

# **Grade 8 Mathematics**

## **Item Sampler (Teacher version)**



## Grade 8 Mathematics Assessment Instructions for Teachers

- There will be 2 parts to the grade 8 Mathematics Assessment, each administered on separate days.
- Students will be given 90 minutes to complete each part, and will be allowed another 15 minutes if necessary.
- One part will be done without the aid of a calculator. Assessment questions dealing with the calculations of fractions and other friendly numbers will be in the non-calculator use part of the assessment.
- There will not be a specific section on Mental Math. However skills in mental math and estimation will help students to solve problems more efficiently.
- The assessment will assess primarily the outcomes from the Gr. 8 curriculum, and will incorporate math concepts students learned in previous grades. **Therefore, it is a reflection of the Math concepts and skills covered through all the grades.**
- The assessment will reflect the Curriculum Guide and we have taken into consideration the language and models used in the textbook when developing questions.
- For calculations involving  $\pi$ , we have used the approximation  $\pi = 3.14$  as we cannot ensure that all students have a calculator with a  $\pi$  button. We encourage students to use this approximation; otherwise their answer will vary from the available choices. In problems involving estimation, students should use  $\pi = 3$ . Please note in classroom practice, we would encourage the use of the  $\pi$  button.
- A Formula sheet will be provided. Manipulatives, regularly used in the classroom, will be allowed. We will provide a list of manipulatives that should be available to students in the Information Guide which is available at [PLANS.ednet.ns.ca](http://PLANS.ednet.ns.ca)
- A copy of the Formula sheet and sample bubble sheets will be sent out before the official assessment.

For the open-ended questions (constructive responses) students will solve the problem and bubble in the answer on the grid provided for each question. See the sample below.

.	.		
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

## **Practice Questions**

**These sample questions are representative of the types of questions that will appear on the Grade 8 Mathematics Assessment. This collection of questions is NOT meant to be used as a sample assessment. We would suggest that teachers use these questions while teaching/reviewing different mathematic concepts. These sample questions cover all cognitive levels.**

**Please note that these samplers have not been formatted for publishing.**

**Upon completion of the questions, discuss the following points with your students:**

- 1) Discuss the correct answers and why other choices are wrong. This will make students aware of common errors.
- 2) Discuss different procedures they could have used in solving the problem. Having students show their work will aid these discussions and lead to awareness of the most efficient strategies.
- 3) Encourage students to check for reasonableness of answers.

**Effective assessment strategies to practice/ discuss with your students are:**

- 1) Read the question slowly and carefully, making sure you understand what is being asked.
- 2) Carefully examine pictures, charts, graphs, tables, etc and think about the information being given.
- 3) For selected response (multiple choices) questions work out the answer to the problem and then select the best choice. Having written work will help you identify any errors.
- 4) Attempt each question but do not linger on a question that is giving you difficulty. Return to the more difficult questions once you have answered all others.
- 5) Encourage the use of workspace for calculations and diagrams.





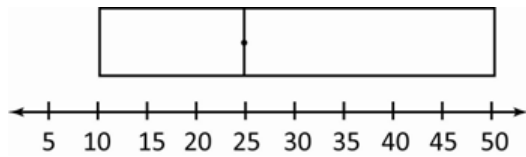
2. Which box-and-whisker plot represents the data in the following stem-and-leaf plot?

Stem (tens)	Leaf (ones)
1	0 3 3 4 7
2	1 1 3 5
3	0 5 8 9 9 9
4	0 2 4 7
5	0

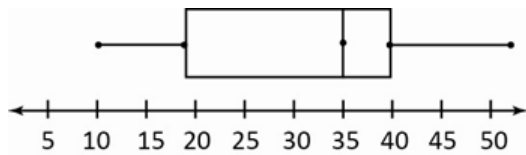
##

#

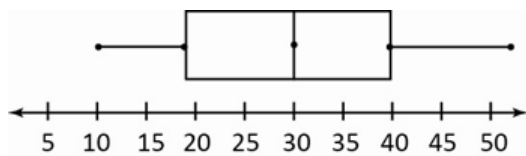
A.



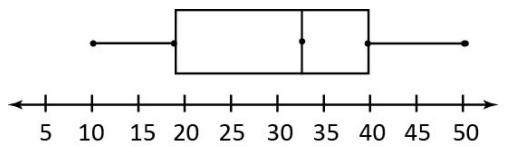
B.



