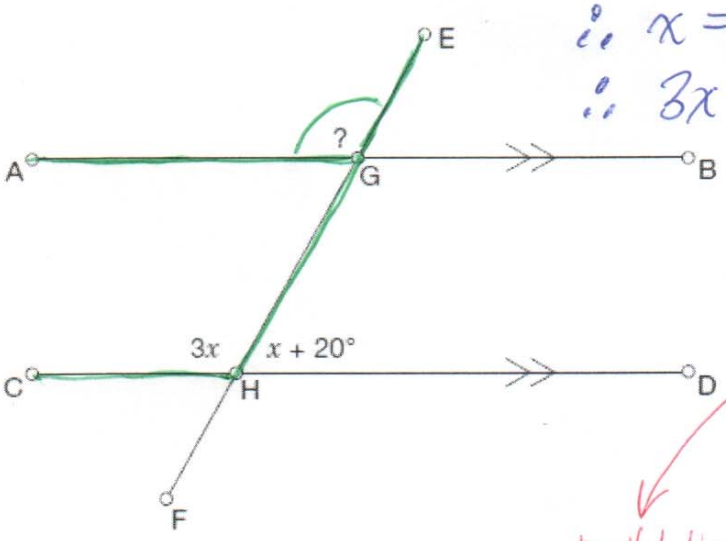
Cell-a-Bration is a better deal when fewer than 320 minutes are used. E-Phone is a better deal for more than 320 minutes.

Determine under which conditions Serge should choose Cell-a-Bration and under which conditions Serge should choose E-Phone.

Justify your answer.

19. In the diagram below,

- $\angle DHG = x + 20°$
- $\angle GHC = 3x$
- AB || CD



$3x + x + 20 = 180$ (CD is a straight line)

$\therefore 4x + 20 = 180$

$\therefore 4x = 160$

$\therefore x = 40$

$\therefore 3x = 120$

$\therefore \angle CHG = 120°$

$\therefore \angle EGA = 120°$

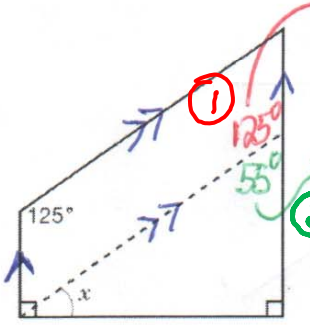
(by PLT F pattern, that is, $\angle EGA$ and $\angle CHG$ are corresponding angles)

$\therefore \angle CHG$ and $\angle GHD$ are supplementary

parallel line theorem

Determine the **measure** of $\angle EGA$.
Justify your answer.

20. Teresa needs to cut a piece of wood in order to make a parallelogram. She marks a line on the wood where she will cut.



① opposite angles of a parallelogram are equal

② supplementary angles

③ $\therefore x = 180 - 90 - 55$
$= 35$

What is the size of angle x?

a 25°

b 35°

c 45°

d 55°

21. Inez created the following table of values based on a relationship between x and y and calculated the first differences. The values of y have been concealed.

x	y	First differences
11		
12		−3
13		−3
14		−3

Δx is constant

y decreases by a constant amount (−3) each time x increases by 1

$\therefore$ relation is linear

Which statement describes the relationship between x and y?

~~a~~ ~~y increases linearly as x increases.~~

b y decreases linearly as x increases.

~~c~~ ~~y increases non-linearly as x increases.~~

~~d~~ ~~y decreases non-linearly as x increases.~~

22. What a Bargain!

Susan buys a tennis racket from a store.

- The tennis racket's original price is $75.
- All tennis rackets are on sale for 25% off the original price.
- The tennis racket has a scratch, so she receives an additional 10% off the sale price.

How much does Susan pay for her tennis racket, including 13% tax?

Show your work.

Sale Price
= $75 − 25% of $75
= $75 − 0.25($75)
= $75 − $18.75
= $56.25

Discounted Price due to Damage
= $56.25 − 10% of $56.25
= $56.25 − 0.10($56.25)
= $56.25 − $5.62
= $50.63

Total Cost including Taxes
= $50.63 + 13% of $50.63
= $50.63 + 0.13($50.63)
= $50.63 + $6.58
= $57.21

Susan pays $57.21 for her tennis racket.