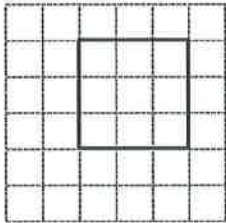


KEY

Chapter 1 – Square Roots and Surface Area

1. Explain 2 different methods used to determine the side length of this square:



Method #1: count them!

Method #2: $\sqrt{9} = 3$

2. Estimate the value of the following:

(a) $\sqrt{\frac{5}{11}}$ 0.67

(b) $\sqrt{0.27}$ 0.52

3. Use benchmarks to estimate $\sqrt{55}$ to the nearest tenth. Explain how you know.

$7\frac{6}{15}$ or 7.4

4. Use a calculator to estimate $\sqrt{55}$ to the nearest hundredth.

7.42

5. A square garden has an area of 240.25 m^2 .

- (a) Determine the length of one side of the garden.

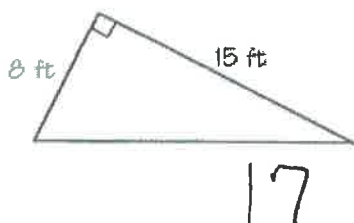
15.5 m

- (b) Determine the perimeter of the garden.

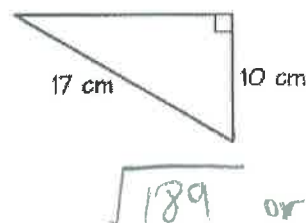
62 m

6. Use the Pythagorean Theorem to determine the length of the missing side.

- (a)



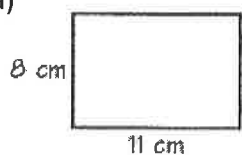
- (b)



$\sqrt{189}$ or 13.75

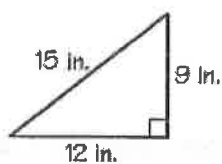
7. Determine the area of the following:

(a)



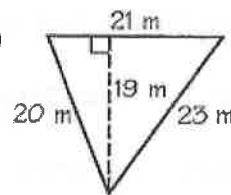
$$88 \text{ m}^2$$

(b)



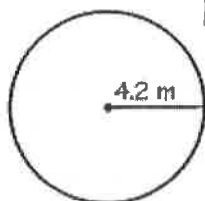
$$54 \text{ in.}^2$$

(c)



$$199.5 \text{ m}^2$$

(d)

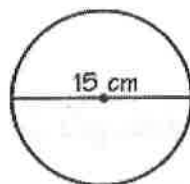


$$17.64\pi \text{ m}^2$$

or

$$55.42 \text{ m}^2$$

(e)



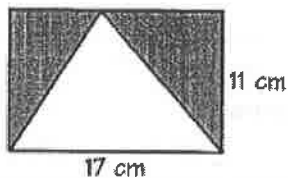
$$56.25\pi \text{ cm}^2$$

or

$$176.71 \text{ cm}^2$$

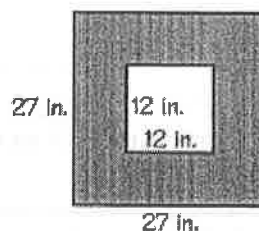
8. Determine the area of the shaded region.

(a)



$$93.5 \text{ cm}^2$$

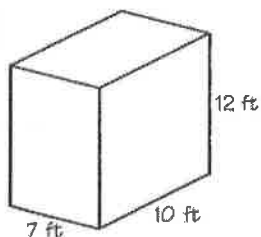
(b)



$$585 \text{ m.}^2$$

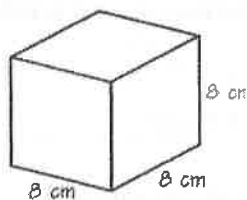
9. Determine the surface area of the following:

(a)



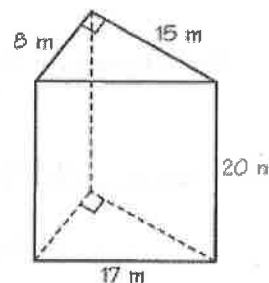
$$548 \text{ ft}^2$$

(b)



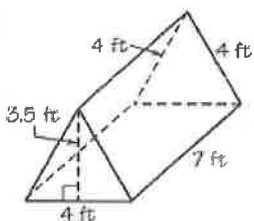
$$384 \text{ cm}^2$$

(c)



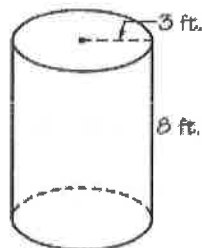
$$920 \text{ m}^2$$

(d)



$$98 \text{ ft}^2$$

(e)

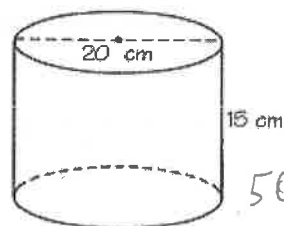


$$66\pi \text{ ft.}^2$$

or

$$207.35 \text{ ft}^2$$

(f)



$$500\pi \text{ cm}^2$$

or

$$1570.80 \text{ cm}^2$$

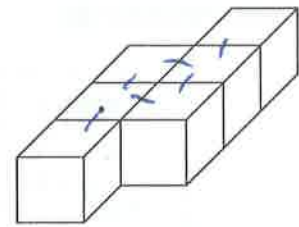
10. The object at the right is constructed using linking cubes. Each face of a cube has an area of 1 unit^2 .

- (a) Describe or show on the diagram where there are overlapping faces.

