MPM1D **Exam Review – Unit 1**
(Focus on Integers and Rationals)

1. Add or subtract. Express your answers in lowest terms.

a) $\frac{7}{8}+\frac{5}{8}$ **b)** $\frac{5}{6}-\frac{1}{3}$

c) $\frac{2}{3}+\frac{1}{5}$ **d)** $2\frac{1}{4}-\frac{5}{6}$

2. Multiply or divide. Express your answers in lowest terms.

a) $\frac{4}{15}\times\frac{5}{8}$ **b)** $\frac{1}{3}\div\frac{5}{9}$

c) $3\frac{2}{7}\times4\frac{2}{3}$ **d)** $1\frac{1}{5}\div\frac{5}{6}$

3. Donald needs \$20 to buy a ticket to a show. He earned $\frac{1}{4}$ of the money on Monday, $\frac{2}{5}$ on Tuesday, and $\frac{1}{10}$ on Wednesday. What fraction of the money does Donald still need to earn?

4. Find each sum, difference, product, or quotient.

a) $-8+3$ **b)** $6+(-8)$

c) $-2+(-5)$ **d)** $7-(-3)$

e) $-12-9$ **f)** $-1-(-4)$

g) -25×3 **h)** $11\times(-4)$

i) $-50\times(-4)$ **j)** $72\div(-8)$

k) $-60\div(-12)$ **l)** $-24\div4$

5. Evaluate.

a) $32\div(-4)\times3$

b) $(-2)\times6+(-4)$

c) $-64\div8\div(-2)$

d) $23+(-7)-(-5)-6$

6. Kate borrowed \$7 from her parents on each of the last 4 days. This morning she paid her parents \$20. How much does Kate still owe her parents?

7. Evaluate.

a) $-16+4\times(-3)$

b) $35\div(-7)+(-3)(-5)$

c) $(6-18)\times(-8+2)$

d) $5(14-11)^2-(-2)$

e) $-10+8-12\div(-4)\times2$

f) $-30\div5\times2+(-8)$

g) $[(6^2+3)\div13]^2$

h) $(12+9)\div(-20+17)$

8. Martine deposited \$15 in her bank account each week for 6 weeks. Then she withdrew \$8 each week for 9 weeks. How much money does Martine have left in her bank account?

9. Evaluate each of the following:

a) $\frac{-2}{5}+\frac{12}{5}$ b) $\frac{-2}{3}-\frac{5}{9}$

c) $3\frac{1}{4}-5\frac{5}{6}$ d) $\left(\frac{3}{-4}\right)\left(\frac{-8}{9}\right)$

e) $2\frac{4}{5}\div\left(-3\frac{1}{3}\right)$ f) $\left(\frac{12}{-5}\right)\left(\frac{15}{-8}\right)\left(\frac{-4}{21}\right)$

Answers

1. **a)** $\frac{3}{2}$ **b)** $\frac{1}{2}$ **c)** $\frac{13}{15}$ **d)** $1\frac{5}{12}$

2. **a)** $\frac{1}{6}$ **b)** $\frac{3}{5}$ **c)** $15\frac{1}{3}$ **d)** $1\frac{11}{25}$

3. $\frac{1}{4}$

4. **a)** -5 **b)** -2 **c)** -7 **d)** 10
e) -21 **f)** 3 **g)** -75 **h)** -44
i) 200 **j)** -9 **k)** 5 **l)** -6

5. **a)** -24 **b)** -16 **c)** 4 **d)** 15

6. \$8

7. **a)** -28 **b)** 10 **c)** 72 **d)** 47
e) 4 **f)** -20 **g)** 9 **h)** -7

8. \$18

9. **a)** 2 **b)** $\frac{-11}{9}$ **c)** $\frac{-31}{12}$ **d)** $\frac{2}{3}$
e) $\frac{-21}{25}$ **f)** $\frac{-6}{7}$

