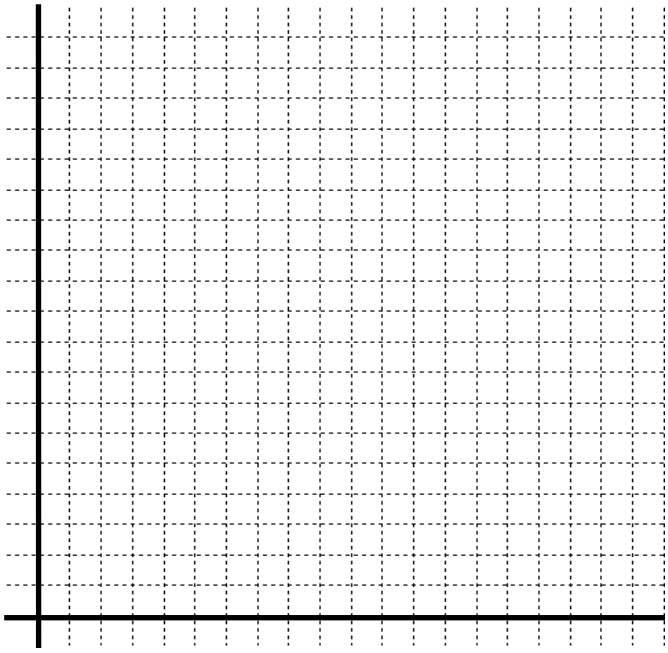
FINAL EXAM REVIEW

CHAPTER 2

1. This table shows the lengths of five boats and the number of passengers each one can carry

Length (feet)	17	19	21	23	25
Capacity (passengers)	6	8	10	11	13

(a) Create a **scatter plot** of the data



(b) Describe the relationship between the **length of the boat** and **passenger capacity**

(c) Estimate the number of passengers that a **20 foot boat** can carry _____

* This method is called _____

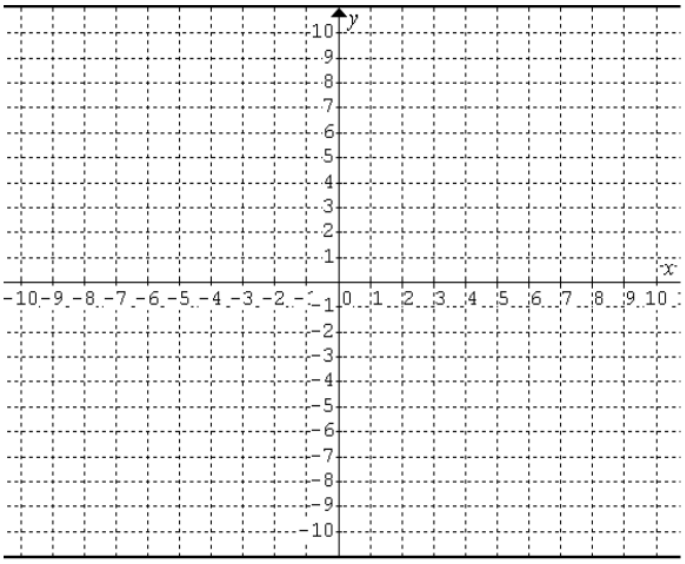
(d) Estimate the number of passengers that a **29 foot boat** can carry _____.

* This method is called _____

2. Graph each set of a points on a grid. For all *linear* relationships, draw a **line of best fit**. For all *non-linear* relationships, draw a **curve of best fit**

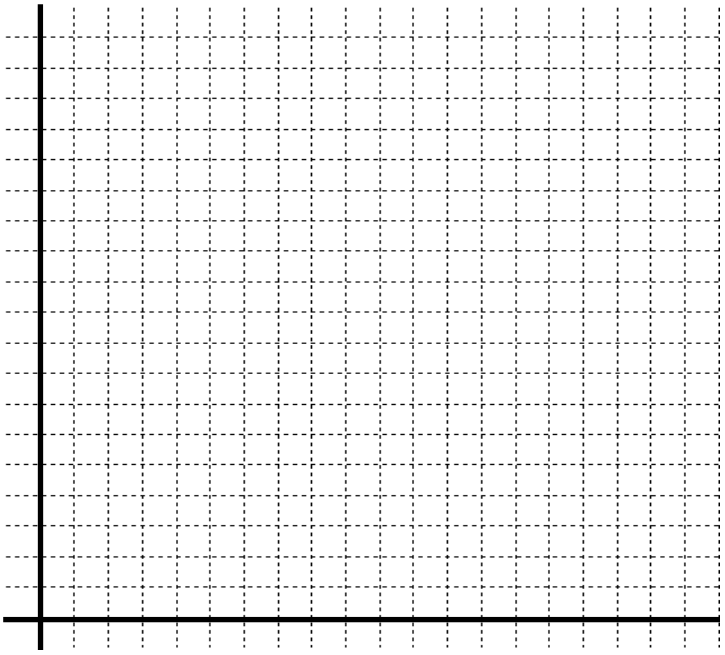
(a)

x	–3	–1	2	1	–5	–2	0	–4
y	0	2	5	4	–2	1	3	–1



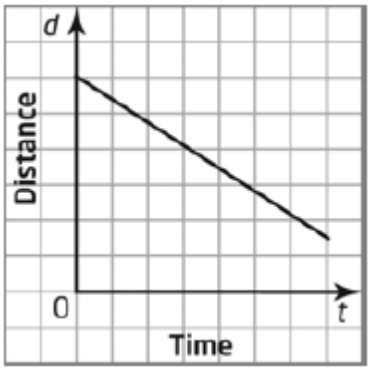
(b)