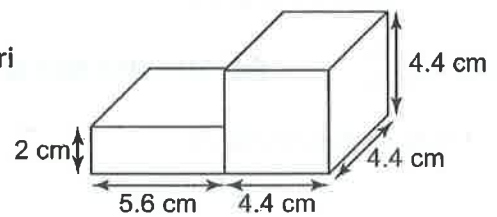
$$6 \times 6 = 36 \quad \text{overlap} \quad 6 \times 2 = 12$$

$$36 - 12 = 24$$

- (b) Determine the surface area of the composite object.

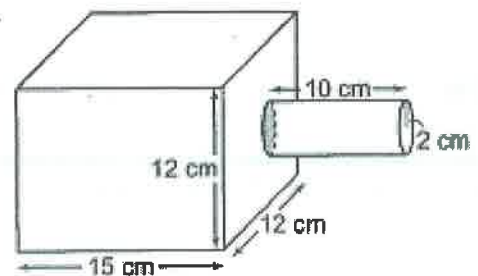


11. Determine the surface area of the composite object at the right.



$$138.56 \text{ cm}^2$$

12. Determine the surface area of the composite object at the right.



$$1133.66 \text{ cm}^2$$

Chapter 2 Review: Powers and Exponent Laws

1. Complete this table.

Power	Base	Exponent	Repeated Multiplication	Standard Form
3^5	3	5	$3 \times 3 \times 3 \times 3 \times 3$	243
$(-2)^4$	-2	4	$(-2) \times (-2) \times (-2) \times (-2)$	16
10^3	10	3	$10 \times 10 \times 10$	1000
-2^6	2	6	$-(2 \times 2 \times 2 \times 2 \times 2 \times 2)$	-64

2. Write as a power of 10.

(a) ten 10^1 (b) $10 \times 10 \times 10 \times 10$ 10^4 (c) -1 -10^0 (d) 10 000 000 10^7

3. Write in standard form.

(a) $2^5 = 32$ (b) $5^3 = 125$ (c) $0.5^2 = 0.25$

4. Write as a single power:

(a) $8^3 \times 8^6$ 8^9 (b) $4 \times 4^3 \times 4^8$ 4^{12} (c) $x^4 \times x^{41}$ x^{45} (d) $4^{21} \div 4^7$ 4^{14}
 (e) $9^{10} \div 9 = 9^9$ (f) $\frac{3^4 \times 3^5}{3^6 \times 3^2} = 3$ (g) $3^{17} \times 3^{12}$ 3^{29} (h) $\left(\frac{a^7}{a^5}\right)^4$ a^8
 (i) $d^8 \div d^6$ d^2 (j) $3^8 \div 3^4$ 3^4 (k) $\frac{6^9}{6^9}$ 1 (l) $a^4 \times a^8 \times a^2$ a^{14}
 (m) $m^{14} \div m^2$ m^{12} (n) $(ab^3c^2)^4$ $a^4b^{12}c^8$ (o) $\frac{x^4 \cdot x^6}{x}$ x^9 (p) $(2a^2b)^3$ $8a^6b^3$

5. Evaluate each of the following:

(a) $6^0 = 1$ (b) $1^{15} \times 1^4 \times 1^6 = 1$ (c) $\left(\frac{2}{5}\right)^3$ 0.064 or $\frac{8}{125}$

6. Evaluate:

(a) $3^2 + 4^2$ 25 (b) $(-5)^2 + (-12)^2$ 169
 (c) $-2^3 + 10^2$ 92 (d) $\left(\frac{2}{5}\right)^2 \times \left(-\frac{5}{8}\right)^2$ 0.0625 or $\frac{1}{16}$

7. Write each power of a power as a single power, then evaluate it.

(a) $(9^8)^0$ $9^0, 1$ (b) $[(-2)^4]^2$ $(-2)^8, 256$ (c) $-(3^2)^3$ $-(3^6), -729$

8. Write each expression as a power, then evaluate it.

(a) $3^3 \times 3^2$ $3^5, 243$ (b) $(-2)^4 \times (-2)^0$ $(-2)^4, 16$ (c) $5^{11} \div 5^{10}$ $5^1, 5$ (d) $10^8 \times 10^2 \div 10^6$ $10^4, 10000$

9. For each pair of powers, which power is greater?

i) 8^3 or 3^8 3^8 ii) 2^{10} or 10^2 2^{10} iii) 5^1 or 1^5 5^1

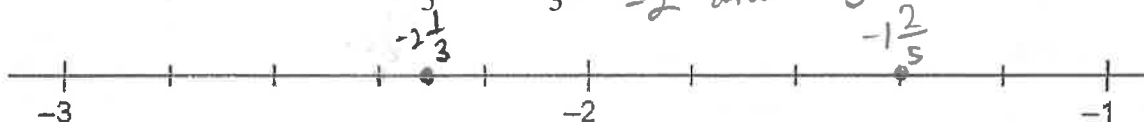
Chapter 3 – Rational Numbers

1. List 2 out of the 4 types of numbers that make up a rational number. Show an example of each.

Natural numbers, whole numbers, integers or fractions

2. Find 2 numbers that are between $-1\frac{2}{5}$ and $-2\frac{1}{3}$.

-2 and $-1\frac{4}{5}$



3. Write the following from least to greatest.

$-\frac{2}{5}$ 1.23 $1\frac{2}{9}$ -0.5 $-\frac{1}{2}$ 0.6
 $-\frac{1}{2}, -\frac{2}{5}, -0.5, 0.6, 1\frac{2}{9}, 1.23$