MPM1D **Exam Review – Unit 2** (Focus on Powers and Algebra)

1. Evaluate.

a) 5^3 **b)** 2^8

c) -3^4 **d)** $(-2)^4$

e) $(-1)^{10}$ **f)** $\left(\frac{2}{3}\right)^3$

2. Evaluate. Use the correct order of operations.

a) $3^4 + 4^2$ **b)** $7^2 - 7$

c) $9^2 \div 3^2$ **d)** $5 \times \left(\frac{2}{5}\right)^3$

e) $(3^2 + 4^2)$ **f)** $(3 + 4)^2$

3. Write as a single power. Then, evaluate.

a) $8^5 \times 8^4 \div 8^7$ **b)** $6^7 \div 6^5 \div 6$

c) $(3^3)^4 \div 3^9$ **d)** $\frac{\left(5^3\right)^4 \times 5^2}{5^{10}}$

e) $2^7 \times 2^5 \div (2^2)^4$

f) $[(-6)^3]^3 \div [(-6)^2]^4$

4. Simplify.

a) $b^6 \times b^3$ **b)** $g^2 \times g^8 \div g^7$

c) $(a^5)^3 \div (a^4)^2$ **d)** $m^5n \times m^2n^4$

e) $p^7q^4 \div p^3q^4$ **f)** $\frac{8b^3d \times 4bd^2}{2\left(2bd\right)^2}$

5. Identify the coefficient and the variable for each term.

a) $7m$ **b)** $-3x^5$

c) $\frac{3}{7}m^2n$ **d)** gh

6. Classify each expression as a monomial, binomial, trinomial, or polynomial.

a) $a^2 - 2a + 1$

b) $2 - 3x^4 - 5x^2 + 4x$

c) $6m^2n^5$

7. State the degree of each term.

a) $-8b^4$

b) $-x^4y^3$

8. Simplify each expression.

a) $2b + 7g - 5b - 8g$

b) $3x + y^2 + 5y^2 - 7x$

c) $6q + u + 4u + q + u + 4u - u$

d) $10 - m^2 - 7 - m^2 + 4m^2$

e) $-3v + 2v + 6 - 3v - 9 - v$

f) $7 + h + h - 5 + 6h + 2 + 3h$

9. Simplify.

a) $(6k - 4) + (2k + 4)$

b) $(2a + 1) - (4a + 2)$

c) $(b - 6) - (2 - 5b) + (b + 4)$

d) $(g + 12) + (g - 7) - (2 - 3g)$

e) $(x^2 + 2x + 1) + (2x^2 + 4)$

f) $(2m^2 + m + 12) - (3m^2 + 4m - 6)$

10. Expand.

a) $5(x + 3)$ **b)** $4(b + 2)$

c) $w(2w + 1)$ **d)** $q(q + 4)$

e) $3c(6 - 4c)$ **f)** $-p(2p - 1)$

g) $-5(a^2 - 4a - 2)$ **h)** $2d(d^2 - 3d - 1)$

11. Expand and simplify.

a) $3(x + 3) + 2(x + 1)$

b) $-4(m + 2) + 3(m - 7)$

c) $-(d - 3) - 5(d + 2)$

d) $5[b + 2(b + 1)]$

e) $-2[3(a + 3) - 4]$

f) $4[-2(4 - t) + 3t]$

Unit 2 Answers

1. **a)** 125 **b)** 256 **c)** −81
d) 16 **e)** 1 **f)** $\left(\frac{8}{27}\right)$

2. **a)** 97 **b)** 42 **c)** 9
d) $\left(\frac{8}{25}\right)$ **e)** 25 **f)** 49

3. **a)** 8^2; 64 **b)** 6^1; 6 **c)** 3^3; 27
d) 5^4; 625 **e)** 2^4; 16 **f)** $(-6)^1$; −6