C.



D✓



No calculator

Cognitive Level: 2

Outcome: 8F5



3. On a math test, the mean score was 83 for the 25 students. Johnnie made 43 on this test. He was allowed to write a make-up test and scored 93. The teacher replaced his score of 43 with his new score of 93 and re-calculated the mean score.

How was the mean affected?

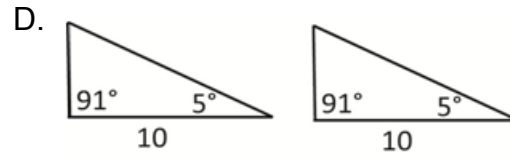
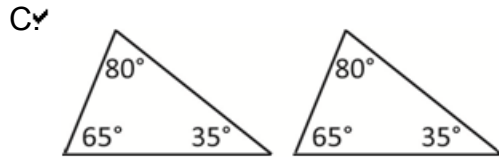
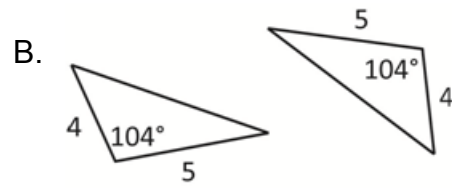
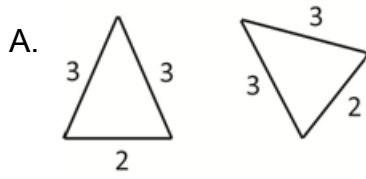
- A. There was no change to the mean.                      B. The mean increased to 83.4.
- C✓ The mean increased to 85.                                D. The mean increased to 88.

Calculator would be permitted.

Cognitive Level:2

Outcome: 8F7

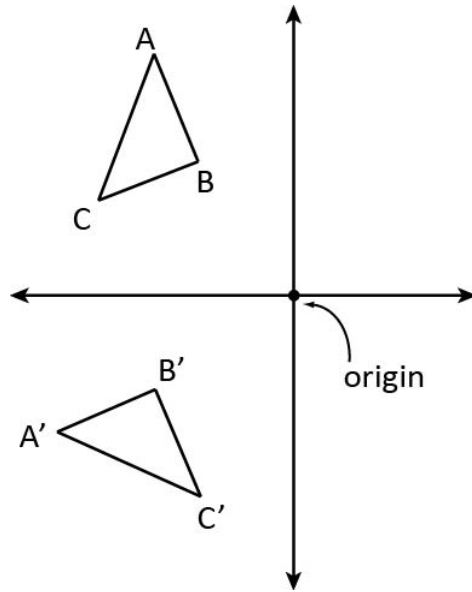
4. Which of the following pairs of triangles are **NOT** necessarily congruent?



Cognitive Level: 1

Outcome: 8E1

5.  $\triangle ABC$  has been rotated **counter**-clockwise  $90^\circ$  about the origin.



Which are properties of this transformation?

A. ✓ -  $\angle A = \angle A'$

- same orientation
- B and B' are the same distance from the rotation centre

B. -  $\angle A = \angle A'$

- different orientation
- B and B' are the same distance from the rotation centre

C. -  $\angle A = \angle A'$

- same orientation
- side AB is parallel to side A'B'

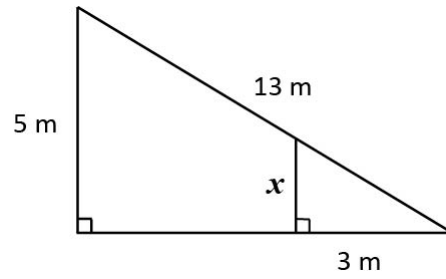
D. -  $\angle A = \angle A'$

- different orientation
- A and A' are the same distance from the mirror line (y axis)