4. Determine each of the following:

(a) $\frac{3}{5} + \frac{-1}{3}$ $\frac{4}{15}$ (b) $\frac{-1}{4} + \frac{-2}{3}$ $-\frac{11}{12}$ (c) $\frac{1}{2} - \frac{7}{10}$ $-\frac{1}{5}$
 (d) $\frac{-3}{4} - \frac{1}{8}$ -0.875 (e) $\frac{5}{6} + \frac{4}{5}$ $\frac{49}{30}$ (f) $\frac{-1}{3} + \frac{11}{15}$ $\frac{2}{5}$
 (g) $2\frac{2}{3} - 1\frac{1}{2}$ $\frac{7}{6}$ (h) $-4\frac{1}{2} + 1\frac{3}{10}$ $-3\frac{1}{5}$ (i) $-3\frac{1}{3} - 2\frac{3}{4}$ $-6\frac{1}{12}$
 (i) $\frac{2}{5} \times \frac{3}{4}$ $\frac{3}{10}$ (j) $\frac{-3}{7} \times \frac{1}{6}$ $-\frac{1}{14}$ (k) $\frac{-5}{8} \cdot \left(\frac{-2}{3}\right)$ $\frac{5}{12}$

$$(l) \quad -3\frac{1}{3} \cdot 5\frac{1}{4} = -17\frac{1}{2}$$

$$(m) \quad \frac{-3}{4} \div \frac{1}{10} = -7\frac{1}{2}$$

$$(n) \quad 7\frac{1}{2} \div 3\frac{1}{3} = 2\frac{1}{4}$$

$$(o) \quad \frac{5}{8} \div \left(-6\frac{2}{3}\right) = -\frac{3}{32}$$

$$(p) \quad 15 \div 2\frac{2}{5} = 6\frac{1}{4}$$

4. Evaluate using BEDMAS:

$$(a) \quad \left(-\frac{3}{4}\right) + \frac{1}{3} \times \frac{1}{2} - \frac{11}{12} = -1\frac{1}{2}$$

$$(b) \quad \left(\frac{1}{2} + \frac{2}{5}\right)^2 - \frac{1}{5} \div 2\frac{1}{2} = \frac{73}{100}$$

Chapter 4 – Linear Relations

1. Use the words in the box to answer the following:

The coordinate plane has two number lines that intersect at a point called the origin. The horizontal number line is called the x-axis. The vertical number line is called the y-axis. The two axes divide the coordinate plane into four parts called quadrants. The location of a point on the graph is given using an ordered pair. The first number is the x-coordinate and the second number is the y-coordinate.

origin
x-coordinate
intercept
quadrants
coordinate
y-coordinate
x-axis
ordered pair
graph
y-axis

2. Find the coordinates of the indicated point:

(a) A (3, -4)

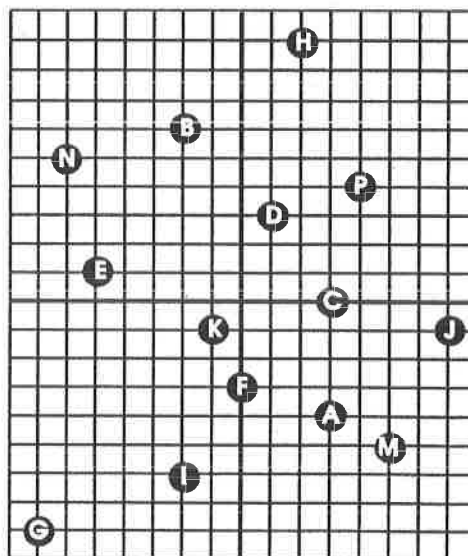
(b) I (-2, -6)

(c) H (2, 9)

(d) C (3, 0)

(e) E (-5, 1)

(f) N (-6, 5)



3. Write the next 3 values of y in each pattern. Then write an equation that shows the relationship between x and y .

(a)

x	1	2	3	4	5	6	7		30
y	11	13	15	17	19	21	23		69

$$y = 2x + 9$$

(b)

x	1	2	3	4	5	6	7		25
y	7	11	15	19	23	27	31		103

$$y = 4x + 3$$

4. Draw the next figure in the following pattern. Then write an equation that shows the relationship between the figure number (x) and the number of dots (y). Use your equation to find the number of dots in the 20th figure of the pattern.