4. **a)** b^9 **b)** g^3 **c)** a^7
d) m^7n^5 **e)** p^4 **f)** $4b^2d$

5. **a)** coefficient: 7; variable m
b) coefficient: −3; variable x^5
c) coefficient: $\frac{3}{7}$; variable m^2n
d) coefficient: 1; variable gh

6. **a)** trinomial **b)** polynomial
c) monomial

7. **a)** 4 **b)** 7

8. **a)** $-3b - g$ **b)** $-4x + 6y^2$
c) $7q + 9u$ **d)** $3 + 2m^2$
e) $-5v - 3$ **f)** $4 + 11h$

9. **a)** $8k$ **b)** $-2a - 1$
c) $7b - 4$ **d)** $5g + 3$
e) $3x^2 + 2x + 5$ **f)** $-m^2 - 3m + 18$

10. **a)** $5x + 15$ **b)** $4b + 8$
c) $2w^2 + w$ **d)** $q^2 + 4q$
e) $18c - 12c^2$ **f)** $-2p^2 + p$
g) $-5a^2 + 20a + 10$ **h)** $2d^3 - 6d^2 - 2d$

11. **a)** $5x + 11$ **b)** $-m - 29$
c) $-6d - 7$ **d)** $15b + 10$
e) $-6a - 10$ **f)** $-32 + 20t$

Unit 3 Review (Equations and Problem Solving)

1. Solve.
a) $5y = 35$ **b)** $b - 8 = -12$
c) $\frac{x}{4} = 7$ **d)** $h + 5 = 13$

2. Solve.
a) $8m + 9 = -15$
b) $2p + 7 = 3$
c) $5 - 4k = -7$
d) $4 + 3c = -12$

3. Solve, then check with a formal verification.
a) $-2a = -22$
b) $3 - q = -5$
c) $\frac{1}{2}g = -9$
d) $7 - 6s = 19$

4. Solve.
a) $2m + 5m - 3 = 4$
b) $4b - 6 + b - 9 = 0$
c) $3x - x + 4 = 0$
d) $2k + 3 = 4k - 5$

5. Solve.
a) $2 + (4h - 1) = 11 + 2h$
b) $8 - (2g + 3) = 3g - 5$
c) $2(d + 6) = 9(d - 1)$
d) $5(3r - 7) + r = 3(r - 3)$

6. Solve.
a) $4s + 3 - s = -6$
b) $p - 3 + 2p - 9 = 0$
c) $5 - (c + 3) = 4 + c$
d) $3(4d - 7) - 6 = 2(d + 2) - 1$

7. The perimeter of an isosceles triangle is 21 cm. The length of each equal side is triple the length of the base. Find the side lengths of the triangle.

8. Solve.
a) $\frac{t-6}{2} = 4$
b) $\frac{1}{3}(c + 2) = 1$
c) $\frac{4a+1}{3} = -5$
d) $\frac{2}{3}(s - 4) = 4$

9. Solve.
a) $\frac{d+4}{2} = \frac{3d}{4}$
b) $\frac{k-1}{2} = \frac{k+3}{4}$
c) $\frac{2}{3}(q - 3) = \frac{1}{4}(q + 7)$
d) $\frac{3c-1}{5} = \frac{4c+1}{9}$

10. Rearrange each formula to isolate the variable indicated.

a) $A = lw$ for l

b) $P = 2a + 2b$ for b

c) $y = mx$ for x

d) $l = w + 4$ for w

e) $P = 2a + b$ for b

11. Write an equation for each phrase.

a) 4 less than triple a number is 23

b) the sum of double a number and 6 is 16

c) half a number, less 3, is 8

d) the area decreased by 7 is 14

e) the sum of two consecutive integers is 49

f) the distance increased by 8 is 25

12. Blackie's mass is 4 kg less than Jessie's mass. Together, Blackie and Jessie have a mass of 72 kg. What is each dog's mass?

13. Chantal works at a music store. She earns \$8 per hour plus \$0.05 for each CD she sells. Tonight she is working a 5-h shift. How many CDs must Chantal sell to earn \$42?

Unit 3 ANSWERS

1. **a)** 7 **b)** −4 **c)** 28 **d)** 8

2. **a)** −3 **b)** −2 **c)** 3 **d)** $\frac{-16}{3}$

3. **a)** 11 **b)** 8 **c)** −18 **d)** −2

4. **a)** 1 **b)** 3 **c)** −2 **d)** 4

5. **a)** 5 **b)** 2 **c)** 3 **d)** 2

6. **a)** −3 **b)** 4 **c)** −1 **d)** 3

7. 3 cm, 9 cm, 9 cm

8. **a)** 14 **b)** 1 **c)** −4 **d)** 10

9. **a)** 8 **b)** 5 **c)** 9 **d)** 2

10. **a)** $l = \frac{A}{w}$

b) $b = \frac{P - 2a}{2}$

c) $x = \frac{y}{m}$

d) $w = l - 4$

e) $b = P - 2a$

11. **a)** $3x - 4 = 23$ **b)** $2x + 6 = 16$

c) $\frac{x}{2} - 3 = 8$ **d)** $A - 7 = 14$

e) $x + x + 1 = 49$ **f)** $d + 8 = 25$

12. Blackie: 34 kg; Jessie: 38 kg

13. 40

Unit 4, 5 Review The Straight Line

1.

x	*y*
0	0
1	0.5
2	1.0
3	1.5
4	2.0
5	2.5

a) What is the constant of variation for this relationship?

b) Write an equation relating y and x.

2. Classify each relation as a direct variation, a partial variation, or neither. Explain.

a) $d = 45t$ **b)** $y = 2x^2 + 3$

c) $y = 2x + 3$ **d)** $d = 45t + 12$

3. Evan earns \$7/h babysitting. The amount he earns, in dollars, varies directly with the time, in hours, he babysits.

a) Assign variables. Make a table of values showing Evan's earnings for 0 h, 1 h, 2 h, 3 h, and 4 h.

b) Describe the graph.

c) Identify the constant of variation. What does this represent?

d) Write an equation in the form $y = kx$.

4. The relationship between the variables in the table is linear.

x	*y*
6	61
12	85
14	93

a) Identify the initial value of y and the constant of variation.

b) Write an equation in the form $y = mx + b$.

c) Is this partial or direct variation?

5. The owner of a small business is having brochures printed. The design cost is \$1500. Printing costs \$0.08 per brochure. The relationship between cost and the number of brochures is a partial variation.

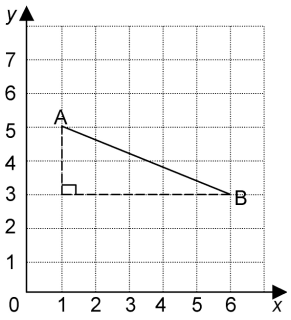
a) Identify the fixed cost and the variable cost.

b) Write an equation for this relationship.

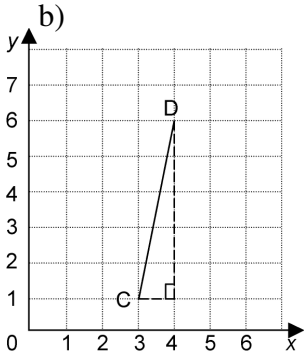
c) What is the total cost for 800 brochures?

6. Find the slope of each line segment.

a)



b)



7. One endpoint of line segment AB is A(3, 4). The slope of this line segment is $\frac{2}{3}$. Find possible coordinates for B.

8. It took 8 min to fill a 52-L bucket.

a) What is the rate of change of the volume of water?

b) Graph the volume of water in the bucket over time.

9. Use first differences. Is each relation linear or non-linear?

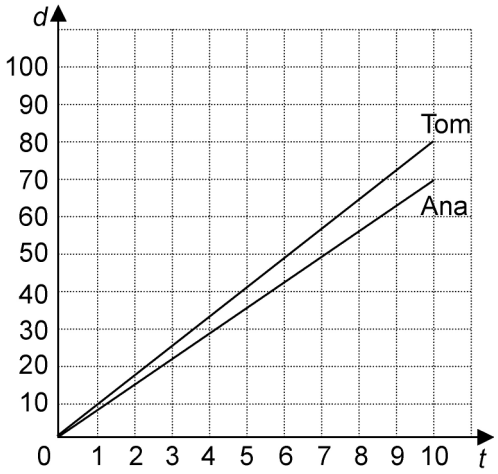
a)

x	*y*
0	–1
1	2
2	5
3	8
4	11
5	14

b)

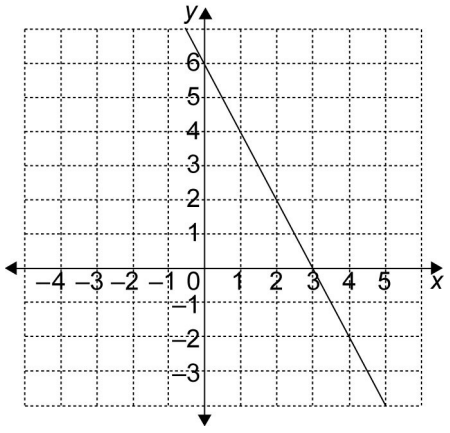
x	*y*
0	0
1	–2
2	–4
3	–6
4	–8
5	–10

10. Tom and Ana ran a race. The graph shows the distance (in metres) each person ran in 10 s.



Who ran faster? How much faster?

11. Find the slope and *y*-intercept of the following line:



12. Identify the slope and *y*-intercept of each line.

a) $y = 4x - 5$

b) $y = -\frac{1}{6}x + 2$

13. Write the equation of a line with each slope and *y*-intercept. Then, graph each line.

a) $m = -1, b = 0$

b) $m = \frac{2}{3}, b = 5$

14. Express each equation in the form $y = mx + b$.

a) $6x - y = 4$

b) $x + 4y = 28$

15. Identify the slope and y-intercept of each equation.

a) $8x + y = 4$

b) $-3x + 2y = 8$

16. Identify the x- and y-intercepts of each line. Then, graph the line

a) $4x - 2y = 8$

b) $5x + 3y - 15 = 0$

17. Which lines are parallel?

$2x - 3y + 12 = 0$

$3y = 2x + 6$

$3x - 2y = 0$

$3x + 2y = -4$

18. Which lines in question 17 are perpendicular?

19. What is the slope of a line that is perpendicular to $3 - x + 4y = 0$?

20. Find the equation of a line with a slope of -3, passing through $(2, -5)$.

21. Find the equation of a line parallel to $2x + 5y = 1$, with the same y-intercept as $x - 4y = 8$.

22. Find the equation for a line passing through $(3, -4)$ and $(2, 5)$.

23. Ingrid is walking in front of a motion sensor. After 1 s, she is 3.9 m from the sensor. After 3 s, she is 1.7 m from the sensor.

a) Find the slope for this relationship.

b) Write an equation of the form $d = mt + b$ that describes Ingrid's motion.

c) After how many seconds will Ingrid's distance from the motion sensor be 0?

24. Solve the following linear system: $x + y = 6$ and $y - 2x = 0$.

ANSWERS

1. **a)** $\frac{1}{2}$ b) $y = \frac{1}{2}x$

2. **a)** direct variation
b) neither
c) partial variation
d) partial variation.

3. **a)**

Time, t	Earnings, E
0	0
1	7
2	14
3	21
4	28

b) linear, slope of 7, y int of 0
c) 7; the amount Evan earns each hour he babysits.
d) $y = 7x$

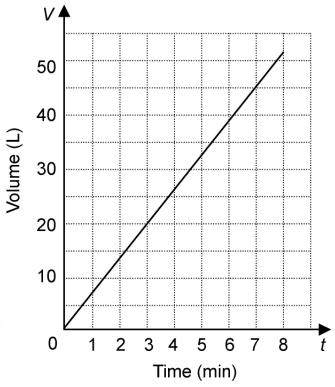
4. **a)** 37; 4
b) $y = 4x + 37$
c) Partial

5. **a)** fixed cost: \$1500
variable cost: \$0.08 times the number of brochures
b) $C = 0.08n + 1500$ **c)** \$1564

6. **a)** $-\frac{2}{5}$ **b)** 5

7. Answers may vary. Possible answer: B(6, 6)

8. **a)** 6.5 L/min **b)**



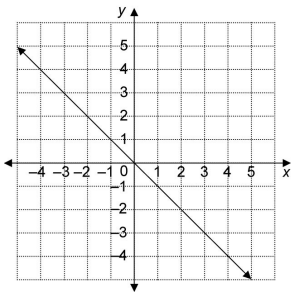
9. **a)** linear
b) linear

10. Tom; 1 m/s

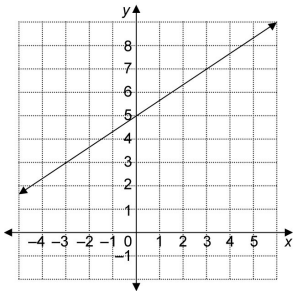
11. slope: -2; y-intercept: 6

12. **a)** slope: 4; y-intercept: -5
b) slope: $-\frac{1}{6}$; y-intercept: 2

13. **a)** $y = -x$



b) $y = \frac{2}{3}x + 5$



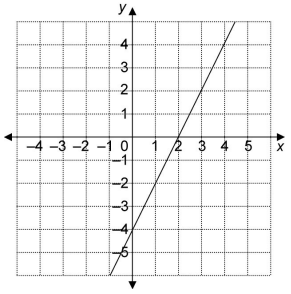
14. a) $y = 6x - 4$

b) $y = -\frac{x}{4} + 7$

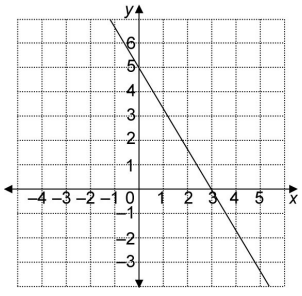
15. a) slope: -8; y-intercept: 4

b) slope: $\frac{3}{2}$; y-intercept: 4

16. a) x-intercept: 2; y-intercept: -4



b) x-intercept: 3; y-intercept: 5



17. $2x - 3y + 12 = 0$ and $3y = 2x + 6$

18. $2x - 3y + 12 = 0$ and $3x + 2y = -4$; $3y = 2x + 6$ and $3x + 2y = -4$

19. -4

20. $y = -3x + 1$

21. $y = -\frac{2}{5}x - 2$

22. $y = -9x + 23$

23. a) -1.1

b) $d = -1.1t + 5$

c) About 4.5 s

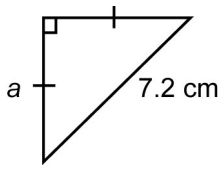
24. (2, 4)

Unit 6 Review Measurement

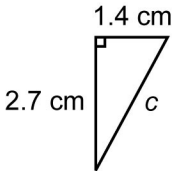
For all questions, round your answer to the nearest tenth of a unit when necessary.