Time (days)	0	1	2	3	4	5
Height (cm)	0.2	0.4	0.8	1.2	2.0	2.6

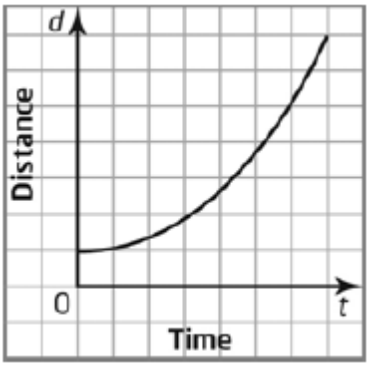


3. Describe the motion in each distance-time graph

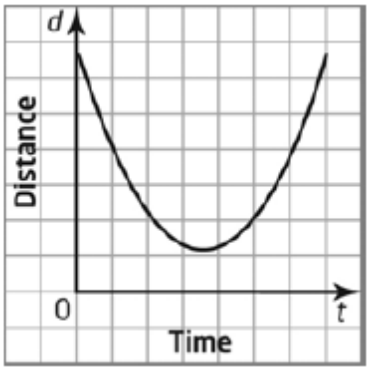
(a)



(b)



(c)



CHAPTER 3

1. Evaluate the following:

(a) 5^3 (b) $(-2)^6$ (c) $\left(\frac{3}{4}\right)^3$

(d) $(-2)^5$ (e) -2^5

2. Use the **exponent laws** and express each as a **single base** and then **evaluate**

(a) $2^5 \times 2^3$
= 28
= **256**

(b) $3^4 \times 3^2$

* (c) $4^3 \times 4^7 \times 4$

(d) $5^5 \div 5^2$

(e) $6^7 \div 6^5$

* (f) $7^9 \div 7^5 \div 7$

(g) $[(5)^3]^2$

(h) $[(-3)^2]^3$

(i) $\frac{(5^4)^3}{5^5 \times 5^4}$

3. Simplify the following:

(a) $a^5b^4 \times a^3b^2$

(b) $\frac{d^6 \times d^5}{d^7}$

(c) $\frac{(y^6)^3}{(y^5)^2}$

4. Identify the **coefficient** and **variable** part of each term

	COEFFICIENT	***VARIABLE***
(a) $6x$	6	x
(b) $-5y$		
(c) 7		
(d) $4a^5b^3$		
(e) dm		

5. In a hockey tournament, teams are awarded **4 points** for a win and **2 points** for an overtime win.

(a) If **P** represents the **total number of points**, **w** represents the **number of wins** and **t** represents the **number of wins by overtime**, write an expression which represents this scenario

_____

(b) Using the expression from (a), calculate the **total number of points** if a team has **5 wins** and **3 overtime** wins

6. State the **degree** of each term

	DEGREE
(a) $5x^4$	4
(b) $-7m^5$	
(c) a^3b^2c	
(d) 5	

7. Complete the table below for each polynomial

	TERM WITH THE HIGHEST DEGREE	***DEGREE***
(a) $5x + 4$	$5x$	1
(b) $3y^4 – 2$		
(c) $5m^2 – 3m + 7$		
(d) $6a^3 – 5a^2 + 4a – 3$		

8.. Simplify the following by **collecting like terms**

(a) $3x + 5y + 4x + 6y$
$= 3x + 4x + 5y + 6y$
$=$ **$7x + 11y$**

(b) $5d + 3m – 4d – 5m$

(c) $2a^2 – 5a + 3 – a^2 + 2a – 6$

(d) $4d – 8e – 6f + 3d + 5e – 10f$

9. Simplify the following by using the **distributive property** and **collecting like terms**

(a) $(5x + 3) + (6x – 4)$
$= 5x + 3 + 6x – 4$
$= 5x + 6x + 3 – 4$
$=$ **$11x – 1$**

(b) $(4x – 2) + (7x – 6)$

(c) $(5y – 3) + (4y – 2)$

(d) $(6x + 3) + (7x – 2) + (9x + 4)$

(e) $(7x - 2) - (5x + 3)$

(f) $(8x + 4) - (6x - 9)$

(g) $(4m^2 - 3m) - (m^2 + m)$

(h) $(6a + 8b) + (3a - 4b) - (5a - 3b)$

10. Expand the following using the **distributive property**

(a) $5(x + 2)$
= **$5x + 10$**

(b) $7(x - 3)$

(c) $-4(y - 3)$

(d) $2m(m + 4)$
= **$2m^2 + 8m$**

(e) $3m(4m - 5)$

(f) $-4g(2g - 3)$

11. Expand the following using the **distributive property** and simplify by **collecting like terms**

(a) $4(2x + 3y) + 5(3x + 6y)$

(b) $3(4y - 2w) - 3(2y + 1)$

(c) $4(3a + 2b) + 3(2a - 3b) - (a + 2b)$

CHAPTER 4

1. Solve for **x** for each of the following using **opposite operations**

(a) $x + 5 = 9$

$x = 9 - 5$

$x = 4$

(b) $f - 7 = 3$

(c) $8 + g = -11$

(d) $\frac{3h}{3} = \frac{15}{3}$

$h = 5$

(e) $-5x = 30$

(f) $-6f = -42$

(g) $\frac{k}{4} = 3$

$4\left(\frac{k}{4}\right) = 4(3)$

$k = 12$

(h) $\frac{x}{7} = -4$

(i) $\frac{x}{-9} = -5$

2. Solve for **x** for the following equations using **two-step solutions**

(a) $2x + 5 = 11$

$2x = 11 - 5$

$\frac{2x}{2} = \frac{6}{2}$

$x = 3$

(b) $3y - 4 = -16$

(c) $4 + 6w = -2$

3. Solve for **x** for each of the expressions and use a **left and right side check** to verify your solution

(a) $5x + 2 = 12$ Check:

(b) $3p + 8 = 5$ Check:

4. Solve for **x** for each expression

(a) $5x + 4 = 2x + 13$ (b) $4x - 3 = 2x + 5$

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

5. Solve for **x** for each expression

(a) $\frac{x+3}{2} = 5$ (b) $\frac{b-5}{7} = 3$ * (c) $6 = \frac{2}{3}m - 2$

6. Solve for **x** for each expression

(a) $\frac{x-5}{3}=\frac{x+4}{4}$ (b) $\frac{x+5}{3}=\frac{x-3}{5}$ * (c) $\frac{3(x-2)}{4}=\frac{2(x+1)}{3}$

(d) $\frac{3(x+2)}{5}=\frac{x-3}{2}$

7. Rearrange each formula to isolate the variable indicated

(a) F = ma, for *m* (b) V = IR, for *I* (c) $A = \pi r^2$, for *r*

$\frac{F}{a} = \frac{ma}{a}$

$\frac{F}{a} = m$

8. The total of three cousins ages is **48**. Hannah is **twice as old** as Sam and Joey is **4 years younger** than Sam. Complete the table below and determine the age of each cousin

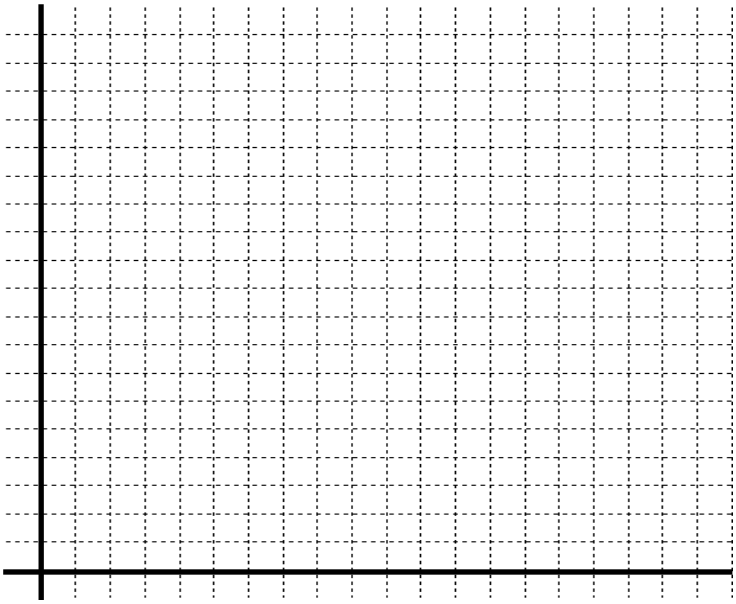
Cousin	***Variable/expression***	***Age***
Sam		
Hannah		
Joey		
Sum of their ages		

CHAPTER 5

1. Samir works during the weekends at a restaurant. He earns **$10 per hour**. His pay varies directly with the time, in hours.

(a) Complete the table below and graph the relationship

# of Hours	*Total pay*
0	
1	
2	
3	
4	
5	



(b) Write the equation in the for **y = kx**. _____

This is an example of _____ variation

2. Identify each relation as **direct *y = kx)** or **partial (y = mx + b)** variation

RELATION	*DIRECT or PARTIAL VARIATION*
(a) y = 3x	
(b) y = 4x + 1	
(c) C = πd	
(d) C = 15h +30	

3. (a) Complete the table below

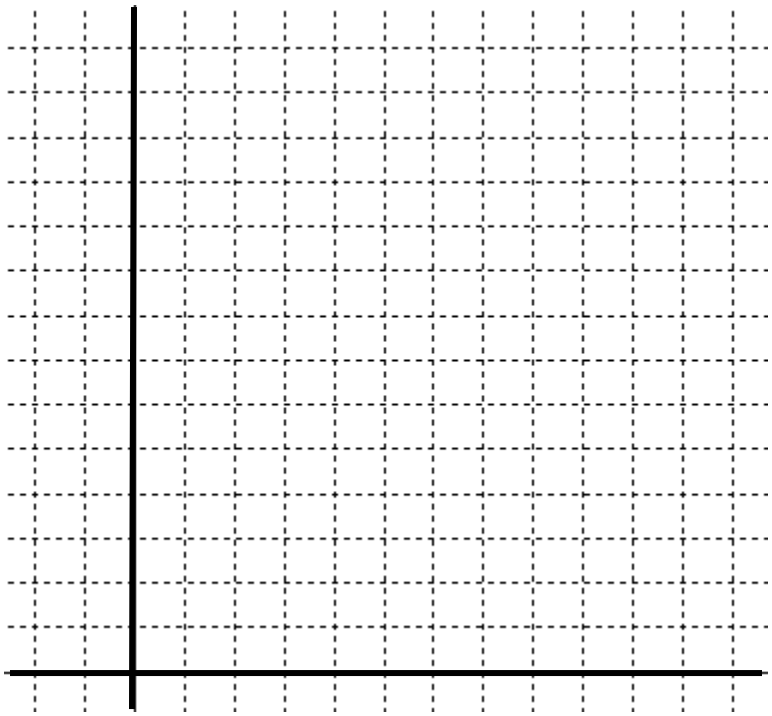
x	*y*
– 1	1
0	5
1	9
2	
3	
	25

(b) Identify the **initial value** _____

Identify the **constant of variation** _____

(c) Write the equation in the form **y = mx + b** _____

(d) Graph the relation



4. A company is having business cards printed. The cost to design the business card is **$25**. There is an additional charge of **$0.02 per business card** printed