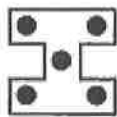


Figure 1

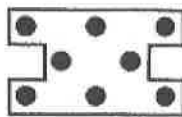


Figure 2

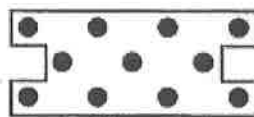


Figure 3



Figure 4

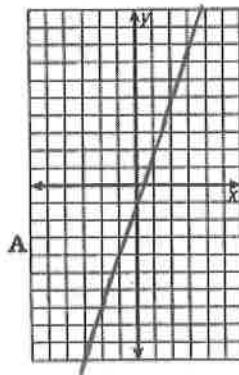
$$y = 3x + 2$$

62 dots in 20th

5. Complete the table then graph and draw a line through them.

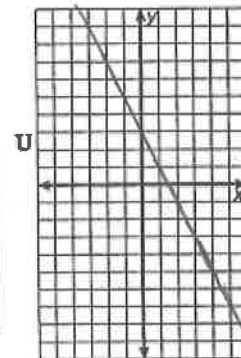
$$y = 3x - 1$$

x	y
3	8
2	5
-2	-7
0	-1



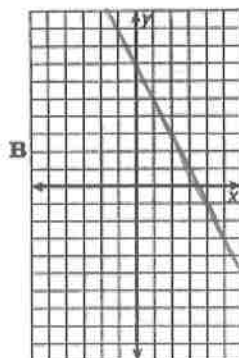
$$y = -2x + 3$$

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



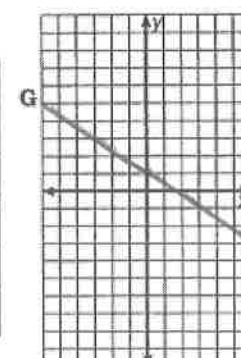
$$y = 7 - 2x$$

x	y
2	3
-1	10
5	-3
0	7



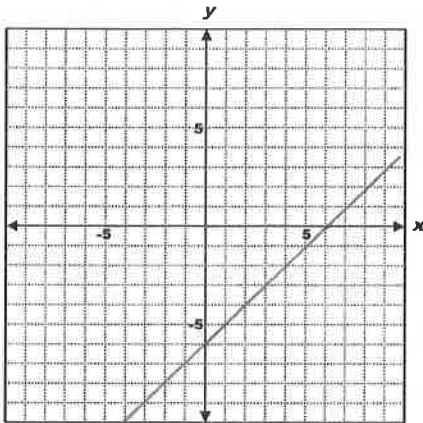
$$y = -\frac{2}{3}x + 1$$

x	y
6	-3
-6	5
3	-1
0	1

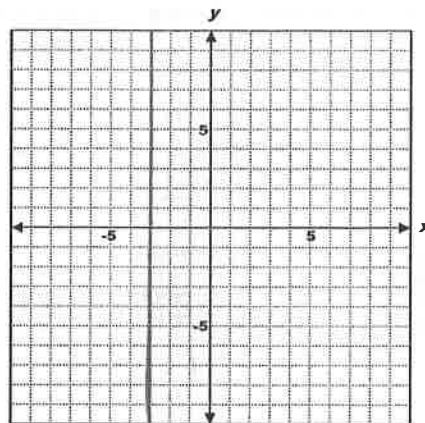


6. Graph each linear relation. You can create a table of values if needed.

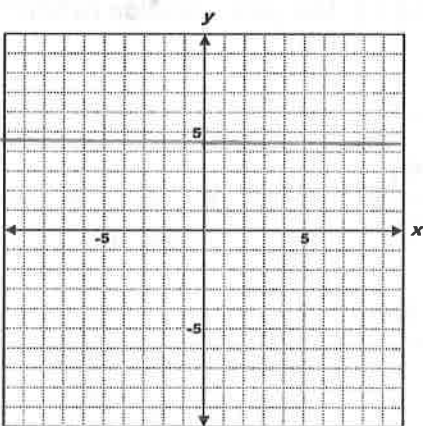
a) $y = x - 6$



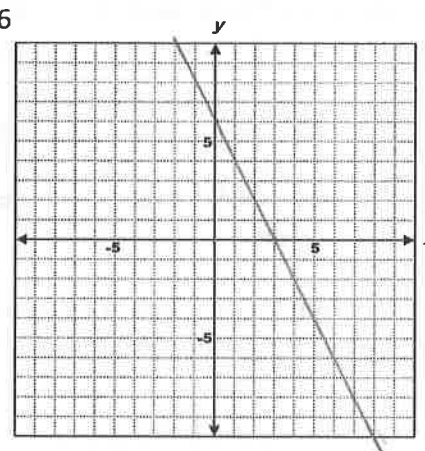
b) $x + 3 = 0$



c) $2y - 3 = 6$



d) $2x + y = 6$

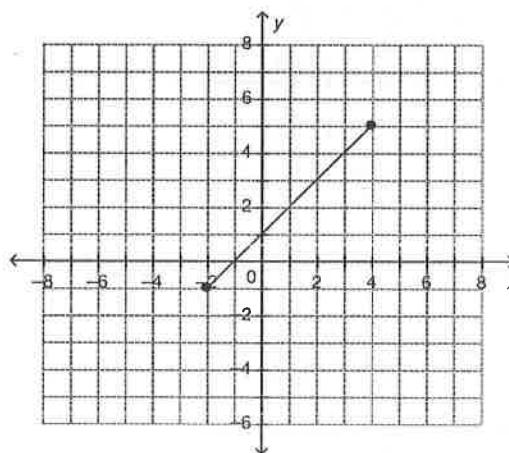


7. This graph represents a linear relation.

(a) When $x = 4$, $y = \underline{5}$

(b) When $x = -4$, $y = \underline{-3}$

(c) When $y = 8$, $x = \underline{9}$



8. A car travels at a constant speed. The graph shows how the distance of the car changes with time.

(a) Estimate the time it takes to travel 130 km.

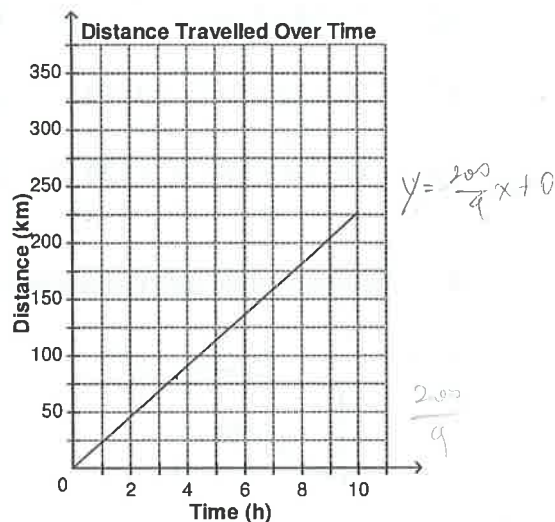
Around 5.8 hrs

(b) Estimate the time it take to travel 270 km.

Around 12.1 hrs

(c) Estimate the distance when the car travels for 3.5 hours.

