TOPIC 9
Numeracy 2

9.1 Overview

Numerous **videos** and **interactivities** are embedded just where you need them, at the point of learning, in your learnON title at www.jacplus.com.au. They will help you to learn the concepts covered in this topic.

9.1.1 Why learn this?

assessON

Why should you learn to count numbers? Imagine going into a shop and asking for a dozen eggs. How could you tell how many eggs you were getting? On trust? Was your change correct? How could you be sure?

You cannot go through life without learning to accurately add, subtract, multiply and divide.

9.1.2 What do you know?

1. **THINK** List what you know about numeracy. Use a thinking tool such as a concept map to show your list.
2. **PAIR** Share what you know with a partner and then with a small group.
3. **SHARE** As a class, create a thinking tool such as a large concept map that shows your class's knowledge of numeracy.

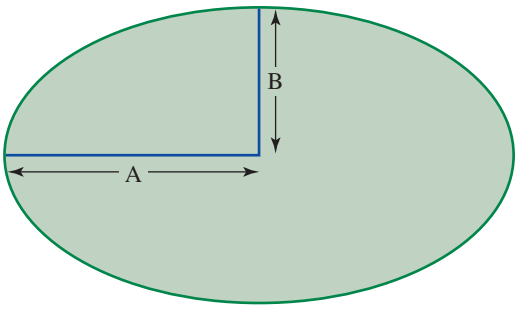
LEARNING SEQUENCE

learnON RESOURCES — ONLINE ONLY

Watch this eLesson: NAPLAN: strategies and tips
Searchlight ID: eles-1688

9.2 Set C

9.2.1 Calculator allowed



1. Each year, the area of tree logging in the Otway Ranges is approximately equivalent to clearing 200 football ovals. The area of a football oval is given by Area = $3.142 \times A \times B$ (see the diagram). If the width of the football oval is 110 m and the length is 160 m, approximately how many square metres of trees are felled each year in the Otways?

A. 1.9×10^4 **B.** 2.76×10^4 **C.** 1.9×10^6 **D.** 2.76×10^6

2. A designer wants to enlarge a cylinder to 150% of its original size. If the diameter is 37 mm, what was the radius of the copy of the cylinder?

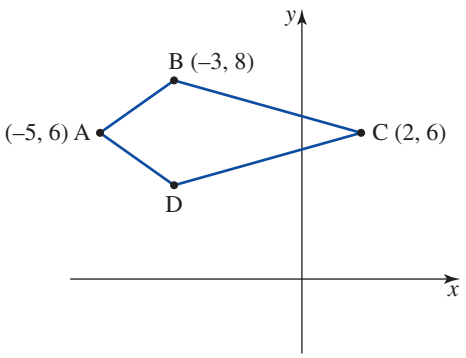
A. 27.75 mm **B.** 46.25 mm
C. 55.5 mm **D.** 92.5 mm

3. A teenager is to receive 750 mL of saline solution. The drip rate is adjusted to 60 mL per hour. When will it be necessary to change the saline solution if the drip rate begins at 10.30 am?

4. The area of a square is 73 square metres. Which is the closest to the length of each side?

A. 8.4 m **B.** 8.5 m
C. 8.6 m **D.** 8.7 m

5. A kite is drawn with the coordinates of D being omitted. What are the coordinates of D?



A. (−3, −3) **B.** (−3, −8) **C.** (−3, 4) **D.** (−3, 6)

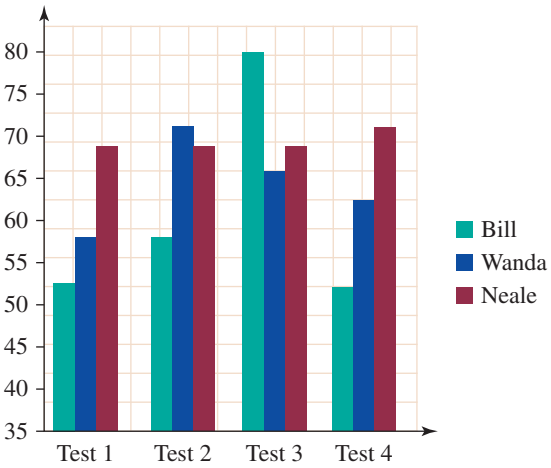
6. Your friend is planning a trip of 2320 km. The plan is to drive between 400 km and 480 km each day. At this rate, which of the following would be a reasonable number of days to complete the trip?