1. Find the length of each indicated side.

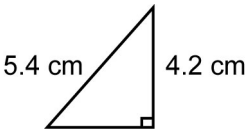
a)



b)

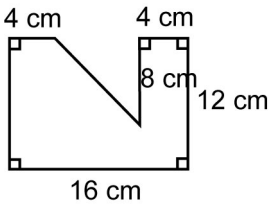


2. Find the area of this triangle.

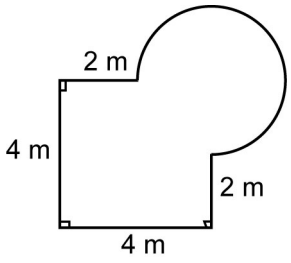


3. Find the perimeter and area of each figure.

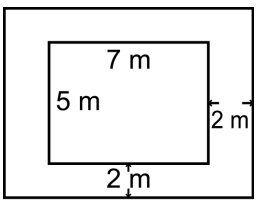
a)



b)

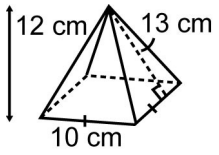


4. A pool is 5 m wide by 7 m long. It is surrounded by a deck 2 m wide. What is the area of the deck?

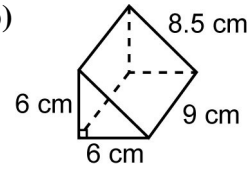


5. Find the surface area and volume of each object.

a)



b)



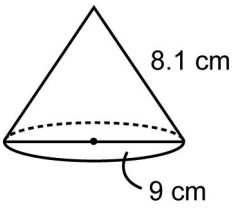
6. Find the side length of each cube.

a) a cube with volume 3375 cm^3

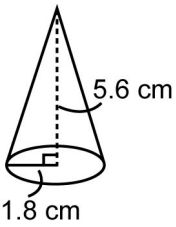
b) a cube with surface area 864 cm^2

7. Calculate the surface area of each cone.

a)

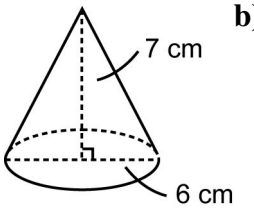


b)

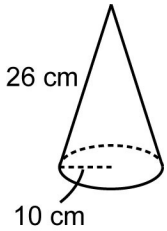


8. Find the volume of each cone.

a)



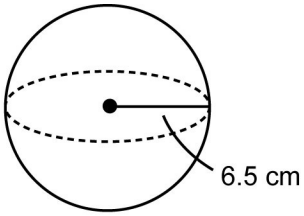
b)



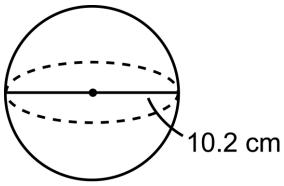
9. Find the volume of the largest cone that fits inside a cube with edges 15 cm long.

10. Find the surface area of each sphere.

a)

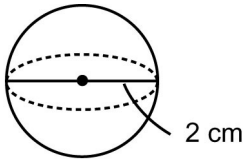


b)

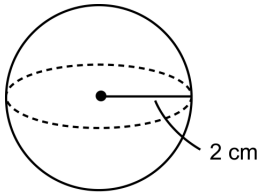


11. Find the volume of each sphere.

a)



b)



12. Which has greater volume?

A a hemisphere with radius 12 cm

B a sphere with radius 8 cm

Answers

1. **a)** 5.1 cm **b)** 3.0 cm
2. 7.1 cm^2
3. **a)** Perimeter: 67.3 cm; Area: 160 cm^2
b) Perimeter: 21.4 m; Area: 25.4 m^2
4. 64 m^2
5. **a)** Surface area: 360 cm^2; Volume: 400 cm^3
b) Surface area: 220.5 cm^2; Volume: 162 cm^3
6. **a)** 15 cm **b)** 12 cm
7. **a)** 178.1 cm^2 **b)** 43.4 cm^2
8. **a)** 66 cm^3 **b)** 2513.3 cm^3
9. 883.6 cm^3
10. **a)** 530.9 cm^2 **b)** 326.9 cm^2
11. **a)** 4.2 cm^3 **b)** 33.5 cm^3