Around 80 km



Chapter 5 – Polynomials

For the questions with algebra tiles; white = positive and shaded = negative

1. For each expression, state whether it is a monomial, binomial, or trinomial. Then, identify the polynomial degree.

	Type of polynomial	Degree
(a) $x^3 - 2x + 3$	trinomial	3
(b) $3y^2 - 9y$	binomial	2
(c) $11c - 14$	binomial	1
(d) 24	monomial	0

2. Use algebra tiles to model $-2x + 3x^2 - 5$. Sketch the tiles you used.

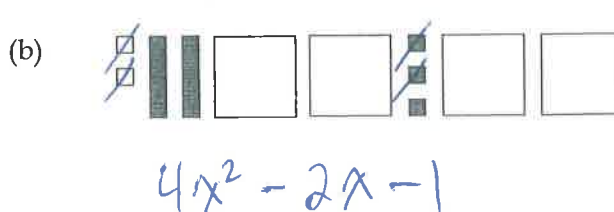
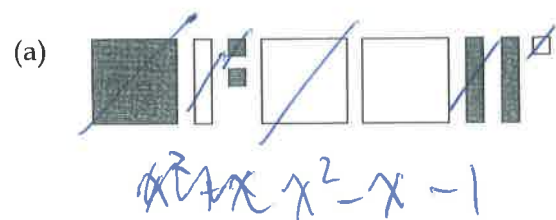
3. For the polynomial $-5x - 3x^4 + 5x^3 - 4$, identify the following:

Variable: x Degree: 4 Number of terms: 4

Write the polynomial in descending order:

$$-3x^4 + 5x^3 - 5x - 4$$

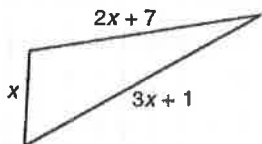
4. Write a polynomial expression in simplified form for the following algebra tiles.



5. Simplify by collecting like terms.

- (a) $3y+8-7y-1$ $-4y+7$ (b) $-4y-15-2y+2$ $-6y-13$ (c) $-19+9y-y+6$ $8y-13$
 (d) $7a+2b+5-5a+9b-1$ $2a+11b+4$ (e) $-3a-6b-10+8a-b-7$ $5a-7b-17$ (f) $20-15a+b+6+4a-4b$ $-11a-3b+26$
 (g) $6n^2+n+15+3n^2+12n+5$ $9n^2+13n+20$ (h) $3n^2+n+4+7n^2+9n+5$ $10n^2+10n+9$ (i) $20+8n+n^2+3n+8n^2+2n$ $9n^2+13n+20$

6. Determine a simplified algebraic expression for the perimeter of the figure:



$$6x+8$$

7. Add the polynomials.

- (a) $(5x-7)+(2x-3)$ $7x-10$ (b) $(-z^2-5z+2)+(-7z^2+2z)$ $-8z^2-3z+2$
 (c) $(6m+6)+(6m-6)$ $12m$ (d) $(2t^2-5)+(3t+6)$ $2t^2+3t+1$

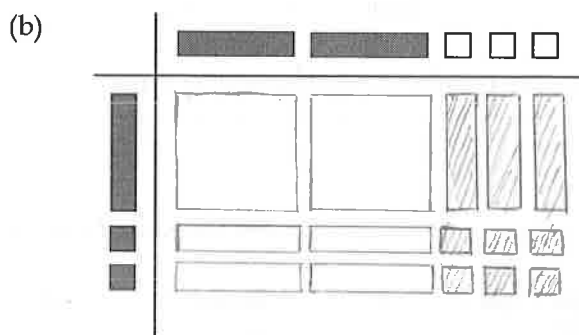
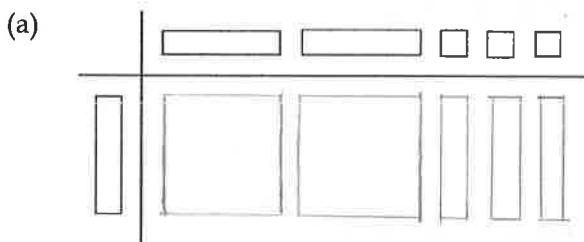
8. Subtract the polynomials.

- (a) $(2s-4)-(2s+3)$ -7 (b) $(-y^2+3y-2)-(-2y^2-2y)$ y^2+5y-2
 (c) $(4b+7)-(6b+8)$ $-2b-1$ (d) $(-3r^2-5)-(3r-2)$ $-3r^2-3r-3$

9. Use the distributive property to answer the following.

- (a) $2(x-3)$ $2x-6$ (b) $2(3x+2)$ $6x+4$ (c) $3(2x+4y+1)$ $6x+12y+3$
 (d) $-2(5x-2)$ $-10x+4$ (e) $3(x+2)+5x$ $8x+6$ (f) $3(x+y)+4(y+x)$ $7x+7y$

10. Fill in the missing algebra tiles for the following multiplication statements.



11. Expand each of the following using FOIL.

(a) $(x+2)(x+3)$
 $x^2 + 5x + 6$

(b) $(s-4)(s-6)$
 $s^2 - 10s + 24$

(c) $(t-5)(t+11)$
 $t^2 + 6t - 55$

(d) $(x+3)^2$
 $x^2 + 6x + 9$

(e) $(x+8)(x-8)$
 $x^2 - 64$

12. Divide each of the following expressions.

(a) $\frac{4x^2 - 6x + 8}{2}$ $2x^2 - 3x + 4$

(b) $\frac{9m^2 + 6m - 15}{-3}$ $-3m^2 - 2m + 5$

(c) $\frac{15x^2 - 20x}{5x}$ $3x - 4$

(d) $\frac{16m^3 + 20m^2 - 4m}{4m}$ $4m^2 + 5m - 1$

Chapter 6 – Equations and Inequalities

Solve each of the following equations:

1. $3n - 6 = 21$ 9

2. $7c + 6 = 34$ 4

3. $8 = \frac{k}{4} - 3$ 44

4. $\frac{m}{7} + 2 = -4$ -42

5. $15 + 9r - 2r = 1$ -2

6. $-10 = -n + 2 - 2n$ 4

7. $c + \frac{1}{6} = \frac{5}{3}$ $\frac{3}{2}$

8. $-3(2x - 1) = -21$ 4

9. $8 = -2(-3 - y)$ 1

10. $0 = -12 - 2(n - 3)$ -3

11. $-2(3n - 1) + 2n = 18$ -4

12. $3(1 - 2y) + y = -2$ 1

13. $7r - 5 = 2r + 5$ 2

14. $4a + 2 = 6a - 12$ 7

15. $2(p + 1) = 3(p - 1)$ 5

16. $4x + 5 = 2x + 3$ -1

17. $14 + 3c + 6 = 5 - 2c$ -3

18. $5(2f + 3) = 6f - 5$ -5

19. $2(4y - 3) = 3(2y + 4)$ 9

20. $5n - 6.4 = 3n + 2.6$ 4.5

21. $3(n - 2) - 19 = 5 + 2(n + 5)$ 40

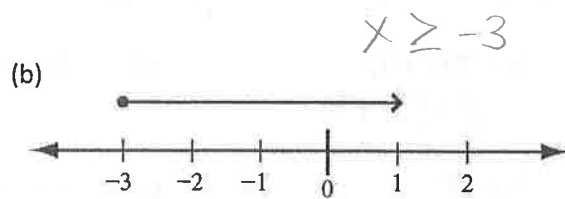
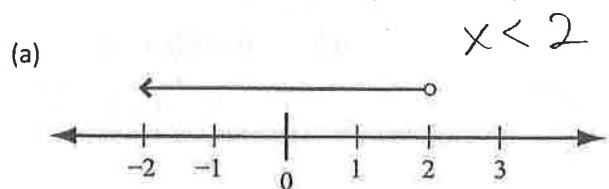
22. $2(a - 4) - 3(a - 2) = 4(a + 1) + 4$ -2

Solve each of the following equations. To eliminate the decimals, you can multiply by the appropriate power of 10 or solve "as is".

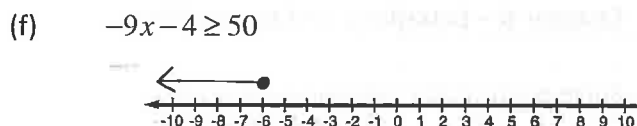
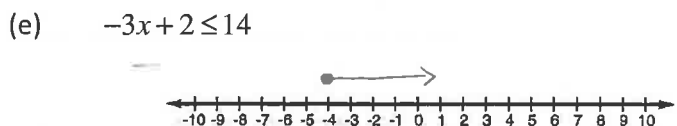
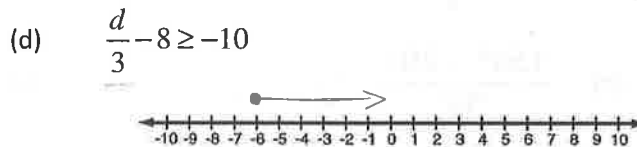
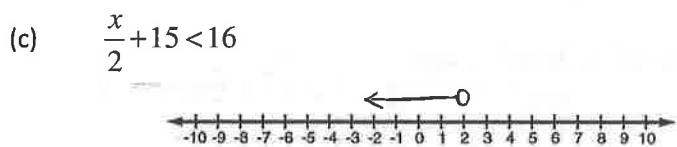
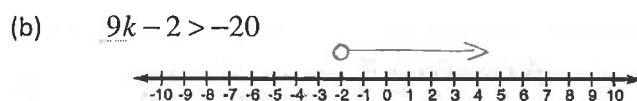
23. $5n - 6.4 = 3n + 2.6$
 4.5

24. $0.09x + 0.13(x + 10) = 20$
 85

25. State which inequality is represented by the number line.



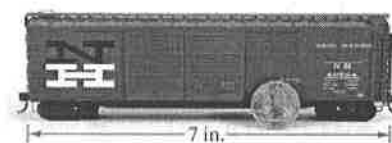
26. Solve each of the following inequalities. Graph the solution.



Chapter 7 – Similarity and Transformations

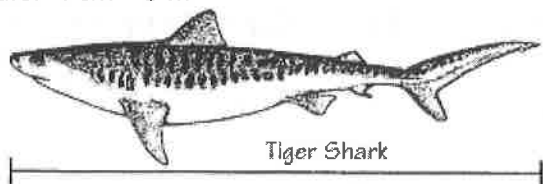
1. If the actual length of the boxcar is 609 inches, what is the scale factor used?

87



2. Measure each length to the nearest tenth. Then use the scale to find the actual length.

(a)
Scale: 4 cm = 3 m



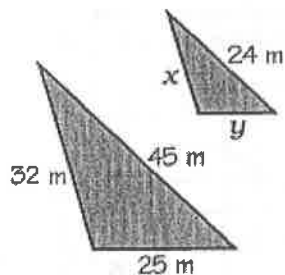
5.25m



4.5m

3. For each pair of similar figures, find the length of each side marked with a x and y .

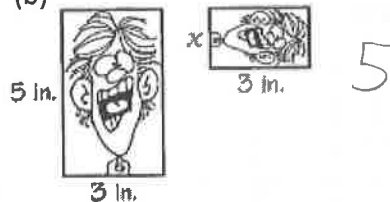
(a)



$$x = 60$$

$$y = 46.88$$

(b)



4. What is the scale factor of ABCD to EFGH?

Which side of EFGH corresponds to side CD?