A. Fewer than 4 days **B.** Between 4 and 6 days
C. Between 6 and 8 days **D.** More than 8 days

7. Last year there were 225 students at Top End High School. This year there are 20 per cent fewer students than there were last year. Approximately how many students are at Top End High School this year?

A. 205 **B.** 245 **C.** 270 **D.** 180

8. This column graph shows four test results for Bill, Wanda and Neale. Which of the following options represents the test results?



A. Bill has a higher average than Neale but a lower average than Wanda.
B. Bill has a lower average than Wanda but a higher average than Neale.
C. Wanda has a higher average than Bill but a lower average than Neale.
D. Wanda has a higher average than Neale and Bill.

9. A prepared workout on a treadmill consists of intervals of walking at various rates and angles of incline. A 3% incline means 3 units of vertical rise for every 100 units of horizontal run. My treadmill, when set at a 3% incline, has a horizontal run of 1.6 m. What will be the vertical rise?

A. 4.8 m **B.** 48 cm
C. 48 mm **D.** 4.8 mm

10. You are about to play your final game in a computer tournament. Your previous scores have been 134, 99, 109, 117 and 101. To win the tournament your average must be at least 114. What is the minimum score you must achieve in this game to win?

11. Suppose your heart rate is 72 beats per minute. How many days will it take your heart to beat 1 000 000 times? Round your answer to the nearest number of days.

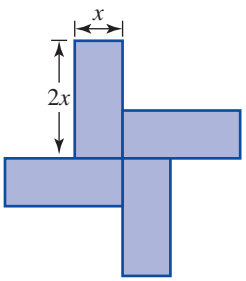
12. A gardener wants to put 12 cm of mulch on his garden, whose dimensions are 20 m by 13 m. How many trailer loads will he require if his trailer holds 1.5 m^3.

A. 20 **B.** 21
C. 46 **D.** 47

13. A machine packs grain at a rate of $1\frac{1}{5}$ tonnes of grain per hour. How long will the machine take to pack 18 000 kg of grain?

A. 15 hours
B. 21 hours 6 minutes
C. 21 hours 24 minutes
D. 216 hours

14. In the following diagram, the shape is made from four identical rectangles.



Each rectangle has a width of x and a length of $2x$. If the perimeter of the shape is 48 cm, what is the area of the shape?

A. 112.5 cm^2 **B.** 72 cm^2 **C.** 60 cm^2 **D.** 180 cm^2

15. A student recorded the times for 25 people running a 100-metre race. The stem-and-leaf diagram shows the results.
Key: 13 | 7 represents 13.7 seconds

Stem	*Leaf*
13	7
14	2344
14	557789
15	012234
15	55679
16	012

What percentage of students ran for 14.8 seconds or less?
A. 36% **B.** 40% **C.** 45% **D.** 48%

16. A student recorded the times for 25 people running a 200-metre race. The stem-and-leaf diagram shows the results.
Key: 13 | 7 represents 13.7 seconds

Stem	*Leaf*
13	7
14	2344
14	557789
15	012234
15	55679
16	012

What percentage of students ran for more than 14.8 seconds but less than 15.5 seconds?
A. 28% **B.** 32% **C.** 36% **D.** 40%

17. Tsing works in a bakery. One of her chores is to take cardboard sheets and to fold them into small and large trays. It takes 2 minutes to fold a small tray and 3 minutes to fold a large tray. Can she complete 80 small and 45 large trays in the allocated time of 3.5 hours?
A. Yes, Tsing will finish in 2.6 hours.
B. No, Tsing will take 4 hours and 25 minutes.
C. Yes, Tsing will finish exactly in 3.5 hours.
D. No, Tsing will take 4 hours and 55 minutes.

18. The maximum quantity of air that can fill your lungs is called Force Vital Capacity (L). This can be modelled by the formula $L = 4.43 \times H - 0.026 \times A - 2.89$ where H = your height (metres) and A = your age (years). If you are 165 cm tall and 15 years old, what is your capacity (to the nearest litre)?

A. 4 **B.** 5
C. 70 **D.** 106

19. What is the surface area of a rectangular prism that has a length of 11 cm, a width of 6 cm and a height of 50 millimetres?
A. 170 cm^2 **B.** 302 cm^2
C. 330 cm^2 **D.** 1832 cm^2

20. You have a piece of string 3.7 metres long. You cut it into 6 pieces of equal length to tie to 6 balloons, and there is 22 cm of string left. How long were each of the 6 pieces?

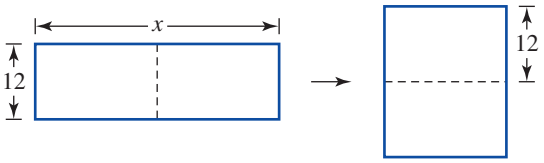
21. My teacher and I boarded a tram together. At the second stop, three people got on. At the third stop, three people got on and one got off. At the fourth stop, three got off. At the fifth stop, six people got off. At the sixth stop, one-half of the passengers got off and I was the only passenger left on the tram. How many passengers were on the tram when my teacher and I got on?

22. Examine the expression $3k^2 + 6k - 5 + 6k^2 + 2$. When it is simplified, which of the following is the equivalent expression?

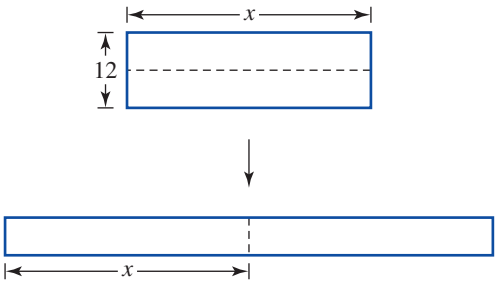
A. $3k^2 + 12k - 3$ **B.** $9k^2 + 6k - 3$ **C.** $9k^2 + 6k + 7$ **D.** $15k^2 + 6k - 3$

23. Jane and Lance each have a rectangular piece of paper of the same dimensions. The length is labelled x cm and the width is 12 cm. Jane and Lance each cut their paper in half in two different ways as illustrated.

Jane's cutting



Lance's cutting



Which of the following represents the sum of the perimeters of the two new designs?

A. $P = 5x + 48$ **B.** $P = 5(x + 12)$ **C.** $P = 6x + 60$ **D.** $P = 6(x + 12)$

24. The process for making a Chinese dish called 'Dragon's beard noodles' by hand is as follows.

Take a 100-cm strand of dough and fold it in half. Stretch the dough back to its original length so that the two thinner strands are formed. Repeat this process over and over increasing the number of noodles as they get progressively thinner.

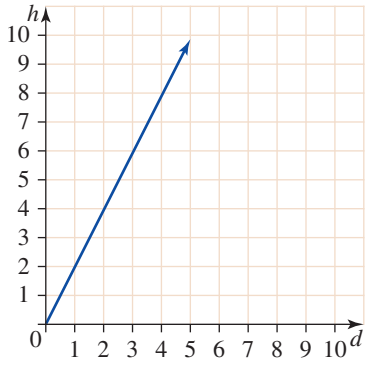
After the 6th fold how many noodles strands will you have?

A. 12 **B.** 32 **C.** 64 **D.** 128

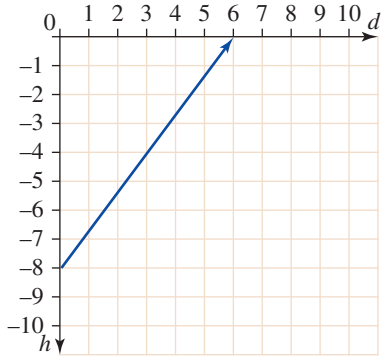
25. The steps on the foreshore have a horizontal width of 24 cm and a height of 18 cm, as shown.

For someone climbing the steps, which of the following graphs models the height above the ground (h) against the distance from the first step (d)?

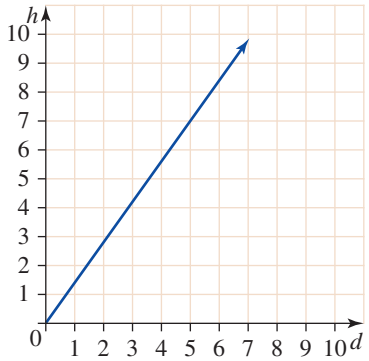
A.



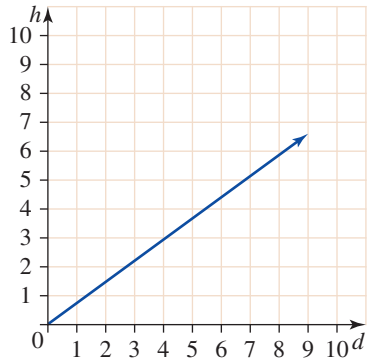
B.



C.



D.



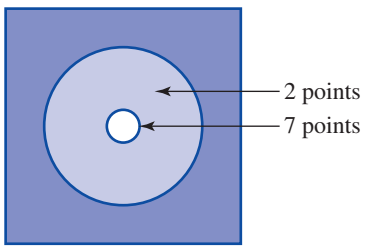
26. A recipe for pizza dough requires a 20 cm × 40 cm rectangular pan. However, you have only a square pan, with dimensions of 25 cm × 25 cm. What will be the approximate difference in the size of your pizza due to using the square pan?

A. Smaller by 22% **B.** Larger by 22% **C.** Smaller by 28% **D.** Larger by 28%

27. Alice ripped a piece of paper into three parts, and tore each of those parts into three more parts. If she repeated this action 3 times, how many pieces of paper would she have?

A. 15 **B.** 81 **C.** 243 **D.** 729

28. Ning was throwing darts at a target as shown at right. When his dart landed on or inside the circle (bullseye) of the target board, he earned 7 points. However, when his dart landed outside the circle he earned 2 points. After 50 throws his friend reported his score to be 140 points. Ning wanted to know how many bullseyes he had hit, but his friend did not know.



Let x = number of hits on the bullseye. Which of the following equations could be used to solve for x?

A. $7x + 50 - x = 140$

B. $7x + 2(50 - x) = 140$

C. $7x + 2x = 140$

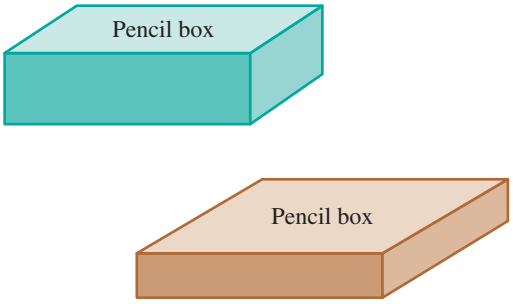
D. $2x + 2(50 - 7x) = 140$

29. John bushwalked 36 km through the Grampians in 3 days. On the first day he hiked 50% of the total distance. On the second day he hiked 25% of the distance that remained. How many kilometres did he hike on the third day?

A. $11\frac{1}{2}$ **B.** $13\frac{1}{2}$ **C.** $22\frac{1}{2}$ **D.** 27

30. Two pencil boxes as shown have the following information. The volume of one pencil box is 24 cm^2 more than the volume of the other pencil box. One box has two of its sides measuring 3 cm and 4 cm, while the other box has sides that measure 1.5 cm and 6 cm. The third sides of the boxes are the same length. What is that length?

A. 2 cm **B.** 4 cm
C. 6 cm **D.** 8 cm



9.3 Set D

9.3.1 Non-calculator

1. A 130 cm long strand of wire is cut into three pieces.
The longest piece is three times as long as the second shortest piece.
The second longest piece is three times as long as the shortest piece.
How long is the shortest piece?

A. 18 cm **B.** 10 cm **C.** 17.5 cm **D.** 15 cm

2. One litre of paint covers an area of 20 square metres.
How much paint will cover one square metre?

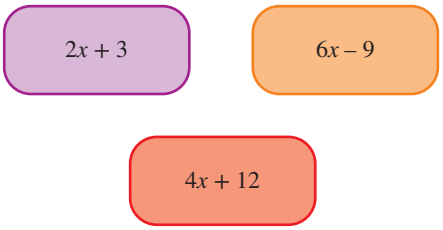
A. 0.005 litre **B.** 0.002 litre
C. 0.05 litre **D.** 0.02 litre

3. A pancake recipe requires $4\frac{1}{2}$ cups of milk. If you wish to make one-fifth of the recipe, how many cups of milk will you need?

A. 0.2 **B.** 0.5
C. 0.8 **D.** 0.9

4. Each card pictured is labelled with a value. What is the mean value of these cards?

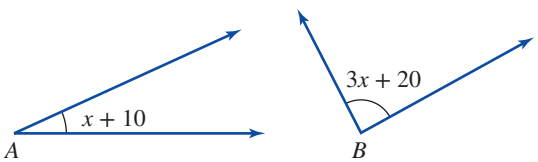
A. $12x + 6$ **B.** $12x + 24$
C. $4x + 6$ **D.** $4x + 2$



5. In order to purchase a new iPod you must save at least $260.
What inequality represents the amount of money, m, that you must save?

A. $m \leq 260$ **B.** $m < 260$
C. $m \geq 260$ **D.** $m > 260$

6. In the diagram below, $\angle A$ and $\angle B$ are complementary.



What is the measure of $\angle B$?

A. 65° **B.** 45° **C.** 30° **D.** 15°

7. A swimming pool is being filled with water. The pool already contained 5000 litres of water. The table shows the number of litres of water in the pool after t hours.

Litres of water in pool (L)	Number of hours (t)
5000	0
7500	1
10000	2
12500	3
15000	4

Which rule can be used to determine the number of litres, L, of water in the pool after t hours?

A. $L = 2500t$ **B.** $L = 5000t$

C. $L = 5000t + 2500$ **D.** $L = 5000 + 2500t$

8. Anne wants to solve the equation shown.

$$2x - 3 = 13.$$

Which steps could she use to find the solution?

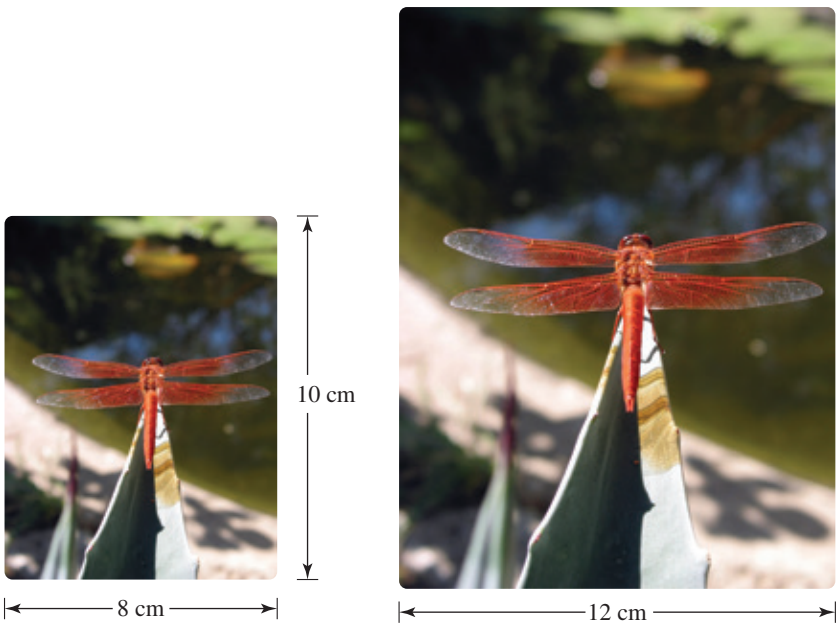
A. Add 3 to both sides, then divide both sides by 2.

B. Subtract 3 from both sides, then divide both sides by 2.

C. Divide both sides by 2, then add 3 to both sides.

D. Multiply both sides by 2, then subtract 3 from both sides.

9. The photograph of a dragonfly is shown with its dimensions.



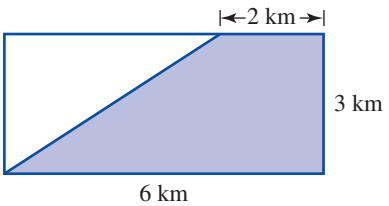
You decide to enlarge the photograph, and the new width is 12 cm. What is the new length?

A. 14 cm **B.** 15 cm **C.** 16 cm **D.** 17 cm

10. Madeline noticed that in one minute she blinked 50 times. At this rate, approximately how many days will it take her to blink 1000000 times?

A. 8 **B.** 10 **C.** 12 **D.** 14

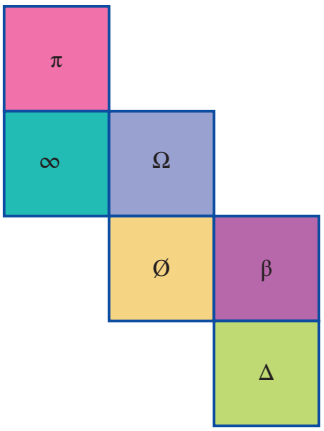
11. A parcel of land is to be subdivided as shown below. The shaded area is to be sold.



What percentage of the total area does this represent?

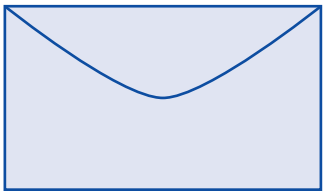
A. $33\frac{1}{3}$ **B.** 50

C. $66\frac{2}{3}$ **D.** 75



12. When the diagram shown is folded to make a cube, what symbol is on the face opposite the face marked △?

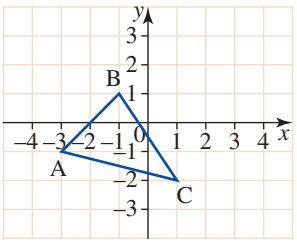
A. β
B. Ω
C. ø
D. ∞



13. You have an envelope that has a perimeter of 35 cm. If the ratio of the length to the width is 4:3, what are the dimensions of the envelope?

A. $L = 20$ cm, $W = 15$ cm
B. $L = 10$ cm, $W = 7.5$ cm
C. $L = 15$ cm, $W = 20$ cm
D. $L = 7.5$ cm, $W = 10$ cm

14. A triangle ABC was drawn on coordinate axes as shown. What would be the coordinates of the triangle reflected in the *y* axis?



A. (1, 3) (1, 1) (−1, −3)
B. (3, −1) (1, 1) (−1, −2)
C. (−3, 1) (−1, −1) (1, 3)
D. (3, 1) (1, 1) (1, −3)

15. Evaluate the following expression.

$$2\tfrac{2}{5} - 1\tfrac{2}{3}$$

16. An electronic device counted 4500 vehicles passing through an intersection during an 8-hour period. If the number of vehicles passing through the intersection per hour remains the same, what proportion can be used to find *x*, the number of vehicles that would be counted during a 10-hour period?

A. $\frac{4500}{8} = \frac{x}{10}$ **B.** $\frac{8}{4500} = \frac{x}{10}$ **C.** $\frac{8}{x} = \frac{10}{4500}$ **D.** $\frac{8}{4500} = \frac{10}{x}$

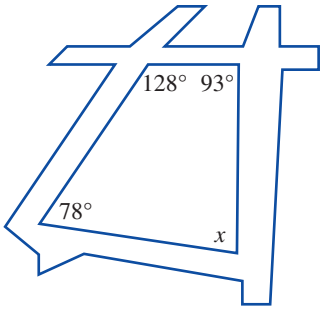
17. John has five fewer marbles than Liam, and Tang has three times as many as John. If Liam has *n* marbles, which of the following represents the number of marbles that Tang has?

A. $3n - 5$ **B.** $3n$ **C.** $5 - 3n$ **D.** $3(n - 5)$

18. The directions for using a concentrated cleaning product say to add 3 capfuls of the product to every 4 litres of water. Which of the following equations can be used to calculate *c*, the number of capfuls of the product needed for 7 litres of water?

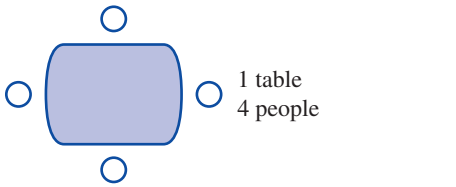
A. $\frac{3}{4} = \frac{c}{7}$ **B.** $\frac{3}{4} = \frac{c}{11}$ **C.** $\frac{4}{3} = \frac{c}{7}$ **D.** $\frac{4}{3} = \frac{c}{11}$

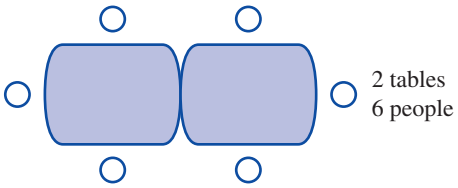
19. Intersecting paths have been constructed to surround a decorative garden bed. What is the angle measurement for x?