Cognitive Level: 2

Outcome: 8E2

6. What is the length of side  $x$ ?



A✓ 1.25 m

B. 1.67 m

C. 1.00 m

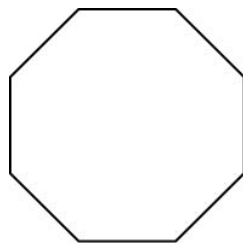
D. 4 m

Calculator permitted

Cognitive Level: 3

Outcome: 8E3

7. A regular octagon has how many lines of reflective symmetry?



A. 2

B. 4

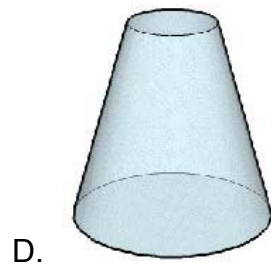
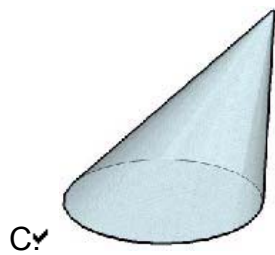
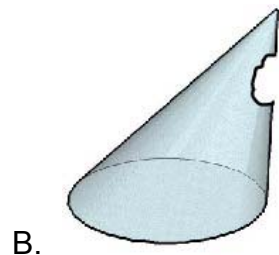
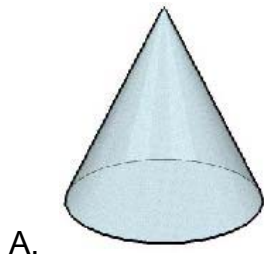
C. 6

D. 8

Cognitive Level: 1

Outcome: 8E5

8. Which of the following is an oblique cone?

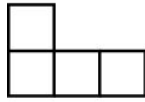
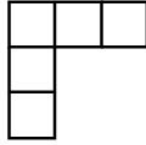


Cognitive Level: 1

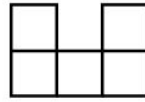
Outcome: 8E6

9. Look at the top, front, and right views below.

Top View



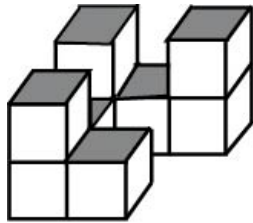
Front View



Right View

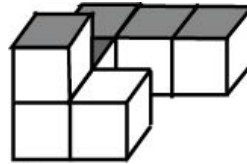
Which isometric drawing represents the views above?

A.



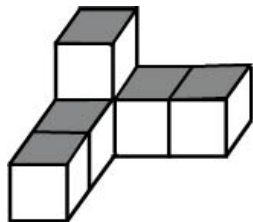
Front

B.



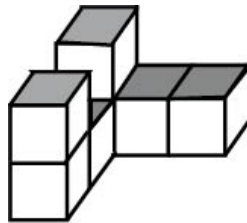
Front

C.



Front

D.

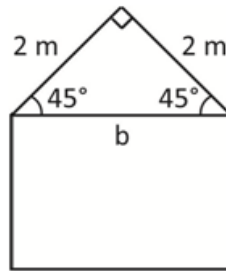


Front

Cognitive Level: 2

Outcome: 8E7

10. Terry is building a small shed for her backyard as shown in the diagram below.



What is the length of **b**?

A. 2

B. 4

C. 8

D. 2.83

Calculator permitted

Cognitive Level: 2

Outcome: 8D9



11. What is the capacity of a drinking glass in the shape of a cylinder with a radius of 5 cm and a height of 10 cm given that  $1 \text{ cm}^3 = 1 \text{ mL}$ ?

A. 50 mL

B. 392.5 mL

C. 100 mL

D. 785 mL

Calculator permitted

Cognitive Level: 2

Outcome: 8D2

12. A square piece of paper has an area of  $81 \text{ cm}^2$ .

What is the area of the largest circle that can be drawn on the piece of paper?

A.  $63.59 \text{ cm}^2$

B.  $254.34 \text{ cm}^2$

C.  $28.26 \text{ cm}^2$

D.  $56.52 \text{ cm}^2$

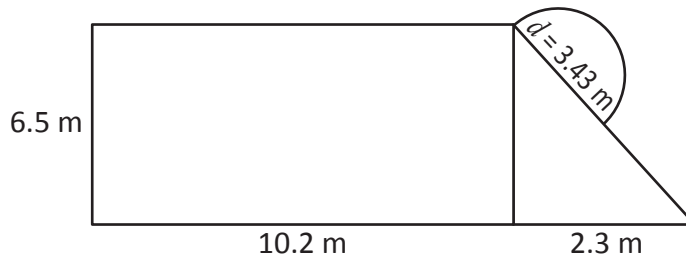
Calculator permitted

Cognitive Level: 2

Outcome: 8D4

13. The Johnson family is building a new deck in their backyard. It consists of a rectangular shaped upper level, a triangular shaped middle level, and a semicircle patio on the ground level.

What is the total area of the deck? Round your answer to the nearest tenth.



--	--	--	--

cm<sup>2</sup>

○ ○

0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

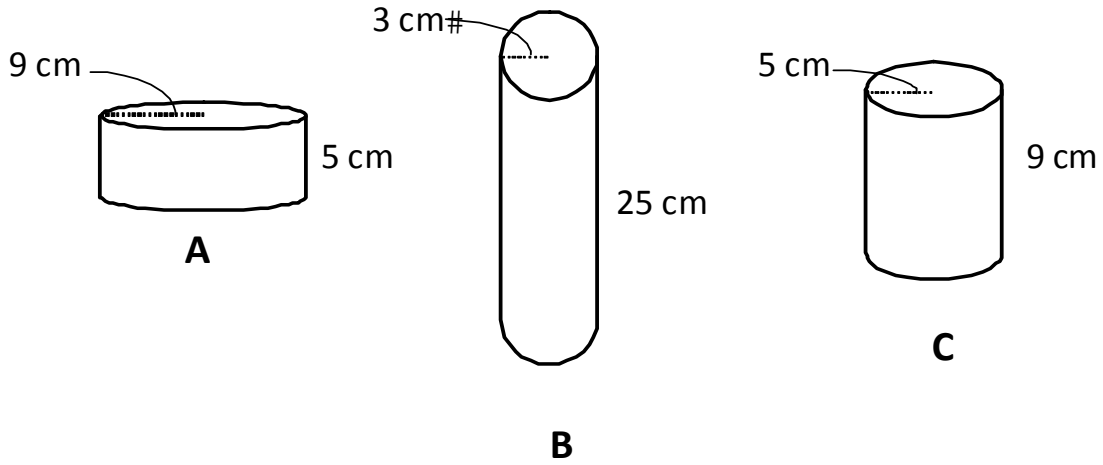
Calculator permitted

Cognitive Level: 2

Outcome: 8D6

Answer: 78.1 m<sup>2</sup>

14. Estimate which containers will hold the same amount of water.



A. containers A & B

B. containers A & C

C. containers B & C

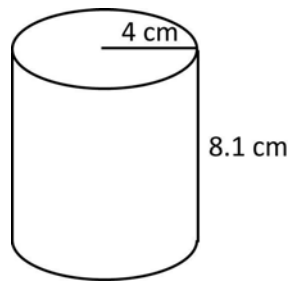
D. containers A, B, & C

No calculator

Cognitive Level: 1

Outcome: 8D7

15. Look at the cylinder below.



What is the best estimate of the surface area of the cylinder?

A.  $32 \text{ cm}^2$

B.  $64 \text{ cm}^2$

C.  $300 \text{ cm}^2$

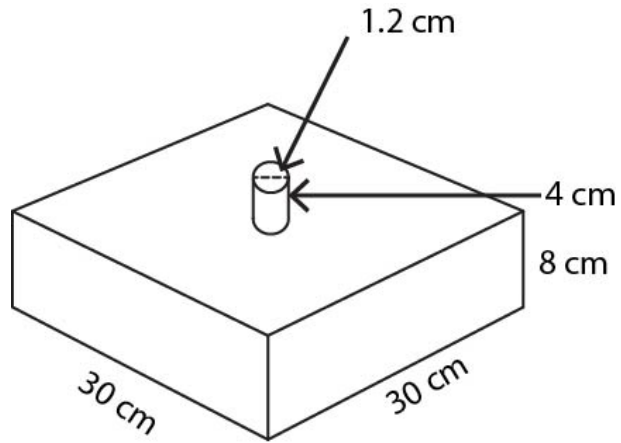
D.  $200 \text{ cm}^2$

No calculator

Cognitive Level: 2

Outcome: 8D7

16. Peter wants to paint the object below. (The bottom square of the object will not be painted.)



If 1 container of paint covers  $300 \text{ cm}^2$ , how many containers of paint will Peter need to buy?

A. 2 cans

B. 3 cans

C. 6 cans

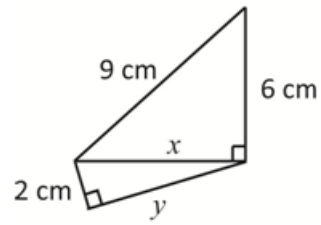
D. 7 cans

Calculator permitted

Cognitive Level: 2

Outcome: 8D8

17. In the following figure, what is the value of  $y$  rounded to the nearest hundredth?



A.  $y = 1.00$  cm

B.  $y = 11.00$  cm

C.  $y = 6.99$  cm

D.  $y = 6.39$  cm

Calculator permitted

Cognitive Level: 2

Outcome: 8D10

18. What is an equivalent form of  $56 \times 0.9 - 56 \times 0.8$ ?

A.  $0 \times 0.72$

B.   $56 \times 0.1$

C.  $56 \times 0.72$

D.  $56 \times 1.7$

No calculator

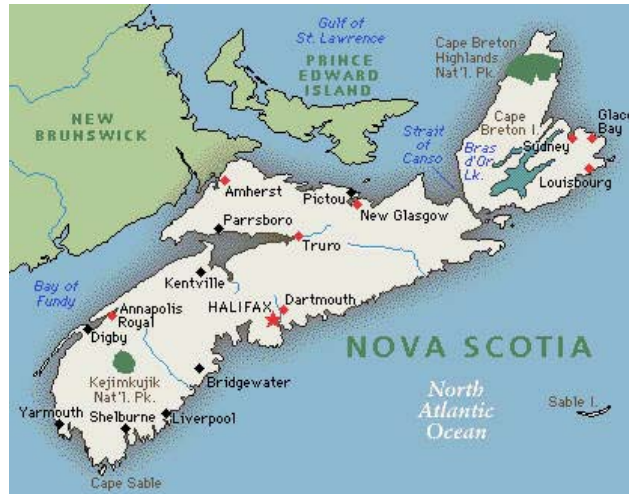
Cognitive Level: 1

Outcome: 8B1



19. On a map, Mary measures the distance between Truro and Halifax to be 5 cm. She knows the actual distance between Truro and Halifax is 100 km. She then measures the distance between Halifax and Yarmouth on her map and finds it to be 18 cm.

What is the actual distance between Halifax and Yarmouth?



Map not to scale

--	--	--	--

km

	.
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

Calculator permitted

Cognitive Level: 2

Outcome: 8B2

Answer: 360 km

20. The instructions on a label of powdered drink mix suggest mixing 15 g of powder with 250 mL of water.

How much powder should be mixed with 2 L of water?

A. 60 g

B✓ 120 g

C. 265 g

D. 1875 g

Calculator permitted although we would encourage students to solve this without a calculator in a classroom situation.

Cognitive Level: 2

Outcome: 8B2

21. Joe bought a scooter. The total cost, including 15% tax, is \$110.40.

What is the cost of the scooter before tax?

\$ 

--	--	--	--

.

0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Calculator permitted

Cognitive Level: 3

Outcome: 8B3

Answer: \$96

22. In 2010, the enrolment of Central High School was 1864 students. In 2011, the enrolment was 1689. What is the percentage decrease in the enrolment from 2010 to 2011?

A. 9.7%

B. 9.4%

C. 10.7%

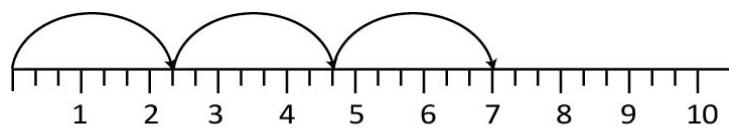
D. 10.4%

Calculator permitted

Cognitive Level: 1

Outcome: 8B4

23. What product is shown on the following number line?



A.  $3 \times \frac{7}{3}$

B.  $3 \times \frac{1}{7}$

C.  $3 \times 7$

D.  $3 \times 2\frac{1}{2}$

No calculator

Cognitive Level: 2

Outcome: 8B7

24. Karina had  $\frac{3}{5}$  of a large submarine sandwich. She gave Kendell  $\frac{3}{4}$  of her portion. What fraction of the large submarine sandwich did Kendell receive?

A.  $\frac{6}{9}$

B.  $\frac{4}{20}$

C.  $\frac{9}{20}$

D.  $\frac{4}{5}$

No calculator

Cognitive Level: 2

Outcome: 8B7

25. Ethan, Jonas, and Emily bought a pizza. Ethan and Emily would each like to have  $\frac{3}{8}$  of the pizza and Jonas would like to have  $\frac{1}{3}$ .

Is this possible? Explain your reasoning.

Because of the format of the assessment, we are unable to ask these types of questions. However, we encourage teachers to help students develop this kind of reasoning as it will help them to solve fraction problems on the assessment.

No calculator

Cognitive Level: 2

Outcome: 8B5

Answer: This is not possible since if you add all their desired portions, it is greater than one.

26. Ingrid is hosting a pizza party. She ordered 3 extra large pizzas and asked them to be cut into twelfths. Each person ate 2 pieces. At the end of the evening there was half of a pizza left. How many guests attended the party?

A. 36

B✓ 15

C. 18

D. 72

No calculator.

Cognitive Level: 2

Outcome: 8B11



27. What is the value of  $\frac{3}{4} + \frac{1}{5} \div \frac{1}{2}$ ?

A.  $1\frac{9}{10}$

B.  $1\frac{3}{20}$

C.  $\frac{5}{9}$

D.  $\frac{8}{9}$

No calculator

Cognitive Level: 2

Outcome: 8B10

28. Parker wanted to raise \$200.00 for his local foodbank. He asked 15 of his neighbours for money. Four of them each gave \$11.50, five of them each gave \$9.25, two of them each gave \$20.00, and four of them each gave \$9.75. How much more money does he need to reach his goal of raising \$200.00?

A. \$171.25

B. \$182.50

C✓ \$28.75

D. \$29.75

Calculator permitted

Cognitive Level: 1

Outcome: 8B13

29. Which expression is equivalent to  $3(2-x)$ ?

A.  $6-x$

B.  $5-x$

C.   $6-3x$

D.  $-6x$

No calculator

Cognitive Level: 1

Outcome: 8B16

30. What is the side length of a square with an area of 64 square units?

A. 8 units

B. 16 units

C. 32 units

D. 128 units

No calculator

Cognitive Level: 1

Outcome: 8A1

31. Which of the following statements is true?

A. The value of  $\sqrt{56}$  is between 7 and 8.

B. 17 is between the value of  $\sqrt{100}$  and  $\sqrt{144}$ .

C. The value of  $\sqrt{111}$  is between 11 and 12.

D. 15 is between the value of  $\sqrt{25}$  and  $\sqrt{30}$ .

No calculator

Cognitive Level: 2

Outcome: 8A3

32. What is the value of  $\sqrt{6400}$  ?

A. 800

B. 80

C. 3200

D. 32

No calculator

Cognitive Level: 1

Outcome: 8A4

33. What is  $10^{-7}$  expressed in standard form?

A. 0.000 000 7

B.  0.000 000 1

C. 0.700 000 0

D. 0.000 000 01

No calculator

Cognitive Level: 1

Outcome: 8A5

34. Which of the following expresses  $0.075 \times 10^7$  in scientific notation?

A.  $7.5 \times 10^9$

B.  $0.75 \times 10^8$

C.  $0.75 \times 10^6$

D.  $7.5 \times 10^5$

No calculator

Cognitive Level: 1

Outcome: 8A6



35. Given the following numbers:

$$\frac{3}{4}, -0.72, \frac{7}{10}, 0.73, -\frac{4}{5}$$

Which of the following shows them in increasing order (from least to greatest)?

A.  $-0.72, -\frac{4}{5}, 0.73, \frac{3}{4}, \frac{7}{10}$

B.  $-\frac{4}{5}, \theta .72, \frac{3}{4}, \frac{7}{10}, 0.73$


C✓  $-\frac{4}{5}, \theta .72, \frac{7}{10}, 0.73, \frac{3}{4}$

D.  $\frac{7}{10}, \theta .72, 0.73, \frac{3}{4}, -\frac{4}{5}$

No calculator

Cognitive Level: 1

Outcome: 8A7

36. If four small squares  represent 100%, how many **small** squares would be required to represent 175%?

A. 4

B. 5

C. 6

D. 7

No calculator

Cognitive Level: 2

Outcome: 8A8

37. Given  $5n + 2 = 12$ , what is the value of  $n$ ?

A. 2

B. 2.8

C. 5

D. 10

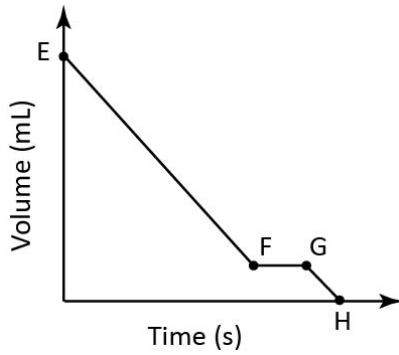
Students should be advised that the expression "what is the value of  $n$ " is the same as "solve for  $n$ ".

No calculator

Cognitive Level: 1

Outcome: 8C6

38. The following graph represents the change in volume of a liquid draining from a bottle.



Which option below could explain the horizontal part of the graph between points F and G?

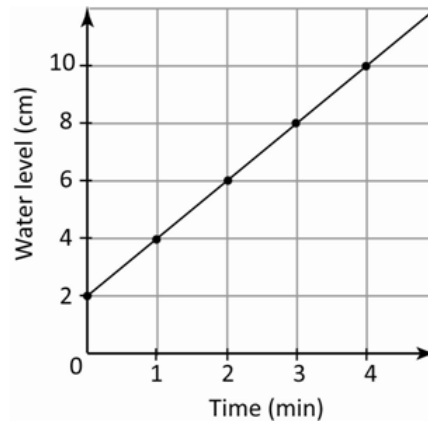
- A. The draining slows down for a short time.
- B. The draining speeds up for a short time.
- C. The liquid is finished draining.
- D✓ The liquid stops draining for a short time.

No calculator

Cognitive Level: 2

Outcome: 8C2

39. The graph below shows the relationship between time and water depth in a pail as it fills with water.



At what rate is the pail being filled?

A. 1 cm/min

B.  2 cm/min

C. 8 cm/3 min

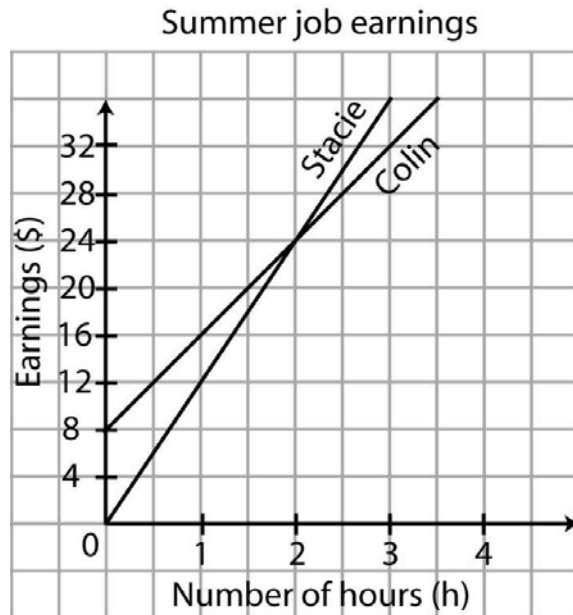
D.  $\frac{1}{2}$  cm/min

No calculator

Cognitive Level: 2

Outcome: 8C3

40. Colin and Stacie both work during the summer. Their earnings are represented in the graph below.



How many hours do Stacie and Colin have to work in order to earn the same amount of money?

No calculator

This question would be in a multiple choice format on the assessment.

Cognitive Level: 3

Outcome: 8C5

Answer: 2 hours

41. A painter charges a flat rate of \$20.00 plus \$15.00 per hour needed to complete a job. If the painter charges \$470.00 for a job, how many hours did the job take?

--	--	--	--

.

0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Calculator permitted

Cognitive Level: 2

Outcome: 8C7

Answer: 30 hours

42. A bag of marbles contains 12 black marbles, 4 blue marbles, 1 red marble, and 8 yellow marbles. What is the probability of drawing a marble that is **neither** black **nor** yellow?

A. 80%

B. 25%

C. 60%

D. 20%

No calculator

Cognitive Level: 3

Outcome: 8G2



43. In his last 20 times at bat, Terrance hit 8 home runs. Based on his performance, what is the theoretical probability that he will hit a home run on his next at bat?

A.  $\frac{2}{5}$

B.  $\frac{3}{5}$

C.  $\frac{96}{400}$

D.  $\frac{4}{20}$

No calculator

Cognitive Level: 3

Outcome: 8G2