Which side of ABCD corresponds to side GF?

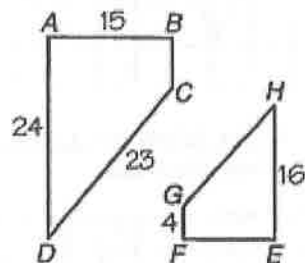
Which angle of EFGH corresponds to $\angle A$?

$$\frac{2}{3}$$

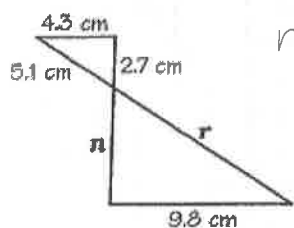
$$GH$$

$$BC$$

$$\angle E$$



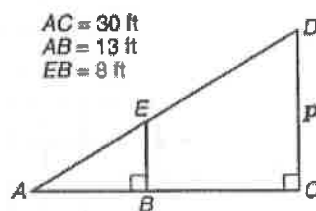
5. Determine the value of n and r .



$$n = 6.15$$

$$r = 11.62$$

6. Determine the value of p .



$$p = 18.46$$

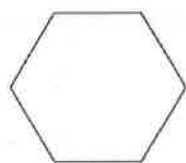
6. Which of the following letters has vertical line symmetry?

T U F

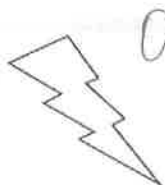
7. Which of the following letters has horizontal line symmetry?

D W B

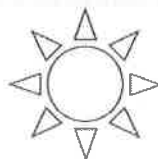
8. State the total number of lines of symmetry for each of the figures below.



6



0



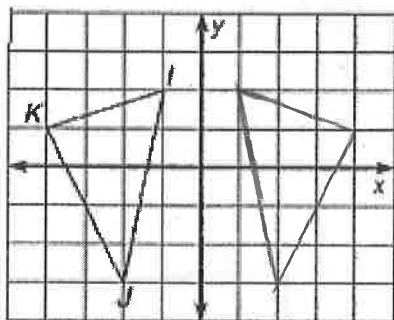
8

9. For each figure, write the order of turn symmetry and calculate the angle of rotation.

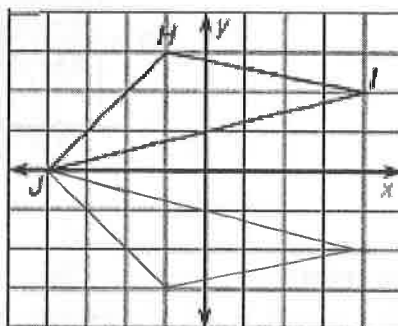


10. Perform the indicated reflection or rotation.

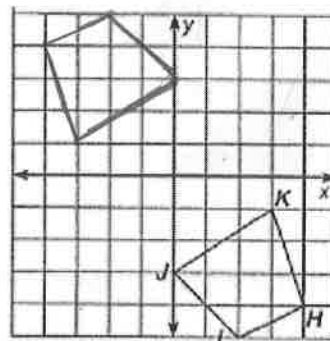
Reflect $\triangle IJK$ over the y -axis.



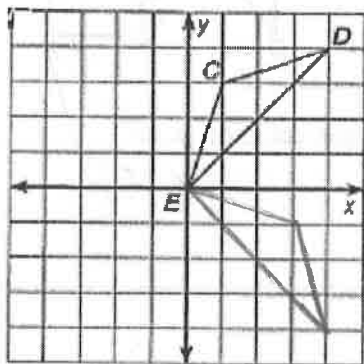
Reflect $\triangle HIJ$ over the x -axis.



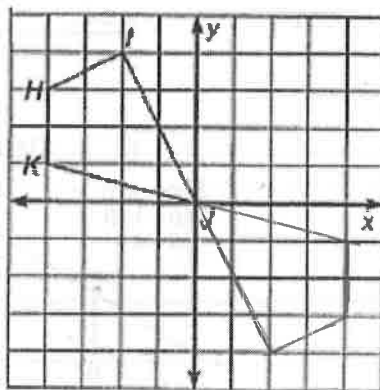
Reflect $\triangle HIJK$ over the x -axis, then that image over the y -axis.



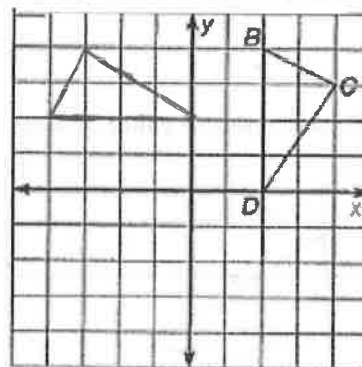
Rotate $\triangle CDE$ 90° clockwise about the origin.



Rotate $\triangle HIJK$ 180° about the origin.



Rotate $\triangle BCD$ 90° counter-clockwise about the origin.



Chapter 8 – Circle Geometry

1. Fill in the blanks with the most appropriate answer:

The points on a circle are all the same distance from the centre.

A line segment from the center to any point on a circle is called a radius.

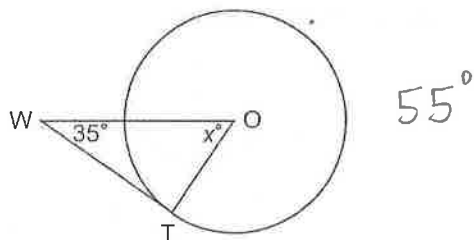
A line segment with both endpoints on a circle is called a chord.