A. 128°
B. 102°
C. 87°
D. 61°

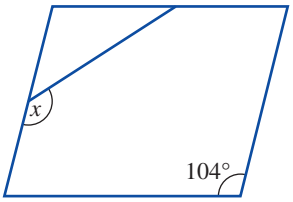
20. The diagrams show the seating arrangements that will be used if tables are placed end to end. Which formula represents the relationship between the number of people (P) that can be seated and the number of tables (t) placed end to end?





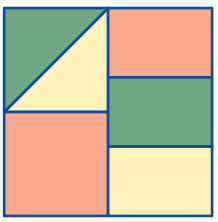
A. $P = 4t$
B. $P = 3t$
C. $P = 4t - 2$
D. $P = 2t + 2$

21. The diagram shows a rhombus. The midpoints of two of its sides are joined with a straight line. What is the measure of angle x?



A. 76°
B. 104°
C. 142°
D. 152°

22. A square dart board is shown below.



Suppose a dart, thrown randomly, hits the board. Determine the probability of the dart's landing on a green segment.

A. $\frac{7}{12}$ **B.** $\frac{1}{8}$ **C.** $\frac{7}{24}$ **D.** $\frac{1}{14}$

23. In how many different ways could these plastic bottles be arranged in a line?

24. What is the solution for the following expression?

$5 + \frac{70}{10} \times (1 + 2)^2 - 1$

A. 95 **B.** 71 **C.** 67 **D.** 46

25. A helicopter has a rotor that moves at a rate of 720 revolutions per minute. Through how many degrees does the rotor turn per second?

A. 0.03 **B.** 12
C. 4320 **D.** 259 200

26. You counted a total of 40 goldfish in a pond in the Botanical Gardens. The gardener told you that the ratio of female fish to male fish was 3 : 5. What was the total of the number of male goldfish?

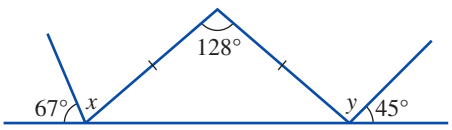
A. 24 **B.** 25 **C.** 26 **D.** 30

27. Based on the table, which statement is true?

Polygons	
Number of sides (n)	**Sum of interior angle measures (S)**
3	180°
4	360°
5	540°
6	720°
7	900°

A. The sum of the interior angle measures decreases by $\frac{1}{2}$ for each side increase of 1.
B. The sum of the interior angle measures increases by 180° for each side increase of 1.
C. The sum of the interior angle measures doubles for each side increase of 1.
D. The sum of the interior angle measures is a whole number multiple of 360°.

28. The sum of x and y is:



A. 196° **B.** 180°
C. 135° **D.** 113°

29. A box is displayed on the top of a shop counter as shown in the photograph. Its dimensions are length $= 1\frac{1}{4}$ m, width $= 1\frac{2}{5}$ m and height = 0.8 m.

What is the volume of the box?

A. 1.2 m^3 **B.** 1.25 m^3
C. 1.4 m^3 **D.** 1.65 m^3

30. If two sides of a triangle are 12 cm and 20 cm, the third side must be:

A. between and including 8 cm and 32 cm.
B. between but not including 8 cm and 32 cm.
C. greater than 8 cm.
D. less than 32 cm.

Answers

Topic 9 Numeracy 2

Exercise 9.2 Set C

9.2.1 Calculator allowed

1. D **2.** A **3.** 11 pm **4.** B
5. C **6.** B **7.** D **8.** C
9. C **10.** 124 **11.** 10 days **12.** B
13. A **14.** B **15.** B **16.** A
17. D **18.** A **19.** B **20.** 58 cm
21. 4 **22.** B **23.** B **24.** C
25. D **26.** A **27.** C **28.** B
29. B **30.** D

Exercise 9.3 Set D

9.3.1 Non-calculator

1. B **2.** C **3.** D **4.** D
5. C **6.** A **7.** D **8.** A
9. B **10.** D **11.** C **12.** B
13. A **14.** B **15.** $\frac{11}{15}$ **16.** A
17. D **18.** A **19.** D **20.** D
21. C **22.** C **23.** 24 **24.** C
25. C **26.** B **27.** B **28.** A
29. C **30.** B