(a) Identify the **fixed cost** _____

Identify the **variable cost** _____

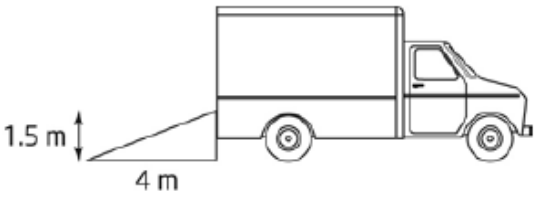
(b) Write an equation for this relationship in the form **y = mx + b**

_____

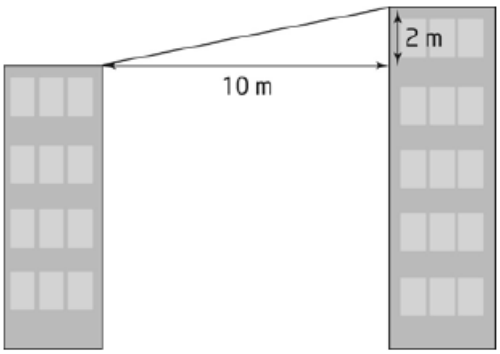
(c) Using your equation from (c), determine the total cost if **500 business cards** are printed

5. Determine the **slope** of each object

(a)



(b)



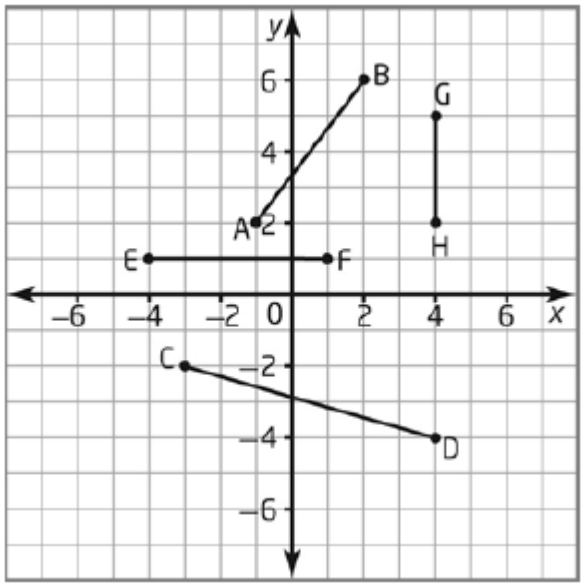
6. Calculate the **slope** of each line segment

AB =

CD =

EF =

GH =



7. Use **first differences** to determine whether each relation is **linear** or **non-linear**

(a)

x	*y*	*1st Differences*
0	5	
1	11	
2	17	
3	23	
4	29	
5	35	

Linear or non-linear? _____

(b)

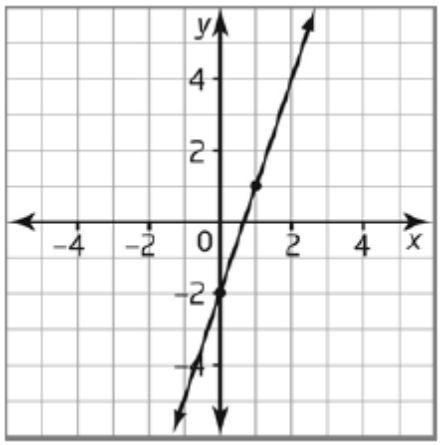
x	*y*	*1st Differences*
0	4	
1	6	
2	10	
3	16	
4	24	
5	32	

Linear or non-linear? _____

CHAPTER 6

1. For each graph, determine the **slope**, **y-intercept** and **equation of the line** in the form **y = mx + b** (where applicable)

(a)

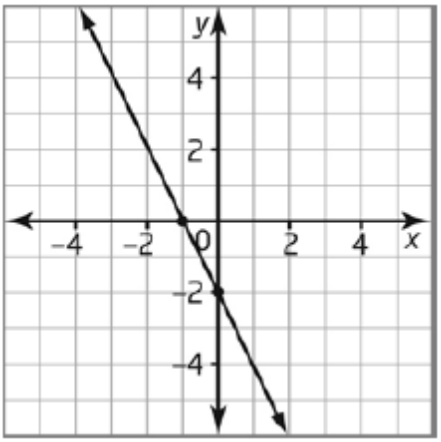


Slope =

y-intercept =

Equation:

(b)