A chord that passes through the center of a circle is called a diameter.

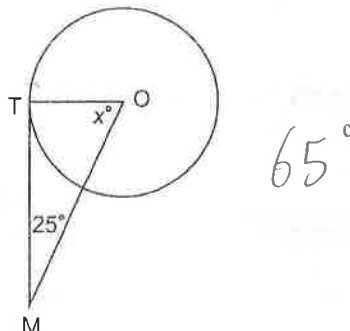
The length of a radius is half the length of a diameter.

2. Determine the measure of angle x° .

(a)

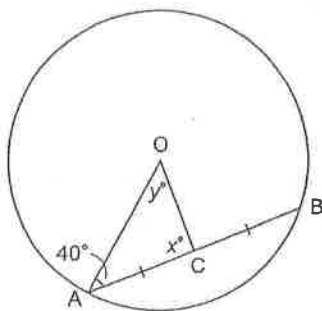


(b)



3. Determine the value of x° and y° .

(a)

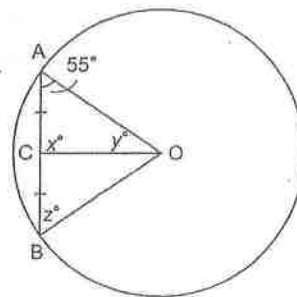


$$x^\circ = 90^\circ$$

$$y^\circ = 50^\circ$$

Determine the value of x° , y° and z° .

(b)



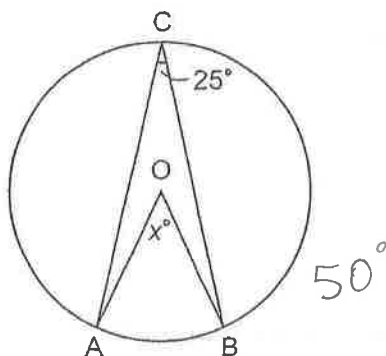
$$x^\circ = 90^\circ$$

$$z^\circ = 55^\circ$$

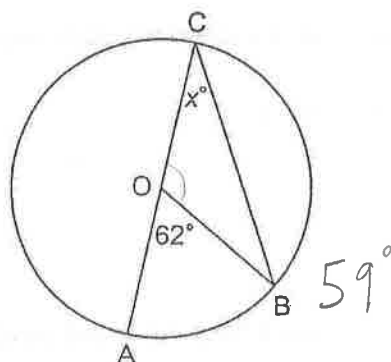
$$y^\circ = 35^\circ$$

4. Determine the value of x° .

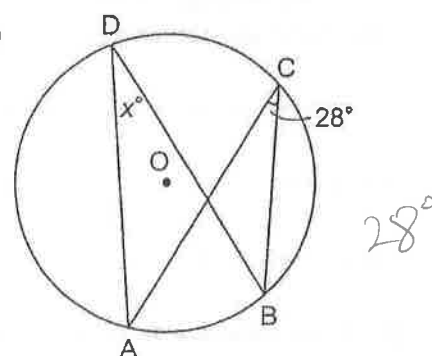
(a)



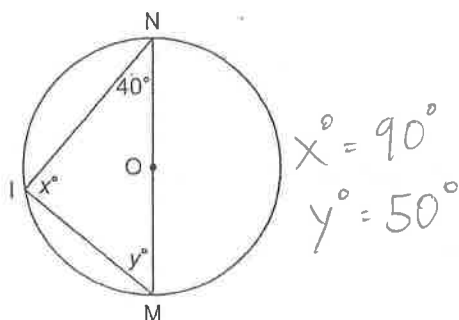
(b)



(c)



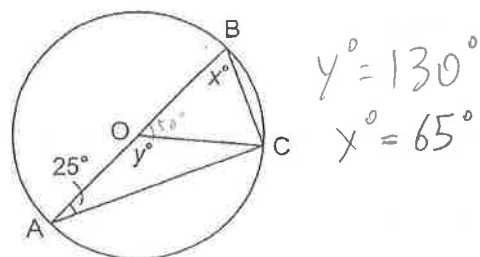
(d)



$$x^\circ = 90^\circ$$

$$y^\circ = 50^\circ$$

(e)



$$y^\circ = 130^\circ$$

$$x^\circ = 65^\circ$$

Chapter 9 - Statistics

1. For each survey question, circle any influencing factors in the question. Then, reword the question so it is free of any influencing factors.

(a) Do you prefer to drink watered down 1% milk or creamy and smooth 2% milk?

Do you prefer to drink 1% milk or 2% milk?

(b) Is the loud, heavy beat of rap music damaging to the human body?

(c) Do you like most people obey the speed limit?

Do you obey the speed limit?

2. For each situation, identify and describe any factors that may influence the collection of data.

- (a) An interest group surveys community residents about whether or not they would support a curfew for teens. The survey is being conducted the week after several incidents of vandalism at the high school were reported in the newspaper.
- (b) The coach of a baseball team needs drivers with good safety records to transport players to tournaments. She asks each parent at a parent meeting if they had any traffic violations in the last six months.

3. For each situation:

- Identify the population.
- Decide if you would survey the population or a sample. Justify your choice.

(a) Determine the reliability of a new cell phone.

Population:

Census or Sample:

(b) Determine the amount of time that grade 9 students spend on physical activity in a week.

Population:

Census or Sample:

4. Identify the sampling method as simple random, stratified, clustered, or systematic in the following:

(a) Ask every fourth person on a list of students at Burnaby South:

(b) ask all grade 10 students at Burnaby South:

(c) Pick two people to phone from each page of the telephone book: