

MPM1D09 Final Exam Review 1 - Basic Concepts

MPM1D0/9: Review #1 For Final Exam-Basic Concepts

MPM1D09 Final Exam Review 2 - Problem Solving

MPM1D0/9: Review #2 For Final Exam-More Basic Concepts plus Problem Solving

Chapter Practice Tests

Age

Short Response

Extend

Answers

Answers (Continued)

Extend

Extend

Extend

Extend

Extend

Multiple Choice

Short Response

Extend

MPM1D0/9: REVIEW #1 FOR FINAL EXAM-BASIC CONCEPTS

1. What does the word “**simplify**” *mean* when it is used in a mathematical sense?

2. **Simplify** each of the following algebraic expressions.

(a) $-9x^3 + 7x^3$

(b) $-9x^3(7x^3)$

(c) $(-9x^3)^2(7x^3 - 5x^2)$

(d) $-5x + 7y - 3x - 9y$

(e) $-5x + 7y - (3x - 9y)$

(f) $-5x(7y)(3x)(-9y)$

(g) $-(3a^2 - ab + 2a) + 4a(a - 3b - 3)$

(h) $(3a^2 - ab + 2a) - 4a(a - 3b - 3)$

(i) $(-4mn^3)^4$

(j) $\frac{(-4mn^3)^4}{(2m^2np^3)^3}$

(k) $\frac{(3bc^5)^4 - 13b^4c^{20}}{(-5b^2cd^3)^3}$

(l) $\frac{-2a(x^2 - y^2)^3}{(x^2 - y^2)^2}$

3. What does the word “**solve**” *mean* when it is used in a mathematical sense?

4. For each equation given below, **solve** for the indicated variable. (Rearrange each formula as indicated.)

(a) $A = \pi r^2$, solve for r

(b) $V = \pi r^2 h$, solve for h

(c) $P = 2(l + w)$, solve for l

(d) $c^2 = a^2 + b^2$, solve for a^2

(e) $c^2 = a^2 + b^2$, solve for b^2

(f) $c^2 = a^2 + b^2$, solve for c

(g) $c^2 = a^2 + b^2$, solve for a

(h) $F = \frac{9}{5}C + 32$, solve for C

(i) $y = mx + b$, solve for x

(j) $V = \frac{4\pi r^3}{3}$, solve for r

(k) $A = \frac{h(a + b)}{2}$, solve for h

(l) $A = \frac{h(a + b)}{2}$, solve for a

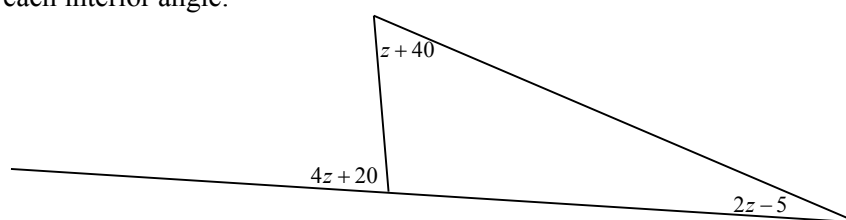
5. **Solve** each of the following equations. **Check each solution.**

(a) $-5(2x - 7) = -5 - 6(-5x + 1)$

(b) $\frac{1}{3}(5y - 7) - \frac{y}{6} = -7y + \frac{2}{9}$

(c) $-3 - \frac{2s + 5}{5} = \frac{s - 7}{4}$

6. Find the measure of each interior angle.



7. Serge is choosing a cellphone plan and wants the lowest cost.

Cell-a-Bration charges \$12 per month plus \$0.05 per minute of airtime used. **E-Phone** charges \$28 per month for unlimited usage.

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

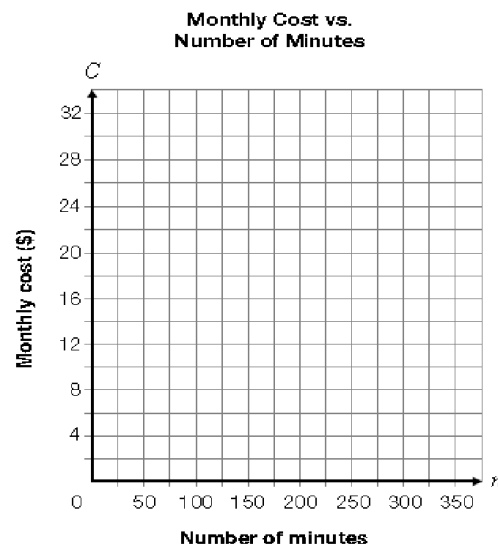
To solve this problem, follow the steps given below.

(a) Write an equation for each cell phone company. The equation should relate C , the cost per month, to n , the number of minutes used.

(b) Carefully plot the graph of each equation.

(c) Find the point of intersection of the two graphs.

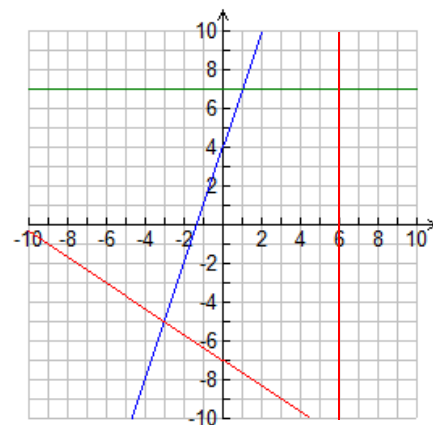
(d) Draw your conclusions.



8. Find the equation, *in slope, y-intercept form*, of the line that passes through the points $(-4, -6)$ and $(-1, -1)$.
9. Find an equation, *in standard form*, of the line with slope $-\frac{3}{7}$ and y-intercept -9 .

10. For each line shown at the right,

- Determine the slope.
- Determine the intercept(s).
- Write the equation of each line in slope, y-intercept form.
- Write an equation of each line in standard form.

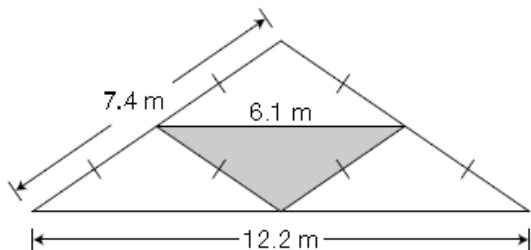


11. Consider the line defined by the equation $7x - 5y + 35 = 0$.

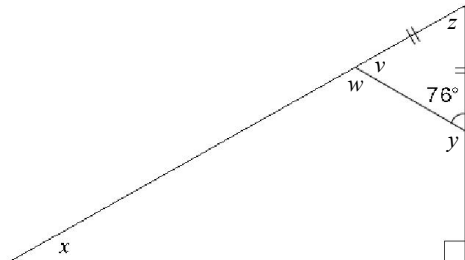
- Determine the intercepts of the line. Use the intercepts to sketch a graph of the line.
- Rewrite the equation in *slope-y-intercept form*. Use the slope and y-intercept to sketch a graph of the line.
- Which method made it easier to sketch the graph of the line? Explain.
- Find the equation, *in slope, y-intercept form*, of the line passing through $(-5, 7)$ and *parallel* to the given line.
- Find the equation, *in slope, y-intercept form*, of the line passing through $(-5, 7)$ and *perpendicular* to the given line.
- Find the equation, *in slope, y-intercept form*, of a line having the same y-intercept as the given line and *perpendicular* to it.

12. Shown below is a portion of the frame of the roof of a small house. This portion consists of four isosceles triangles.

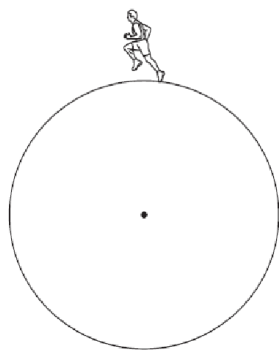
- Calculate the *perimeter* and *area* of the shaded interior triangle.
- Calculate the *total area* of the portion of the frame shown.



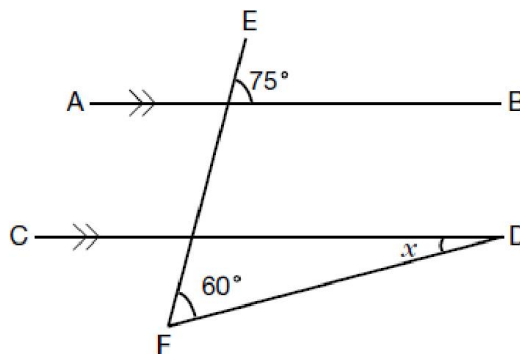
13. Calculate the values of v , w , x , y and z . Explain your reasoning.



14. Tim runs *five laps* of a circular track, covering a distance of 400π metres altogether. What is the distance from the track to the centre?



15. Determine the value of x . Explain your reasoning.



16. Several relations are given below.

- (a) Identify the independent and dependent variables for each relation.
- (b) Determine whether the relation is linear or non-linear.
- (c) **Challenge:** Write an equation that relates the dependent variable to the independent variable.

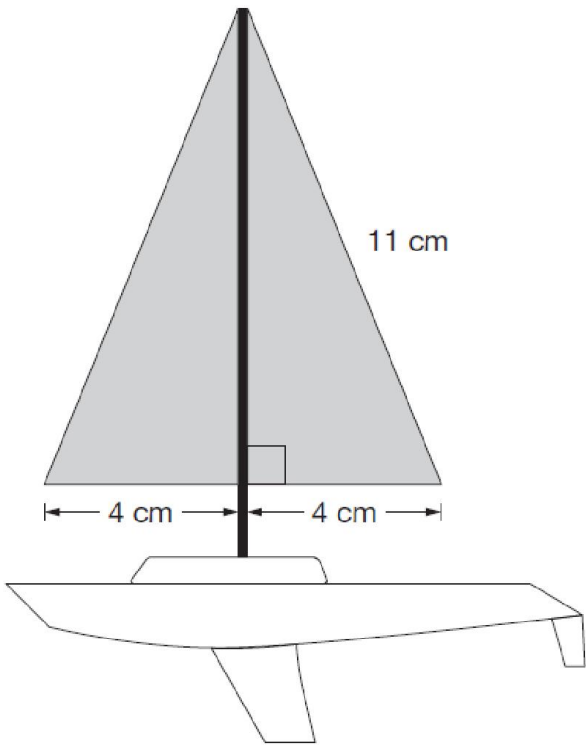
x	y
1	$\frac{1}{3}$
2	$\frac{2}{3}$
3	1
4	$\frac{4}{3}$

x	y
0	5
5	7
10	10
15	14

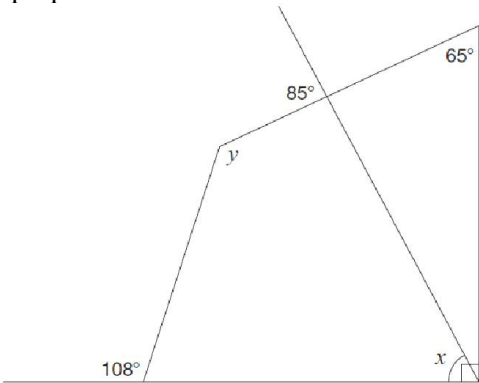
x	y
1	2
2	4
3	8
4	16

x	y
0	$\frac{1}{2}$
5	$\frac{1}{4}$
10	$\frac{1}{6}$
15	$\frac{1}{8}$

17. Calculate the area of the sails of the toy sailboat. Explain your reasoning.



18. Determine the values of x and y . Justify your answers using geometric properties.

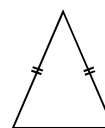
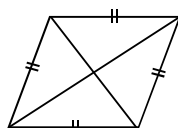
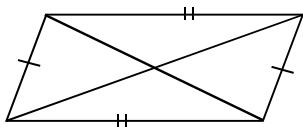


Angle measure	Justification
$x =$ _____	
$y =$ _____	

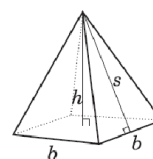
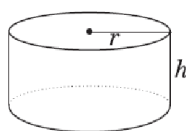
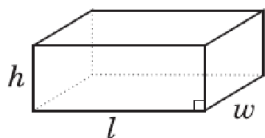
19. Explain each of the following. Include diagrams in your explanations.

- (a) The **surface area** of a rectangular prism with length l , width w and height h is given by the equation $A = 2lw + 2lh + 2wh = 2(lw + lh + wh)$. Explain how this formula was developed.
- (b) The **surface area** of a right circular cylinder with radius r and height h is given by the equation $A = 2\pi r^2 + 2\pi rh$. Explain how this formula was developed.
- (c) The **surface area** of a right circular cone with radius r and slant height s is given by the equation $A = \pi r^2 + \pi rs$. Explain how this formula was developed.
- (d) The **volume** of a right circular cylinder with radius r and height h is given by the equation $A = \pi r^2 h$. Explain how this formula was developed.

20. Name each shape. State as many properties as possible for each one.



21. Given a **constant (fixed) surface area**, what dimensions would optimize (maximize) the volume of each of the following shapes?



Answers

1. The word "simplify" means to write an algebraic expression in the simplest possible form.

2. (a) $-2x^3$, (b) $-63x^6$, (c) $567x^9 - 405x^8$, (d) $-8x - 2y$, (e) $-8x + 16y$, (f) $945x^2y^2$, (g) $a^2 - 11ab - 14a$, (h) $-a^2 + 11ab + 14a$, (i) $256m^4n^{12}$, (j) $\frac{32n^9}{m^2p^9} = 32m^{-2}n^9p^{-9}$, (k) $\frac{68c^{17}}{-125b^2d^9} = -\frac{68}{125}b^{-2}c^{17}d^{-9}$, (l) $-2a(x^2 - y^2) = -2ax^2 - 2ay^2$

3. The word "solve" means to find the value of the unknown (in an equation) or to write an equation that expresses the value of one variable in terms of the other(s).

4. (a) $r = \sqrt{\frac{A}{\pi}}$, (b) $h = \frac{V}{\pi r^2}$, (c) $l = \frac{P - 2w}{2}$, (d) $a^2 = c^2 - b^2$, (e) $b^2 = c^2 - a^2$, (f) $c = \sqrt{a^2 + b^2}$, (g) $a = \sqrt{c^2 - b^2}$, (h) $C = \frac{5}{9}(F - 32)$, (i) $x = \frac{y - b}{m}$, (j) $r = \sqrt[3]{\frac{3V}{4\pi}}$, (k) $h = \frac{2A}{a + b}$, (l) $a = \frac{2A}{h} - b = \frac{2A - bh}{h}$

5. (a) $x = \frac{23}{20}$
(b) $y = \frac{46}{153}$
(c) $s = -\frac{45}{13}$

6. $z = 15^\circ$

The measures of the interior angles are:

$$\begin{aligned} z + 40^\circ &= 55^\circ \\ 2z - 5^\circ &= 25^\circ \\ 180^\circ - 55^\circ - 25^\circ &= 100^\circ \end{aligned}$$

8. $y = \frac{5}{3}x + \frac{2}{3}$

10. (a) $-2/3$, 3, 0, undefined

9. $3x + 7y + 63 = 0$ (c) $y = -\frac{2}{3}x - 7$, $y = 3x + 4$, $y = 0x + 7$, not possible
(d) $2x - 3y + 21 = 0$, $3x - y - 4 = 0$,
 $0x + y - 7 = 0$ or $y = 7$
 $x + 0y - 6 = 0$ or $x = 6$

12. (a) $P = 13.5$ m, $A \doteq 6.4$ m² (b) $P = 27$ m, $A \doteq 25.6$ m²

14. 40 m

16. Only the first (leftmost) one is linear. The others are non-linear. For all the relations, x is independent and y is dependent.

Equations: $y = \frac{1}{3}x$, $y = \frac{1}{50}x^2 + \frac{3}{10}x + 5$, $y = 2^x$, $y = \frac{1}{\frac{2}{5}x + 2}$

18. $x = 60^\circ$, $y = 133^\circ$

20. **Parallelogram:** opposite sides are parallel and have the same length, the diagonals bisect each other (cut each other in half)

Rhombus: same as parallelogram, diagonals intersect at 90°

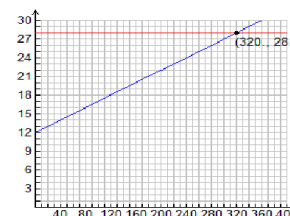
Isosceles Triangle: base angles are equal

7. Cell-a-Bration:

$C = 0.05n + 12$

E-Phone: $C = 28$

For fewer than 320 minutes, Cell-a-Bration is a better deal.
For more than 320 minutes, E-Phone is a better deal.



11. (a) x -int: -5 , y -int: 7 , (b) $y = \frac{7}{5}x + 7$, (d) $y = \frac{7}{5}x + 14$
(e) $y = -\frac{5}{7}x + \frac{24}{7}$, (f) $y = -\frac{5}{7}x + 7$

13. $v = 76^\circ$, $w = y = 104^\circ$, $z = 28^\circ$, $x = 62^\circ$

15. $x = 15^\circ$

17. About 41 cm². (Use the Pythagorean Theorem to calculate the height of the triangle.)

19. See notes for unit 6 (academic), unit 5 (AP) at www.misternolfi.com

21. **Cube:** $l = w = h$

Cylinder: $h = 2r = d$ (height = diameter)

Pyramid: $b = h$ (base = height)

MPM1DO/9: REVIEW #2 FOR FINAL EXAM—MORE BASIC CONCEPTS PLUS PROBLEM SOLVING

1. **Simplify** each of the following algebraic expressions.

(a) $-3x + x$

(b) $-3x(x)$

(c) $-3x(7x-5)$

(d) $-3x(7x)-5$

(e) $-3x-(7x-5)$

(f) $-3x-4(7x-5)$

(g) $-5a+7b-3a-9b$

(h) $-5a+7b-(3a-9b)$

(i) $-5a(7b)(3a)(-9b)$

(j) $-(3a-1)+4(a-3)$

(k) $(3a-1)-4(a-3)$

(l) $(-3zw^5)^2$

(m) $\frac{256q^{14}r^{11}}{-128q^7r}$

(n) $\frac{14q^{14}r^{12}-(7q^7r^6)^2}{-7qr^{11}}$

(o) $-3x^2-21y-4(7x^2-5y)$

2. **Solve** each of the following equations. **Check each solution.**

(a) $5(-x-1)=-6x-6(-2x+1)$

(b) $\frac{-3}{4}-\frac{2s+5}{6}=\frac{s-7}{4}$

3. Compare the monthly cost of the following long distance plans:

AcrossTheWorld charges \$7 for 100 minutes and \$17 for 300 minutes.

InternationalTalker has a monthly base fee of \$8 and charges \$16 for 400 minutes.

(a) Carefully plot the graph of each equation.

(b) Write an equation for the monthly cost of using each long distance phone company.
The equation should relate C , the cost per month, to n , the number of minutes used.

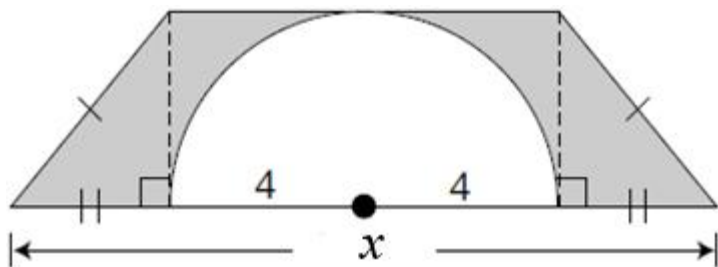
(c) Find the point of intersection of the two graphs. What is the meaning of the point of intersection in the context of this problem?

(d) What is the cost per minute for each company?

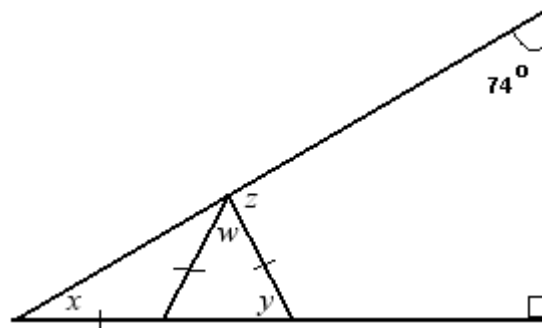
(e) Which company is a better deal? Explain.

4. A line is perpendicular to $3x+7y+21=0$ and has the same x -intercept as $y=\frac{2}{3}x+\frac{34}{9}$. Find the equation of the line in both slope- y -intercept form and standard form.

5. Write an algebraic expression for the area of the shaded part of the figure shown below.



6. Find the values of x , y , z and w . Justify your answers.



7. Diophantus of Alexandria was born around the year 200 AD. The following is a famous riddle about his life:

His boyhood lasted one-sixth of his life. He married after one-seventh more. His beard grew after one-twelfth more and his son was born five years later. The son lived to half his father's final age and the father died four years after the son.

How old was Diophantus when he died?

Answers

1. (a) $-2x$, (b) $-3x^2$, (c) $-21x^2 + 15x$, (d) $-21x^2 - 5$, (e) $-10x + 5$, (f) $-31x + 20$, (g), $-8a - 2b$,
 (h) $-8a + 16b$, (i) $945a^2b^2$, (j) $a - 11$, (k) $-a + 11$, (l) $9z^2w^{12}$, (m) $-2q^7r^{10}$, (n) $5q^{13}r$, (o) $-31x^2 - y$

2. (a) $x = \frac{1}{11}$,
 (b) $s = \frac{2}{7}$

3. **AcrossTheWorld:** $C = 0.05n + 2$,

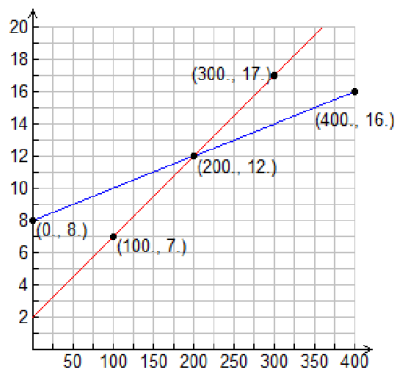
cost per minute is \$0.05

InternationalTalker: $C = 0.02n + 8$,

cost per minute is \$0.02

The point of intersection is (200, 12). It means that both companies charge \$12 for \$200 of usage.

For fewer than 200 minutes, AcrossTheWorld is cheaper because its graph is lower. For more than 200 minutes, InternationalTalker is cheaper because its graph is lower.



4. $y = \frac{7}{3}x + \frac{119}{9}$, $21x - 9y + 119 = 0$

5. $\frac{4(x+8)}{2} - \frac{\pi(4)^2}{2} = 2x + 16 - 8\pi$

6. $x = 16^\circ$, $y = 32^\circ$, $z = 48^\circ$, $w = 116^\circ$

7. Let x represent the age at which Diophantus died. Then solve the equation

$$\frac{1}{6}x + \frac{1}{7}x + \frac{1}{12}x + 5 + \frac{1}{2}x + 4 = x \text{ to}$$

obtain $x = 84$. Therefore, according to the riddle, Diophantus died at the age of 84.

Chapter 2 Practice Test

Multiple Choice

For each question, select the best answer.

- Which is a primary data source?
 - using stock information from the business section of the newspaper
 - measuring the heights of students in your class
 - using data published in an almanac at the library
 - using data collected by Statistics Canada
- Rebecca wants to find out what Canadian dentists think about a new cleaning procedure. Which is the population for this survey?
 - Canadians who have visited the dentist in the last six months
 - Canadians who work in a dentist's office
 - all Canadians
 - all dentists in Canada
- Extrapolation is
 - the process of estimating a value outside the range of the data
 - the process of estimating a value between two measurements in a set of data
 - drawing a conclusion based on reasoning and the data
 - a variable that affects the value of another variable

Short Response

- Write a hypothesis about the relationship between each pair of variables. Then, state the opposite of each hypothesis.
 - cost of owning a cell phone and number of people who own a cell phone
 - number of pages in the telephone book and length of time required to find a specific entry
 - water consumption and quality of tap water
- The president of a company wishes to survey a representative sample of its employees.
 - What is the population?
 - Describe how to select a systematic random sample of employees.
 - How could you select a stratified random sample of employees?
 - Suppose the president surveyed the people who work in the offices closest to her. Is this sample likely to be representative of the population?
- The table compares the age of a tree with the diameter of its trunk.

Age	3	5	6	4	12	8	9	4
Diameter (cm)	9	11	10	9	11	14	13	8

- Make a scatter plot of the data.
Draw a line or curve of best fit.
- State whether the data show a linear or a non-linear relationship.

Extend

- This table shows the population of a city from 1935 to 2005.

Year	Population (1000s)
1935	540
1945	610
1955	768
1965	804
1975	819
1985	421
1995	844
2005	856

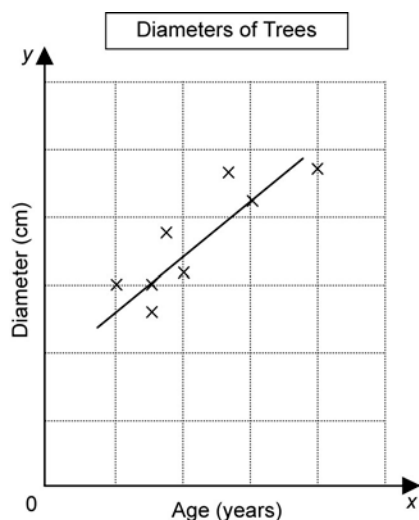
- Make a labelled scatter plot of the data.
- Describe the trend in the population.
- Identify any outliers. Should any outliers be discarded? Why?
- Draw a line or curve of best fit.
- Estimate the population in 1950.

Answers

- B
- D
- A
- The number of people who own cell phones increases as the cost of cell phones decreases. The number of people who own cell phones does not increase as the cost of cell phones decreases.
 - It takes longer to find a specific entry in the telephone book if there are a large number of pages. It does not take longer to find a specific entry in the telephone book if there are a large number of pages.
 - During periods of extremely high water consumption, the quality of tap water decreases. During periods of extremely high water consumption, the quality of tap water does not decrease.
- All the employees of the company
 - list all the employees in alphabetical order; randomly select an employee to begin; survey every tenth employee above and below that name on the list
 - randomly select three people from each department
 - no

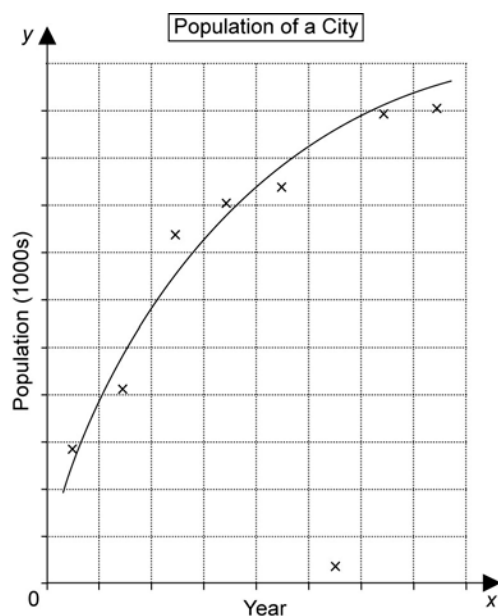
Answers (Continued)

6. a)



b) linear

7. a)



b) The population increased rapidly from 1935 to about 1965. From 1965 to 2005, the population continued to grow, but far more slowly.

c) The population in 1985 is 421. This is an outlier. The rest of the data approximates a smooth curve, this data point must have been recorded incorrectly. It can be discarded.

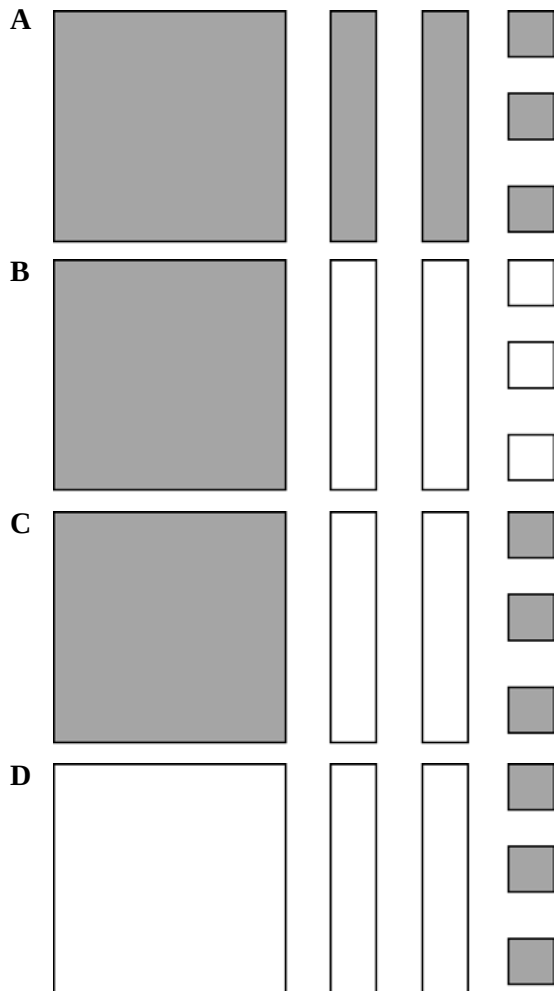
e) about 670 000

Chapter 3 Practice Test

Multiple Choice

For each question, select the best answer.

1. Which model represents the expression $x^2 - 2x + 3$?



2. Which fraction is equal to $\left(\frac{1}{4}\right)^2$?

A $\frac{1}{16}$
B $\frac{1}{8}$
C $\frac{1}{4}$
D $\frac{1}{2}$

3. Which is the result when $m^5 \times m \div m^4$ is simplified?

A m^9
B m
C m^2
D m^{10}

4. What is the value of $2^3 \times 2^4$?

A 48
B 128
C 4096
D 16 384

5. What is the value of $7^7 \div 7^5$?

A 14
B 7
C 1
D 49

6. Which pair of terms are *not* like terms?

A $4a$ and $7a$
B $2mn$ and mn^2
C $3p^2q$ and $-p^2q$
D $-x$ and $3x$

7. The expression $5a^2b^2 - ab^3$ is a

A monomial
B binomial
C trinomial
D term

8. The degree of $-b^4d + bd^3 + b^6$ is

- A 3
- B 4
- C 5
- D 6

9. The result of expanding $-4x(3 - x)$ is

- A $-12x - 4x^2$
- B $12x + 4x^2$
- C $-12x + 4x^2$
- D $12x - 4x^2$

Short Response

10. Write as a single power, then evaluate.

- a) $[(-3)^2]^4 \div (-3)^3$
- b) $\frac{(7^2)^3 \times 7^3}{7^8}$

11. Simplify.

- a) $p^5 \times p^4 \div p^3$
- b) $(k^4)^2 \times k^5$
- c) $-15x^3y^2 \div 3y$
- d) $(-2m^3n^5)^2$

Answers

- 1. C
- 2. A
- 3. C
- 4. B
- 5. D
- 6. B
- 7. B
- 8. D
- 9. C
- 10. a) $(-3)^5; -243$ b) $7^1; 7$
- 11. a) p^6 b) k^{13} c) $-5x^3y$ d) $4m^6n^{10}$
- 12. a) $6k + 2$ b) $-3v - 1$
- 13. a) $g - 34$ b) $4a - 16$ c) $10m - 8$
- 14. a) $T = 3x$ b) $V = 25x$ c) 375¢ or \$3.75
- 15. a) $A = 1\,030\,000 + 0.13x$ b) \$1 197 050

12. Simplify.

- a) $(4k - 1) + (2k + 3)$
- b) $(2v + 3) - (5v + 4)$

13. Expand and simplify.

- a) $-3(g + 2) + 4(g - 7)$
- b) $5(a - 3) - (a + 1)$
- c) $2[m + 4(m - 1)]$

Extend

Show all your work.

14. Zac saves his nickels and dimes in a jar. He estimates that he has twice as many dimes as nickels.

- a) Write a simplified expression to represent the total number of coins Zac has.
- b) Write a simplified expression to represent the total value of the coins, in cents.
- c) Suppose Zac has 15 nickels. How much money does he have?

15. Four actors in a movie opted to be paid different ways.

Actor	Fixed Rate (\$)	Portion of Box Office Sales (\$)
Brad	500 000	—
Gwyneth	300 000	$0.02x$
Joaquim	150 000	$0.03x$
Julia	80 000	$0.08x$

- a) Write a simplified expression for the total amount to be paid to the four actors.
- b) In the first week, box office sales were \$1 285 000. What was the total amount paid to the actors for that week?

Chapter 4 Practice Test

Multiple Choice

For each question, select the best answer.

- Which is the solution for $k - 5 = -9$?
A $k = 4$ **B** $k = 14$
C $k = -14$ **D** $k = -4$
- Which equation has the root $p = -6$?
A $4p - 10 = 14$
B $p + 6 = -12$
C $3p + 8 = -10$
D $p - 4 = 2$
- The formula for perimeter of a triangle is $P = a + b + c$. Which is the formula rearranged to isolate b ?
A $b = P - a - c$
B $b = \frac{P}{a + c}$
C $b = \frac{P - a}{c}$
D $b = \frac{P - c}{a}$
- Lauren is twice Kristy's age. The sum of Lauren and Kristy's ages is 51. Which equation represents the sum of their ages?
A $K + K + 2 = 51$
B $K + 2K + 2 = 51$
C $2K = 51$
D $K + 2K = 51$

Answers

- D**
- C**
- A**
- D**
- a)** 11 **b)** -14 **c)** 3
 d) 2 **e)** -2 **f)** 3
- a)** -1 **b)** 1
- a)** $P = 4w + 6$
 b) $w = \frac{P - 6}{4}$
 c) 5 cm by 8 cm
- 4
- Chad: \$9.00; Colton: \$7.00; Alexis: \$10.50
- 11, -13, -15

Short Response

- Solve.
a) $s - 5 = 6$
b) $\frac{u}{-2} = 7$
c) $3z - 1 = 8$
d) $3 + 5m + 6m = 25$
e) $2(k - 3) = 4k - 2$
f) $4(r - 1) = 10 + (r - 5)$
- Find each root.
a) $\frac{2a + 3}{2} = \frac{3a - 2}{-10}$
b) $\frac{1}{5}(3p + 2) = 1$
- The length of a rectangle is 3 cm more than its width, w .
a) Write an expression for the perimeter of the rectangle in terms of its width.
b) Rearrange the formula to isolate w .
c) The perimeter of the rectangle is 26 cm. What are the dimensions of the rectangle?

Extend

Show all your work.

- Find the root (i.e. the solution), then check.
$$\frac{3(t + 2)}{4} = \frac{2t + 5}{2}$$
- Chad earns \$2 per hour more than Colton and \$1.50 per hour less than Alexis. Together, they all earn \$26.50 per hour. What is each person's hourly wage?
- The sum of three consecutive odd integers is -39. Find the numbers.

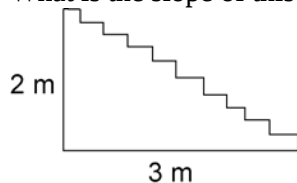
Chapter 5 Practice Test

Multiple Choice

For each question, select the best answer.

- Which relation is a partial variation?
A $y = 25x$ **B** $y = 2^x$
C $y = 5x^2$ **D** $y = 2x - 5$
- Sophie's earnings vary directly with the number of hours she works. She earned \$25 in 4 h. What is the constant of variation?
A 0.16 **B** 6.25
C 100 **D** 21

- What is the slope of this staircase?



- A** 6 **B** $\frac{3}{2}$
C 2 **D** $\frac{2}{3}$

- Which equation represents this relation?

x	y
0	-1
1	-3
2	-5
3	-7
4	-9

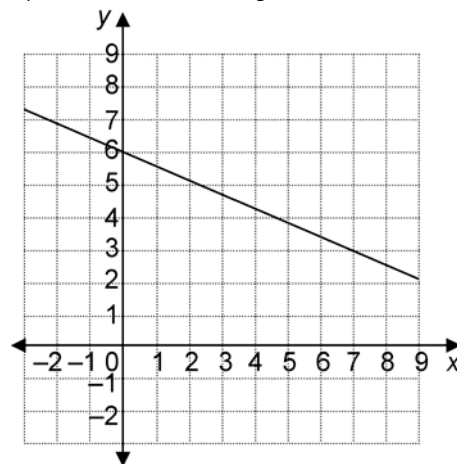
- A** $y = -x - 2$ **B** $y = 2x - 1$
C $y = -2x - 1$ **D** $y = 2x + 1$

- The cost to cater a party is \$200 plus \$15 for each guest. Which equation represents this relation?

- A** $C = 15n + 200$ **B** $C = 15n - 200$
C $C = 200n + 15$ **D** $C = 200n - 15$

Short Response

- Calculate the slope.



- Find the vertical intercept.
- Write an equation for the relation.

- The distance travelled varies directly with time. Anthony ran 49.6 m in 8 s.

- Write an equation for this relationship.
- Graph the relation.

- Is this relation linear or non-linear? How can you tell without graphing?

x	y
4	8.4
8	16.8
12	25.2
16	33.6

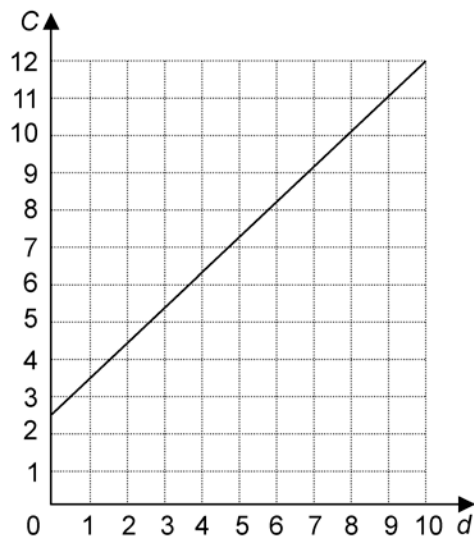
- The cost to install wood trim is \$50, plus \$6/m of trim installed.

- Write an equation for this relationship.
- 18 m of trim were installed. What was the total cost?

Extend

Show all your work.

10. This graph shows the relationship between the cost of a taxi trip and the length of the trip.



- Calculate the rate of change of cost. How does the rate of change relate to the graph?
- Write an equation for the relationship.
- Suppose the flat fee changed to \$3.00. How would the equation change? How would the graph change?

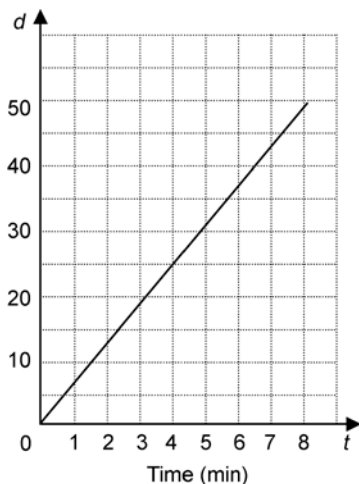
Answers

- D
- B
- D
- C
- A

6. a) $-\frac{3}{7}$ b) 6 c) $y = -\frac{3}{7}x + 6$

7. a) $d = 6.2t$

b)



Answers (Continued)

- Linear; I found the first differences and noticed they were all equal.
- a) $C = 6l + 50$
b) \$158
- a) \$0.95/km; the rate of change is the slope
b) $C = 0.95d + 2.50$
c) The fixed portion of the equation would change from 2.50 to 3.00. The graph would shift up so the vertical intercept is 3.

Chapter 6 Practice Test

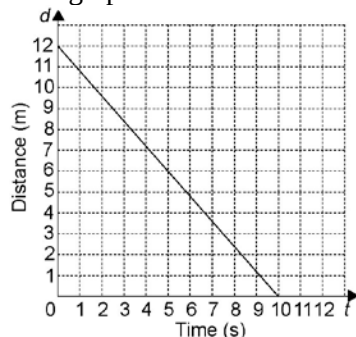
Multiple Choice

For each question, select the best answer.

- Which are the slope and y -intercept of the line $y = 5x + 3$?
A $m = 3, b = 5$
B $m = -3, b = -5$
C $m = -5, b = 3$
D $m = 5, b = 3$
- What are the x - and y -intercepts of the line $5x - 4y = 20$?
A x -intercept = 4, y -intercept = -5
B x -intercept = -4, y -intercept = -5
C x -intercept = -4, y -intercept = 5
D x -intercept = 4, y -intercept = 5
- What is the slope of a line parallel to $x + 2y = 4$?
A 2 **B** -2
C $\frac{1}{2}$ **D** $-\frac{1}{2}$
- What is the slope of a line perpendicular to $x + 2y = 4$?
A 2 **B** -2
C $\frac{1}{2}$ **D** $-\frac{1}{2}$
- Which is the solution to the linear system $y = 6 - x$ and $y = x - 4$?
A (1, 5) **B** (5, 1)
C (-1, 5) **D** (-5, -1)

Short Response

- Rearrange $x - 2y + 4 = 0$ into the form $y = mx + b$.
- Erynn used a motion sensor to create this distance-time graph.



- Find the slope and d -intercept. What information does each of these give us about Erynn's motion?
- Write an equation that describes this distance-time relationship.

- Find an equation for a line
a) with slope -1 passing through (2, 2)
b) that passes through (10, 3) and (5, 6)

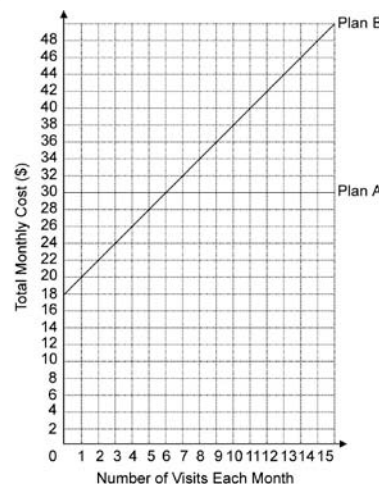
Extend

Show all your work.

- A line is perpendicular to $x + 3y - 4 = 0$ and has the same y -intercept as $2x + 5y - 20 = 0$. Find an equation for the line.
- A fitness club offers two membership plans.
 Plan A: \$30 per month
 Plan B: \$18 per month plus \$2 for each visit to the club
a) Graph the linear system. When would the cost of the two membership plans be the same?
b) Describe a situation under which you would choose each plan.

Answers

- D 2. A 3. D 4. A 5. B
- $y = \frac{1}{2}x + 2$
- a)** slope: -1.2; d -intercept: 12
b) $d = -1.2t + 12$
- a)** $y = -x + 4$ **b)** $y = -\frac{3}{5}x + 9$
- $y = 3x + 4$
- a)**



When you make 6 visits per month, the cost for both plans is \$30.

- I would choose Plan A if I go to the gym more than 6 times each month. If I thought I would go fewer than 6 times per month, I would choose Plan B (or not get a membership!).

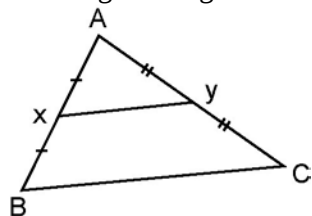
Chapter 7 Practice Test

Multiple Choice

For questions 1 to 5, select the best answer.

- Each exterior angle of an equilateral triangle has which measure?
A 60° B 180° C 360° D 120°
- Triangle DEF has interior angles at D and E, which measure 100° and 25° . Which is the measure of the exterior angle at F?
A 55° B 125° C 180° D 75°
- The sum of the interior angles of a convex polygon
A is always 180°
B is always 720°
C is always 360°
D depends on the number of sides

- The length of segment BC is



- half the length of XY
 - half the length of AB
 - double the length of XY
 - triple the length of XY
- The segments joining the midpoints of a quadrilateral.
A form a parallelogram
B bisect each other
C are always perpendicular to each other
D always bisect each other at right angles

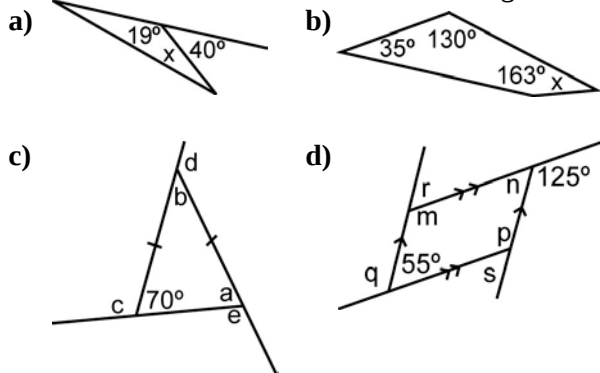
Answers

- D
 - B
 - D
 - C
 - A
- $x = 21^\circ$
 - $x = 32^\circ$
 - $a = 70^\circ$; $b = 40^\circ$; $c = e = 110^\circ$; $d = 140^\circ$
 - $m = p = q = 125^\circ$; $n = r = s = 55^\circ$
 - 3240°
 - True; three diagonals can be drawn from one vertex of a hexagon. These diagonals divide the hexagon into four triangles. The sum of the interior angles of a triangle is 180° . Since there are four triangles in a hexagon, the sum of the interior angles is 4×180 , or 720° .
 - False; the sum of the exterior angles of any convex polygon is always 360° .
 - 8
 - 135°

Short Response

Show all steps to your solution.

- Find the measure of each indicated angle.

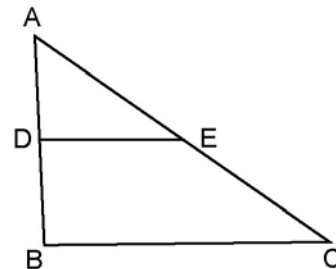


- A convex polygon has 20 sides. Find the sum of the interior angles.
- Explain why each conjecture is true, or use a counterexample to show it is false.
 - The sum of the interior angles of any convex hexagon is always 720° .
 - The sum of the exterior angles of any convex polygon depends on the number of sides.

Extend

Provide complete solutions.

- The sum of the interior angles of a convex polygon is 1080° .
 - How many sides does the polygon have?
 - Suppose the polygon is regular. What is the measure of each interior angle?
- Show that the area of trapezoid BCED is 3 times the area of $\triangle ADE$.



Answers (Continued)

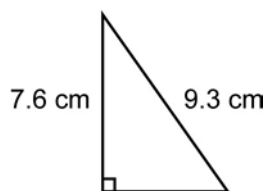
- The area of BCED is $\frac{(DE + BC) \times BD}{2}$.
But $BC = 2DE$.
So, the area becomes $\frac{(DE + 2DE) \times BD}{2}$ or $\frac{3DE \times BD}{2}$.
The area of $\triangle ADE$ is $\frac{DE \times AD}{2}$.
But $AD = BD$.
So, the area becomes $\frac{DE \times BD}{2}$.

Chapter 8 Practice Test

Multiple Choice

For questions 1 to 5, select the best answer.

1. What is the length of x to the nearest tenth of a centimetre?

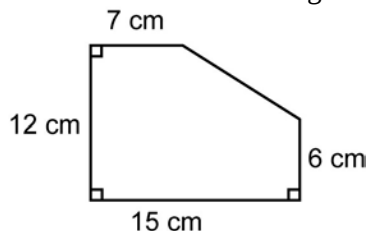


- A 12.0 cm^x B 1.7 cm
C 5.4 cm D 2.9 cm

2. A cone has diameter 6 cm and height 4 cm. Which is the volume of the cone to the nearest tenth of a cubic centimetre?

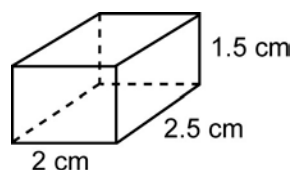
- A 37.7 cm³ B 150.8 cm³
C 100.5 cm³ D 113.1 cm³

3. What is the area of this figure?



- A 204 cm²
B 132 cm²
C 180 cm²
D 156 cm²

4. What is the surface area of this rectangular prism?



- A 7.5 cm²
B 23.5 cm²
C 22.5 cm²
D 17.5 cm²

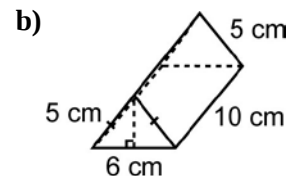
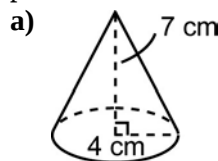
5. What is the surface area, to the nearest tenth of a square centimetre, of a sphere with radius 5 cm?

- A 523.6 cm²
B 314.2 cm²
C 62.8 cm²
D 1570.8 cm²

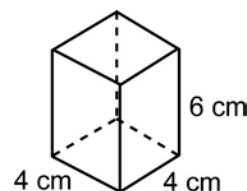
Short Response

Show all steps to your solution.

6. Find the surface area and volume of each object. Round your answers to one decimal place.



7. A cone just fits inside this box.

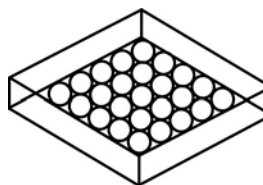


What is the volume of the cone?

Extend

Provide complete solutions.

8. Twenty-five balls, each with diameter 9 cm, are packed in a single layer in a square box.



- a) What is the minimum volume of the box?
b) What is the surface area of the box?
c) How much empty space is in the box?

Answers

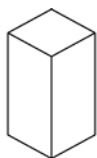
1. C
2. A
3. D
4. B
5. B
6. a) Surface area: 151.6 cm²; Volume: 117.3 cm³
b) Surface area: 184 cm²; Volume: 120 cm³
7. 25.1 cm³
8. a) 18 225 cm³ b) 5670 cm²
c) 8682.4 cm³

Chapter 9 Practice Test

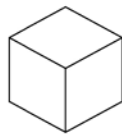
Multiple Choice

For questions 1 to 4, select the best answer.

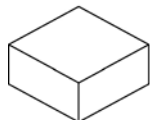
- Angus wants to build a pen against one wall of his house. He has 16 m of fencing. Which dimensions will give him the pen with greatest area?
A 4 m by 4 m **B** 4 m by 8 m
C 2 m by 8 m **D** 3 m by 10 m
- A square-based prism has volume $27\,000\text{ cm}^3$. What are the dimensions of the prism if it has minimum surface area?
A 46 cm by 30 cm by 20 cm
B 90 cm by 30 cm by 10 cm
C 27 cm by 10 cm by 10 cm
D 30 cm by 30 cm by 30 cm
- These square-based prisms all have the same surface area. Which prism has the greatest volume?



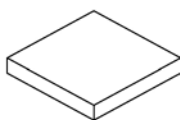
Prism A



Prism B



Prism C



Prism D

- A** Prism A **B** Prism B
C Prism C **D** Prism D

- The surface area of a cylinder is 800 cm^2 . What are the radius and height of the cylinder if it has the greatest volume possible?
A $r = 8\text{ cm}$, $h = 8\text{ cm}$
B $r = 6.5\text{ cm}$, $h = 6.5\text{ cm}$
C $r = 6.5\text{ cm}$, $h = 13\text{ cm}$
D $r = 4\text{ cm}$, $h = 28\text{ cm}$

Short Response

Show all steps to your solution.

- Walter wants to fence an area 400 m^2 . What is the least amount of fencing he will require?

- Suppose you are allowed to use a maximum of 1350 cm^2 of cardboard to build a square-based box. What are the dimensions of the largest box you can build?
- A cylindrical storage tank must hold 70 L of cleaning fluid. Find the radius and height of the tank that requires the least amount of metal. Express your answers to the nearest tenth of a centimetre.

Extend

Provide complete solutions. Round all answers to one decimal place.

- Solvig has 100 cm^2 of cardboard to make a box with the greatest possible volume.
a) Should the box be a square-based prism or a cylinder? Why?
b) What assumptions did you make?

Answers

- B**
- D**
- B**
- C**
- 80 m
- 15 m by 15 m by 15 m
- $r = 2.2\text{ cm}$; $h = 4.5\text{ cm}$
- a)** The dimensions of the square-based prism with the greatest volume are 4.1 cm by 4.1 cm by 4.1 cm. The volume of this prism is 68.9 cm^3 . The cylinder with the greatest volume has a radius of 2.3 cm, a height of 4.6 cm, and a volume of 76.4 cm^3 . Solvig should make a cylinder.
b) I assumed I would be able to use all of the cardboard to make the box. There would be no waste.