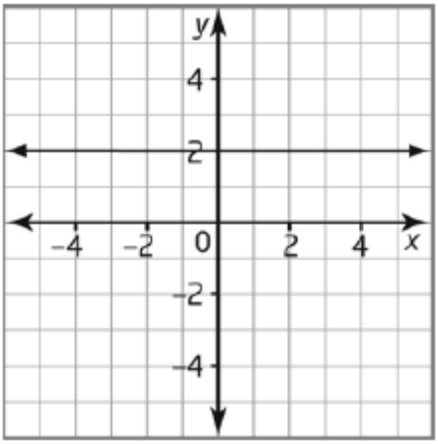


Slope =

y-intercept =

Equation:

* (c)

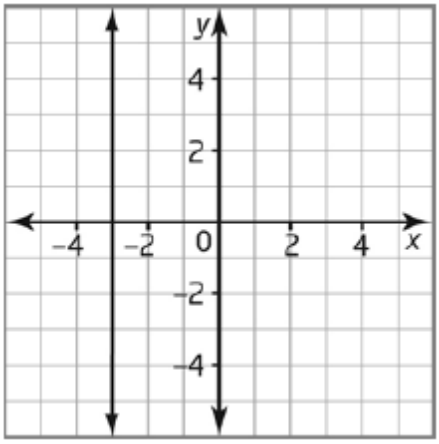


Slope =

y-intercept =

Equation:

** (d)



Slope =

y-intercept =

Equation:

2. For each equation, identify the **slope** and **y-intercept** (where applicable)

(a) y = 4x + 2 slope = _____ y-intercept = _____

(b) $y = -\frac{5}{6}x + 4$ slope = _____ y-intercept = _____

(c) y = – 5 slope = _____ y-intercept = _____

* (d) x = 3 slope = _____ y-intercept = _____

3. Write the **equation of a line** for each *slope* and *y-intercept*. Then graph the line on the grid provided

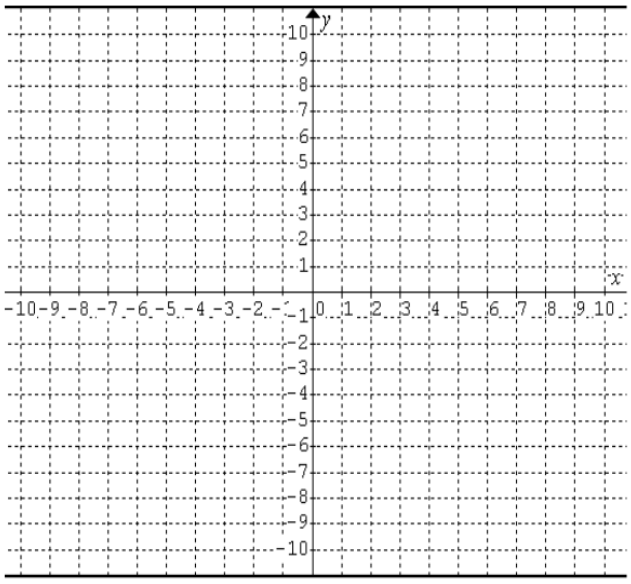
(a) m = 2, b = – 3 Equation: _____

(b) m = $\frac{-2}{5}$, b = 1 Equation: _____

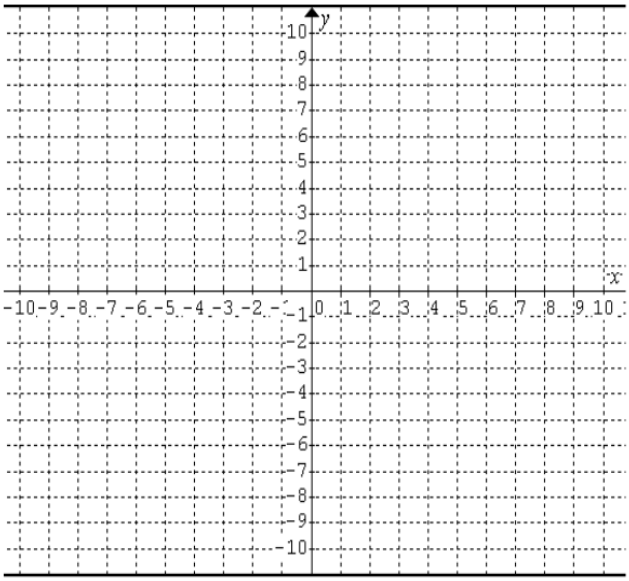
* (c) m = 0, b = 4 Equation: _____

** (d) m = undefined, b= none, x-intercept = 2 Equation: _____

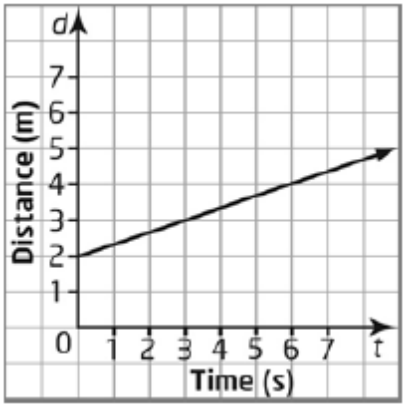
Graphs for **(a)** and **(b)**



Graphs for **(c)** and **(d)**



4. The distance-time graph shows a person's movement in front of a motion sensor



(a) Identify the **slope** _____. What does this represent?

Identify the **d-intercept** _____. What does this represent?

(b) Write an equation in the form **d = mt + b** _____

5. Rewrite each equation in the form **y = mx + b**

(a) $3x + y - 4 = 0$ (b) $2x - y + 9 = 0$

(c) $6x - 3y + 18 = 0$ (d) $2x + 5y - 10 = 0$

6. An electrician charges according to the equation **35n – C + 50 = 0**, where **C** represents the **total charge (in dollars)** and **n** represents the **time (in hours)** for a job to be completed

(a) Rearrange the equation to express it in the form **C = mn + b**

(c) Identify the **slope** _____. What does it represent in this scenario?

Identify the **C-intercept**. _____. What does it represent in this scenario?

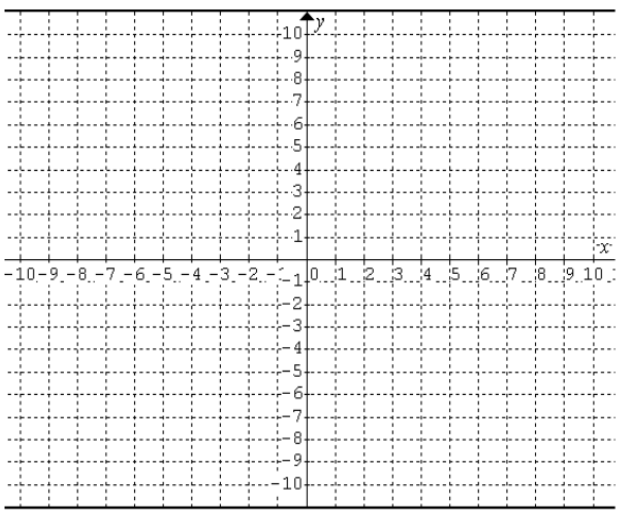
(d) How much would it cost if the electrician worked for **4 hours**?

7. For each equation, determine the **x and y-intercepts** of each line. Graph the line

(a) 4x + 5y = 20

x-intercept:

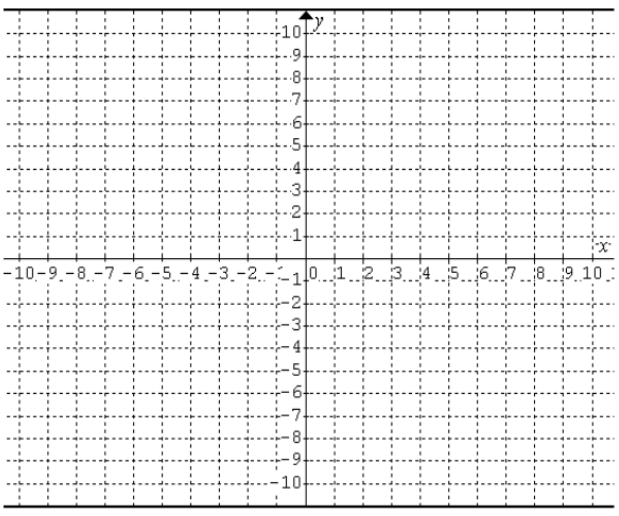
y- intercept:



(b) 2x – 3y = 6

x-intercept:

y-intercept:



8. Determine the equation for a line with a **slope of** $\frac{3}{5}$ and passes through the point **(10, 7)**

9. Find the equation of a line **parallel** to **y = 2x – 5** and passes through the point **(– 3, 11)**

10. Find the equation of a line **parallel** to **4x + 5y + 10 = 0** and has an **x-intercept of 5**

11. Find the equation of a line **perpendicular** to **y = 3x + 7** and passes through the point **(– 6, 13)**

12. Find the equation of a line passing through the given points

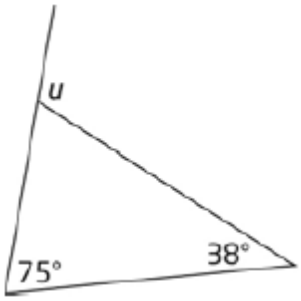
(a) A(1, 6) and B(2, 10)

(a) A(– 3, 4) and B(2, – 11)

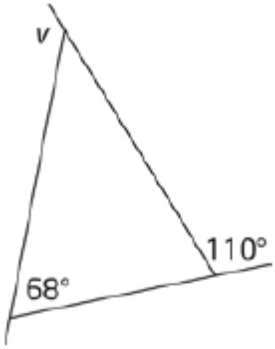
CHAPTER 7

1. Calculate the measure of each unknown angle

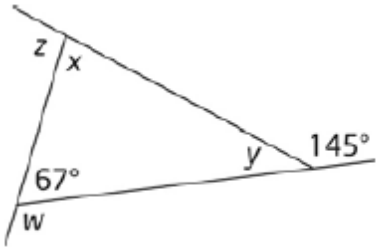
(a)



(b)

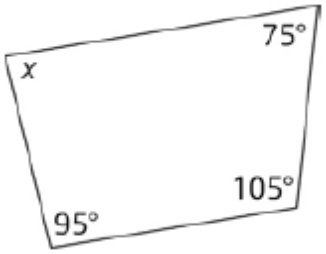


(c)

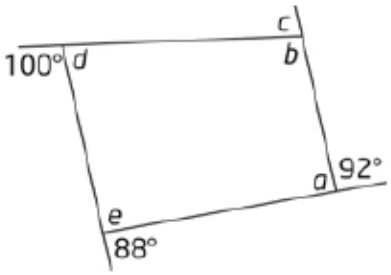


2. Calculate the measure of each unknown angle

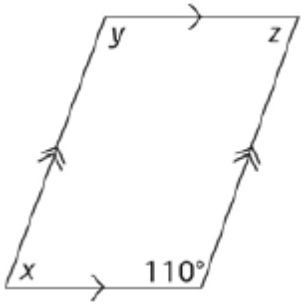
(a)



(b)



(c)



3. Complete the table below for each polygon

Formula for Sum of Interior angles: _____

# of sides	*Sum of interior angles*	*Measure of each angle*
(a) Pentagon (5 sides)		
(b) Heptagon (7 sides)		
(c) Undecagon (11 sides)		

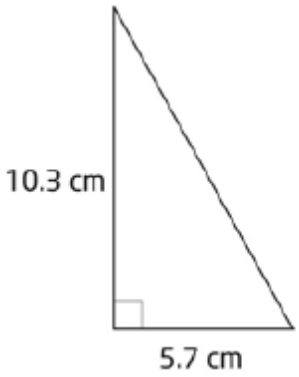
4. Determine **how many sides** a polygon has if the *sum of its interior angles* is

(a) 1080° (b) 1260° (c) 1980°

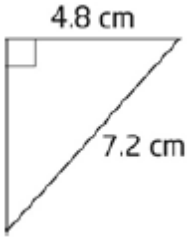
CHAPTER 8

1. Use the **Pythagorean Theorem** to solve for the length of the unknown side

(a)



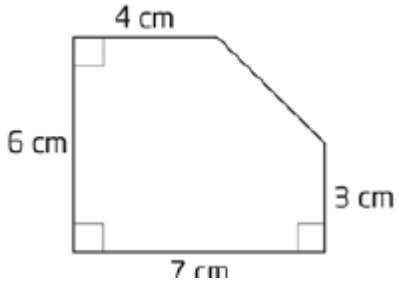
(b)



2. A ladder measuring **8 m** is leaning against a vertical wall. The top of the ladder is **7 m** up on the wall. Calculate the distance **from the wall** to the **foot of the ladder**.

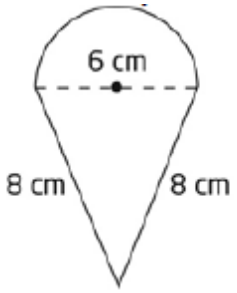
3. Calculate the **perimeter** and **area** of the picture below

PERIMETER



AREA

4. Calculate the **perimeter** and **area** of the picture below

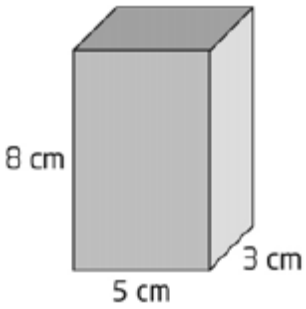


PERIMETER

AREA

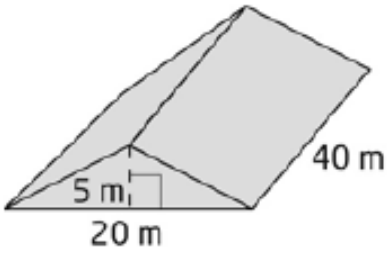
5. Calculate the **surface area** of each object

(a)



(b)

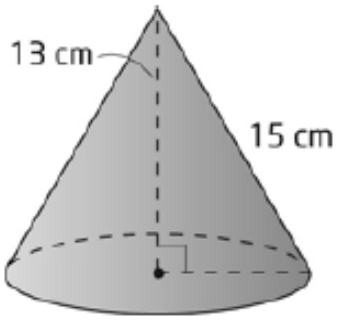
6. (a) Calculate the **volume** of the greenhouse pictured



(b) Calculate the **surface area** of the greemhouse

7. A *cylindrical* paint can holds **3.73 L** and has a **radius of 8.4 cm**. Calculate the **height** of the can. Note: 1L = 1000 cm^3.

8. (a) Calculate the **radius** of the cone pictured



(b) Calculate the **surface area** of the cone pictured

9. (a) Calculate the **volume** of a tennis ball with a **diameter of 8 cm**

(b) The tennis ball in (a) is packaged so that it fits inside a *cube* shaped box. Calculate the **volume of the empty space**

CHAPTER 9

1. A mirror is to have an **area of 4 m^2**. What are the **dimensions** of the mirror to *minimize* the amount of framing required to go around the outside?

2. A rectangular dance floor is enclosed with **160 m** of metal fencing

(a) What are the **dimensions** of the metal fence if **4 sides** of the floor are enclosed? What is the **maximum area**?

(b) What are the **dimensions** of the metal fence if **3 sides** of the floor are enclosed? What is the **maximum area**?

3. A rectangular parking lot is to have an area of **800 m^2**. The parking lot is surrounded by a chain-link fence. What are the **dimensions** of the parking lot if **4 sides** are surrounded?

4. Sea salt is packaged in a plastic-coated *square-based prism* box with a capacity of **802.125 mL**. Determine the **dimensions** of the box that requires the *minimum* amount of material. Express your answer in **cm**. Note: 1 mL = 1 cm^3

5. What are the **dimensions** of the *square-base prism* box with a *maximum volume* that can be made from **2000 cm^2** of cardboard?

SOLUTIONS

CHAPTER 2

1. (b) As length increases, capacity increases

   (c) 9, interpolation (d) 16, intrapolation

2. (a) Linear (b) Non-Linear

3. (a) Constant speed, towards (b) Increasing speed, away

   (c) Decreasing speed, towards then increasing speed, away

CHAPTER 3

1. (a) 125 (b) 64 (c) 27 / 64

   (d) 32 (e) – 32

2. (b) 729 (c) 4 194 304 (d) 125

   (e) 36 (f) 343 (g) 15 625

   (h) 729 (i) 125

3. (a) a^8b^6 (b) d^4 (c) y^8

4.

	COEFFICIENT	***VARIABLE***
(a) 6x	6	x
(b) – 5y	– 5	Y
(c) 7	7	None
(d) $4a^5b^3$	4	a, b
(e) dm	1	d, m

5. (a) $P = 4w + 2L$ (b) 26

6.

	DEGREE
(a) $5x^4$	4
(b) $-7m^5$	5
(c) a^3b^2c	6
(d) 5	0

7.

	TERM WITH THE HIGHEST DEGREE	***DEGREE***
(a) $5x + 4$	$5x$	1
(b) $3y^4 - 2$	3y4	4
(c) $5m^2 - 3m + 7$	$5m^2$	2
(d) $6a^3 - 5a^2 + 4a - 3$	$6a^3$	3

8. (b) $d - 2m$ (c) $a^2 - 3a - 3$ (d) $7d - 3e - 16f$

9. (b) $11x - 8$ (c) $9y - 5$ (d) $22x + 5$

(e) $2x - 5$ (f) $2x + 13$ (g) $3m^2 - 4m$

(h) $4a + 7b$

10. (b) $7x - 21$ (c) $-4y + 12$ (e) $12m^2 - 15m$

(f) $-8g^2 + 12g$

11. (a) $23x + 42y$ (b) $6y - 6w - 3$ (c) $17a - 3b$

CHAPTER 4

1. (b) 10 (c) – 19 (e) – 6 (f) 7

   (h) – 28 (i) 45

2. (b) – 4 (c) – 1

3. (a) 2 (b) – 1

4. (a) 3 (b) 4 (c) 2

5. (a) 7 (b) 26 (c) 12

6. (a) 32 (b) – 17 (c) 26 (d) – 27

7. (b) $\frac{V}{R} = I$ (c) $\sqrt{\frac{A}{\pi}} = r$

8. Sam = 13 years old, Hannah = 26 years old, Joey = 9 years old

CHAPTER 5

1. (b) y = 10x, direct

2. (a) Direct (b) Partial (c) Direct (d) Partial

3. (a)

x	***y***
– 1	1
0	5
1	9
2	13
3	17
5	25

   (b) Initial value = 5, k = 4 (c) y = 4x + 5

4. (a) Fixed = $25, Variable = $0.02 (2 cents) per card

(b) y = 0.02x + 25 (c) $35

5. (a) 0.375 (b) 0.2

6. AB = 4 / 3, CD = – 2 / 7, EF = 0, GH = undefined

7. (a) Linear (b) Non-linear

CHAPTER 6

1. (a) slope = 3, y-intercept = – 2, Equation: y = 3x – 2

(b) slope = – 2, y-intercept = – 2, Equation: y = – 2x – 2

(c) slope = 0, y-intercept = 2, Equation: y = 2

(d) slope = undefined, y-intercept = none, x-intercept = – 3
Equation: x = – 3

2. (a) slope = 4, y-intercept = 2 (b) slope = – 5 / 6, y-intercept = 4

(c) slope = 0, y-intercept = – 5

(d) slope = undefined, y-intercept = none (x-intercept = 3)

3. (a) y = 2x – 3 (b) $y = \frac{-2}{5}x + 1$ (c) y = 4

(d) x = 2

4. (a) Slope = 0.33 m/s, person travels 0.33 metres per second

d-intercept = 2 m, starting distance is 2 metres

5. (a) y = – 3x + 4 (b) y = 2x – 9 (c) y = 2x + 6

(d) $y = \frac{-2}{5}x + 2$

6. (a) C = 35n + 50

(b) $35, costs $35 per hour; 50, initial fee is $50 (c) $190

7. (a) x-intercept = 5, y-intercept = 4

(b) x-intercept = 3, y-intercept = 2

8. $y = \frac{3}{5}x + 1$

9. y = 2x + 17

10. $y = \frac{-4}{5}x + 4$

11. $y = \frac{-1}{3}x + 11$

12. y = – 3x – 5

CHAPTER 7

1. (a) 113° (b) v = 138°

(c) w = 113°. x = 78°, y = 35°, z = 102°

2. (a) 85° (b) a = 88°, b = 100°, c = 80°, d = 80°, e = 92°

(c) x = 70°, y = 110°, z = 70°

3. (a) 540°, 108° each (b) 900°, 128.6° each

(c) 1620°, 147.3° each

4, (a) 8 (b) 9 (c) 13

CHAPTER 8

1. (a) 11.8 cm (b) 5.4 cm

2. 3.9 m

3. Perimeter = 24.2 cm, Area = 37.5 cm^2

4. Perimeter = 25.4 cm, Area = 36.3 cm^2

5. (a) 158 cm^2 (b) 8734 mm^2

6. (a) 2000 m^3 (b) 1796 m^2

7. 16.8 cm

8. radius = 7.5 cm, surface area = 530.1 cm^2

9. (a) 268.1 cm^3 (b) 243.9 cm^3

CHAPTER 9

1. 2m x 2m

2. (a) 40m x 40m, 1600m^2 (b) 40m x 80m, 3200 m^2

3. 28.3 m x 28.3 m

4. 9.3 m x 9.3 m x 9.3 m

5. 18.3 cm x 18.3 cm x 18.3 cm