

**FINAL EXAM REVIEW – CHAPTER 3****3.1 – SLOPE AS A RATE OF CHANGE**

1. Complete the table of values and determine the **rate of change**. Identify the **slope (m)** and **y-intercept (b)** of each and determine the equation of a line  $y = mx + b$

(i)

x	y	Rate of Change
0	3	
1	5	
2	7	
3	9	
4	11	
5	13	

Slope (m) =  
 y-intercept (b) =  
 Equation ( $y = mx + b$ )

(ii)

x	y	Rate of Change
0	-15	
1	-11	
2	-7	
3	-3	
4	1	
5	5	

Slope (m) =  
 y-intercept (b) =  
 Equation ( $y = mx + b$ )

2. Jeff shovels driveways for his neighbours. The table below displays his earnings for the number of driveways he shovels.

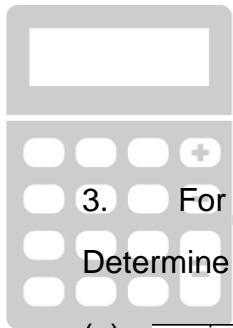
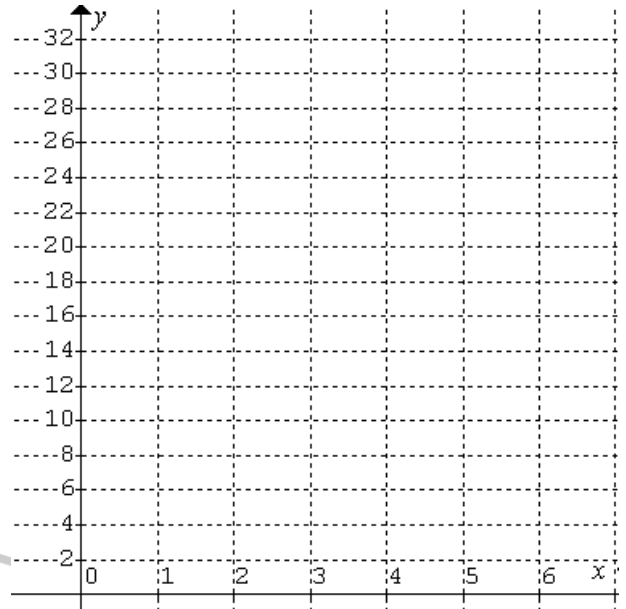
- (a) Graph the relationship on the grid provided

# of driveways	\$ earned
0	\$0
1	\$8
2	\$16
3	\$24
4	\$32

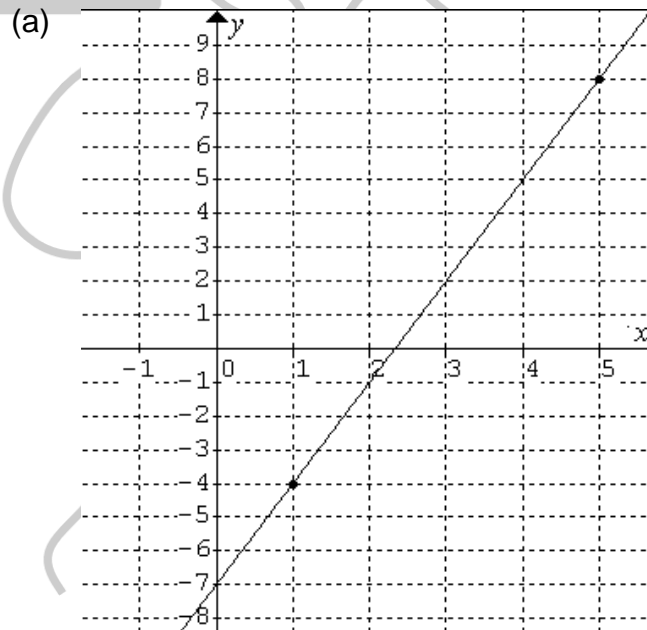
(b) Calculate the **slope** of the line

(c) Determine the **y-intercept** of the line

(d) Determine the equation of the line in the form  **$y = mx + b$**



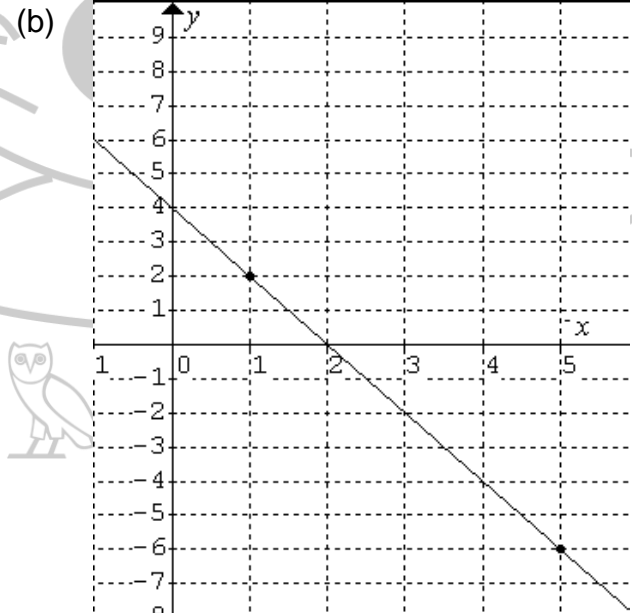
3. For each graph, use  $\text{slope}(m) = \frac{\text{RISE}}{\text{RUN}}$  to calculate the slope of each line. Determine the **y-intercept** and the equation of the line in form  **$y = mx + b$**



Slope ( $m$ ) =

y-intercept ( $b$ ) =

Equation ( $y = mx + b$ )



Slope ( $m$ ) =

y-intercept ( $b$ ) =

Equation ( $y = mx + b$ )

**3.2 – INVESTIGATING SLOPE and y-INTERCEPT**

1. For each equation, identify the **slope (m)** and **direction**, the **y-intercept** and determine an equation of a line that is **parallel** to the line given (Parallel lines have the **same** slope)

Equation	Slope (m)	Positive or negative?	y-Intercept	Equation of line parallel to given equation
(a) $y = 4x + 9$	4	Positive	9	$y = 4x - 3$ (same slope)
(b) $y = -5x - 1$				
(c) $y = \frac{1}{2}x + 4$				
(d) $y = -6x$				
(e) $y = -x + 2$				

**3.3 – PROPERTIES OF SLOPES and LINES**

1. For each pair of equations, determine if the lines are **parallel** or not (Recall: Parallel lines have the **same** slope)

(a)  $y = 2x + 9$        $y = 2x - 3$       **PARALLEL** (both have a **slope = 2**)

(b)  $y = 3x - 5$        $y = 5x + 3$       **NOT PARALLEL** (different slopes)

(c)  $y = \frac{1}{2}x - 5$        $y = -\frac{1}{2}x - 4$

(d)  $y = x - 3$        $y = x + 4$

**3.4 – EQUATIONS OF LINES**

1. Determine the equation of the line in the form  $y = mx + b$  where the *slope* ( $m$ ) and *y-intercept* ( $b$ ) are given

(a) slope = 5, y-intercept = -3       $y = 5x - 3$

(b) slope = -4, y-intercept = 7      \_\_\_\_\_

(c) slope =  $\frac{3}{4}$ , y-intercept = -2      \_\_\_\_\_

\* (d) slope = 0, y-intercept = 7      \_\_\_\_\_

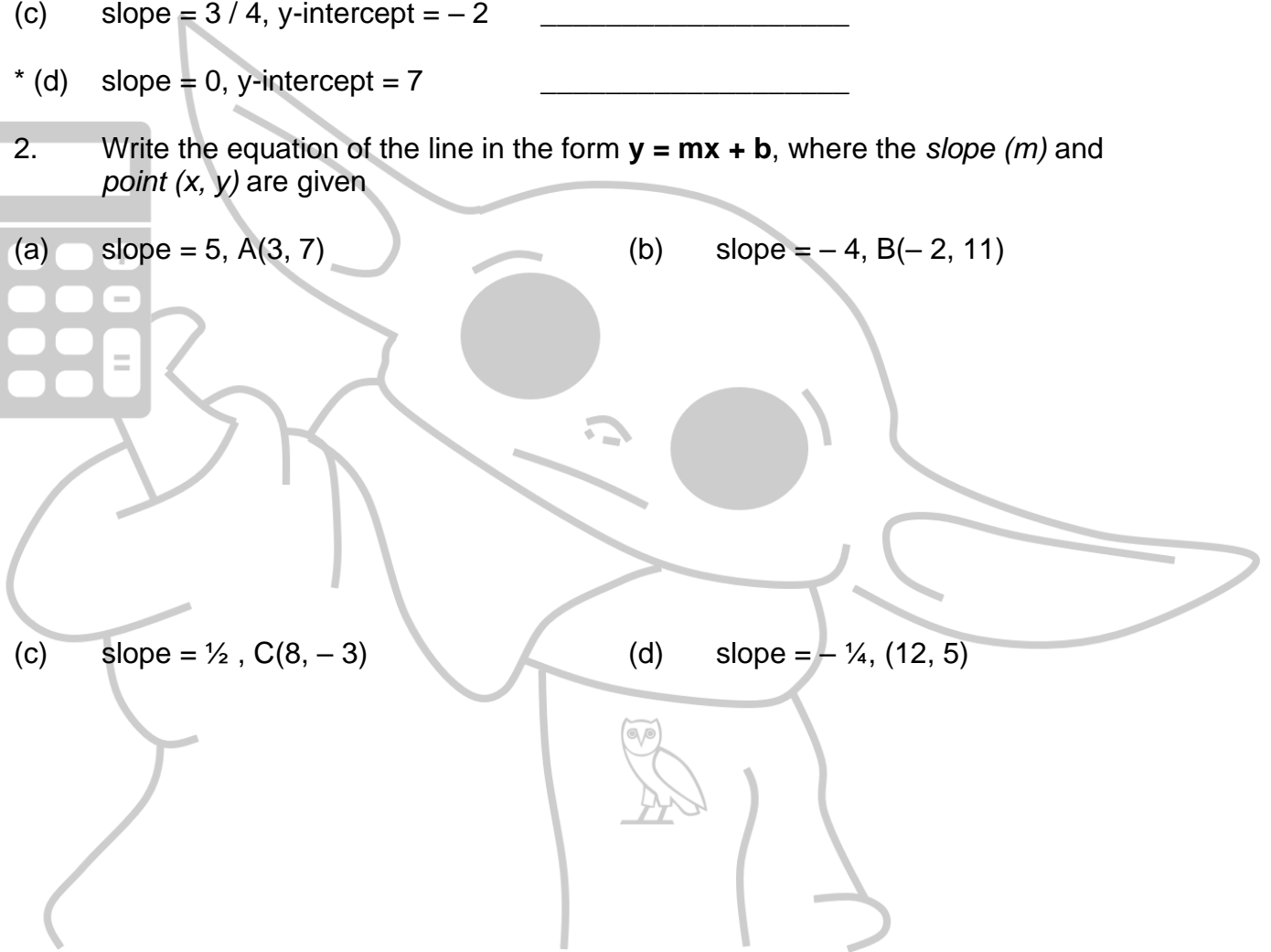
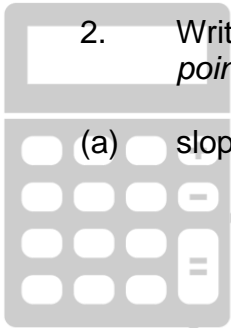
2. Write the equation of the line in the form  $y = mx + b$ , where the *slope* ( $m$ ) and *point* ( $x, y$ ) are given

(a) slope = 5, A(3, 7)

(b) slope = -4, B(-2, 11)

(c) slope =  $\frac{1}{2}$ , C(8, -3)

(d) slope =  $-\frac{1}{4}$ , (12, 5)



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3. For each pair of points

(i) Calculate the **slope** using the formula  $slope(m) = \frac{y_2 - y_1}{x_2 - x_1}$

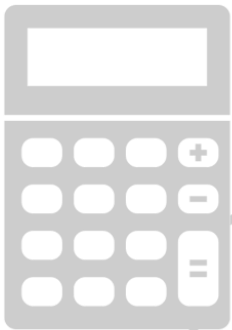
(ii) Use *any* of the points to solve for the **y-intercept (b)**

(iii) Write the equation of the line in the form  **$y = mx + b$**

(a) A(4, 2), B(8, 14)

(b) A(-1, 7), B(2, -5)

(c) A(-2, -12), B(-4, 6)



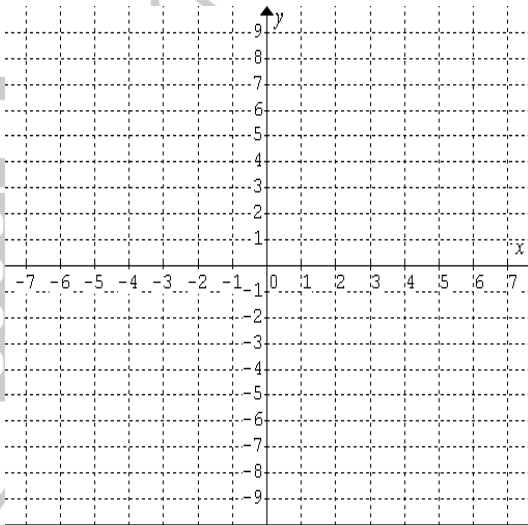
**3.5 – GRAPH LINEAR RELATIONS BY HAND**

1. For each equation, identify the **slope (m)**, **y-intercept (b)** and graph the line *only* using the *y-intercept* and slope

(a)  $y = 5x - 3$

m = \_\_\_\_\_

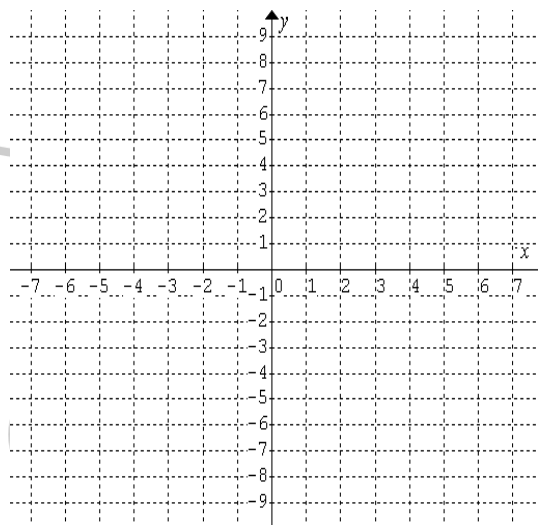
b = \_\_\_\_\_



(b)  $y = -2x + 9$

m = \_\_\_\_\_

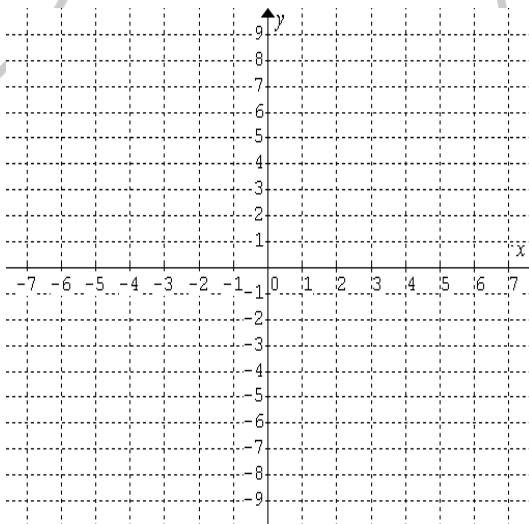
b = \_\_\_\_\_



(c)  $y = \frac{2}{3}x - 5$

m = \_\_\_\_\_

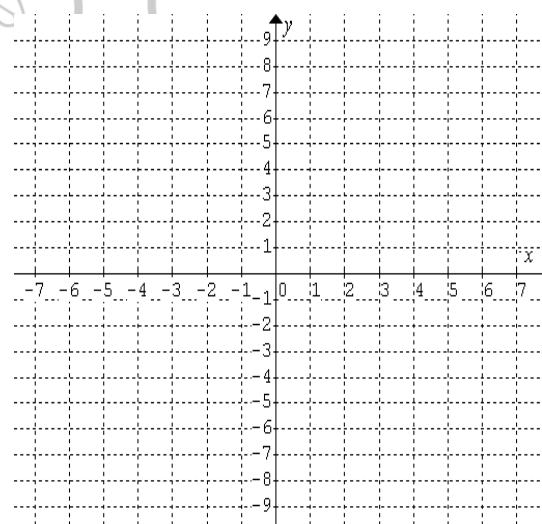
b = \_\_\_\_\_



(d)  $y = \frac{-7}{4}x + 6$

m = \_\_\_\_\_

b = \_\_\_\_\_



**SOLUTION****3.1**

1. (i)  $m = 2, b = 3$ , Equation:  $y = 2x + 3$   
 (ii)  $m = 4, b = -15$ , Equation:  $y = 4x - 15$
2. (b) Slope = 8                      (c)  $y$ -intercept = 0                      (d)  $y = 8x$
3. (a)  $m = 3, b = -7$ , Equation:  $y = 3x - 7$   
 (b)  $m = -2, b = 4$ , Equation:  $y = -2x + 4$

**3.2**

1.

Equation	Slope ( $m$ )	Positive or negative?	$y$ -Intercept	Equation of line parallel to given equation
(a) $y = 4x + 9$	4	Positive	9	$y = 4x - 3$ (same slope)
(b) $y = -5x - 1$	-5	Negative	-1	Varies
(c) $y = \frac{1}{2}x + 4$	$1/2$	Positive	4	Varies
(d) $y = -6x$	-6	Negative	0	Varies
(e) $y = -x + 2$	-1	Negative	2	Varies

**3.3**

1. (c) Not parallel                      (d) Parallel

**3.4**

1. (b)  $y = -4x + 7$                       (c)  $y = \frac{3}{4}x - 2$                       (d)  $y = 7$
2. (a)  $y = 5x - 8$                       (b)  $y = -4x + 3$                       (c)  $y = \frac{1}{2}x - 7$

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(d)  $y = \frac{-1}{4}x + 8$

3. (a)  $m = 3, b = -10, y = 3x - 10$

(b)  $m = -4, b = 3, y = -4x + 3$

(c)  $m = -9, b = -30, y = -9x - 30$





**FINAL EXAM REVIEW – CHAPTER 4****4.1 – SOLVE ONE and TWO STEP LINEAR EQUATIONS**1. Solve for  $x$  for each equation using *one-step* solutions

(a)  $x + 3 = 7$

(b)  $x - 12 = 14$

(c)  $3 + x = 20$

(d)  $3x = 66$

(e)  $4x = -40$

(f)  $-6x = -42$

(g)  $\frac{x}{4} = 12$

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

(i)  $\frac{x}{7} = -11$

2. Solve for  $x$  for each equation using *two-step* solutions

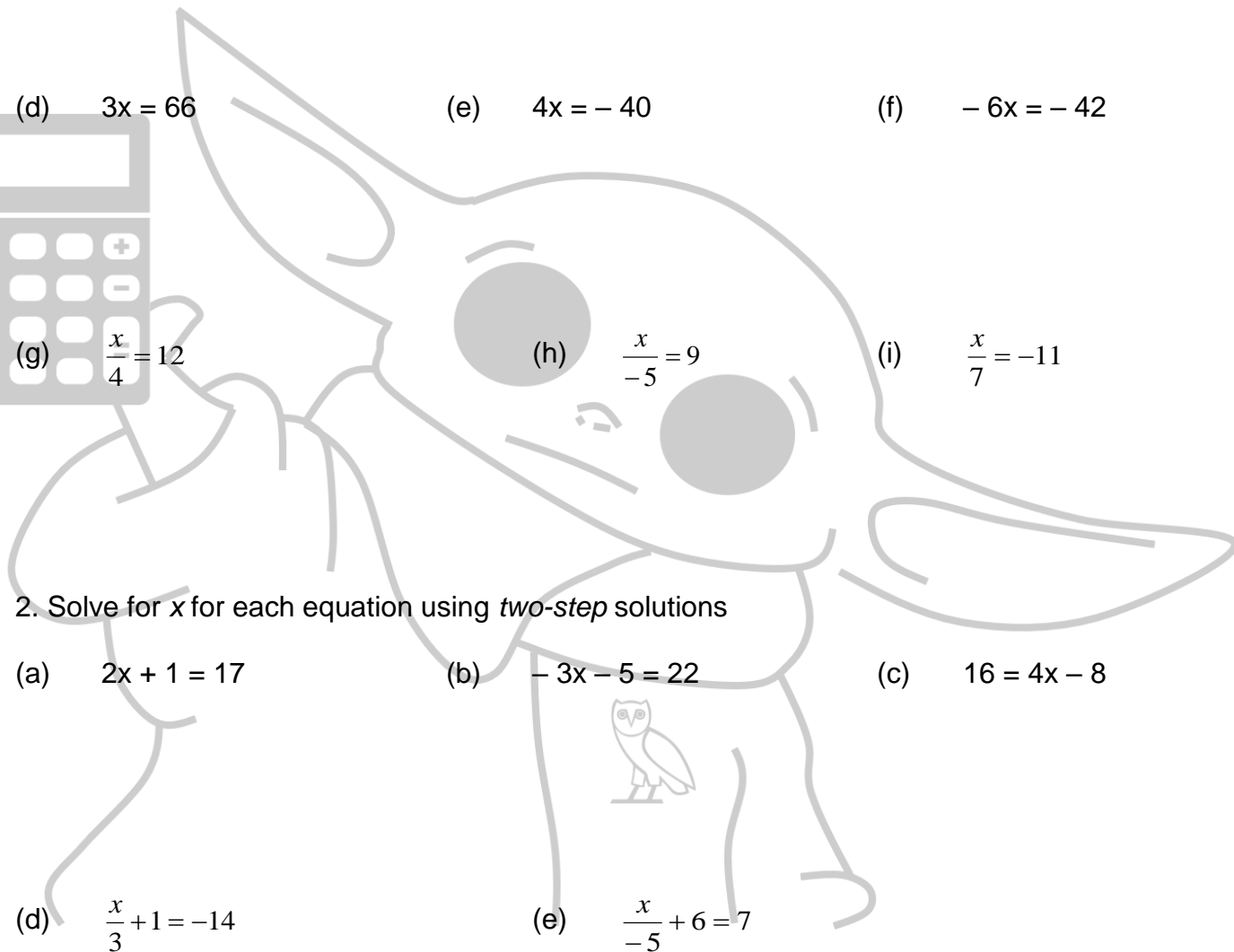
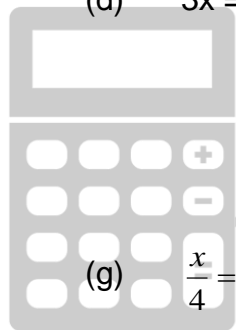
(a)  $2x + 1 = 17$

(b)  $-3x - 5 = 22$

(c)  $16 = 4x - 8$

(d)  $\frac{x}{3} + 1 = -14$

(e)  $\frac{x}{-5} + 6 = 7$



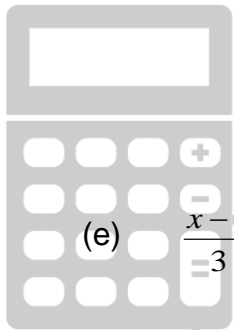
**4.2 – SOLVE MULTI-STEP LINEAR EQUATIONS**1. Solve for  $x$  for each equation:

(a)  $2(x + 1) = 8$

(b)  $-3(x + 2) = 33$

(c)  $5x + 2 = 3x - 10$

(d)  $-6x + 7 = 3x + 25$



(e)  $\frac{x-2}{3} = 2$

(f)  $\frac{x+7}{-8} = 11$

(g)  $\frac{3x-6}{4} = 12$

(h)  $\frac{-4x+3}{5} = 11$



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#### 4.4 – CONVERT LINEAR EQUATIONS FROM STANDARD FORM

1. Write each equation in **slope y-intercept form** ( $y = mx + b$ )

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

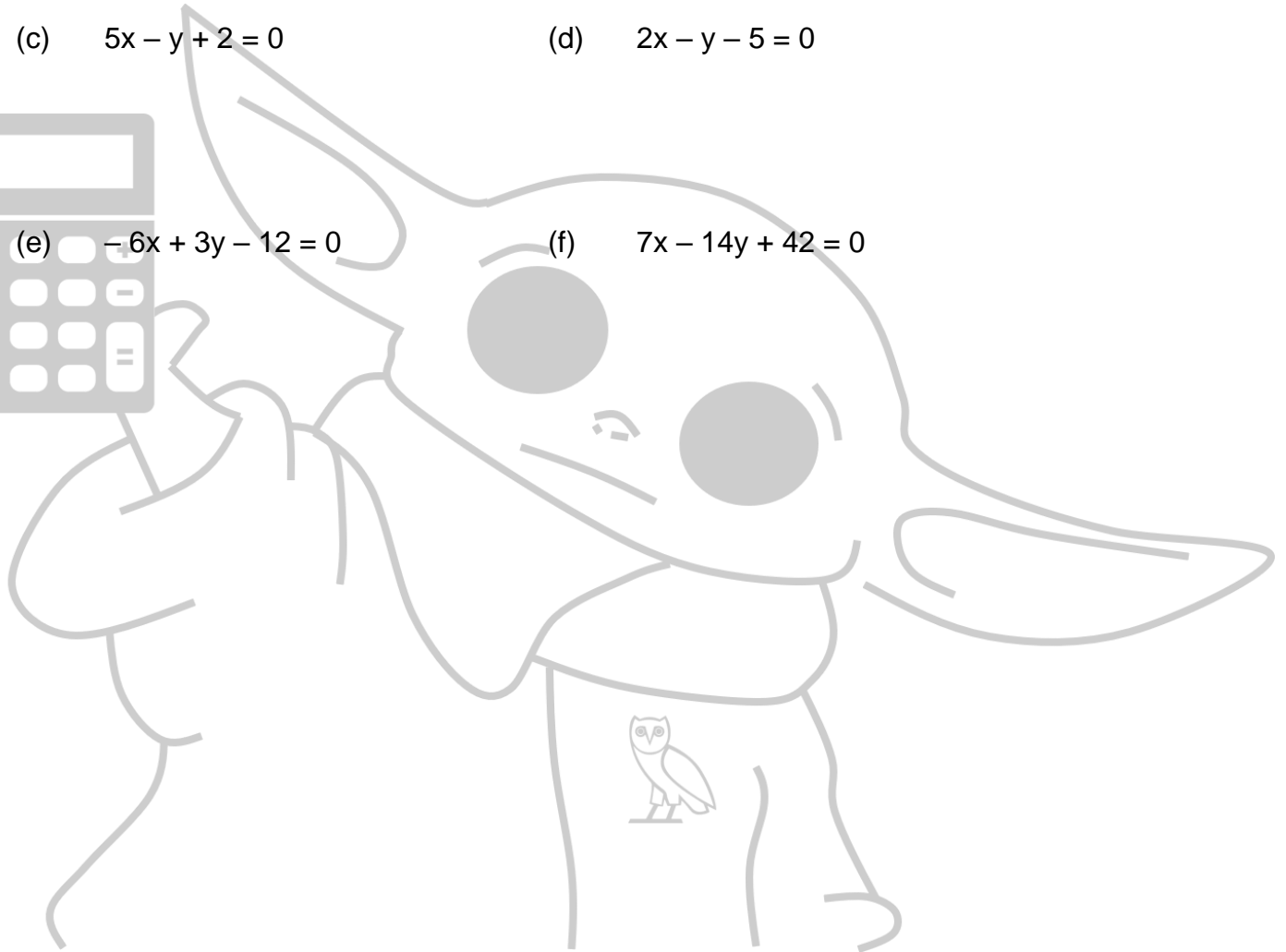
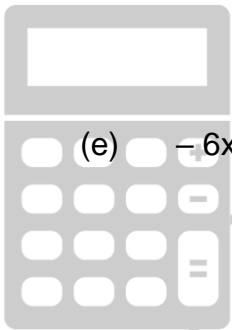
(b)  $2x + y - 1 = 0$

(c)  $5x - y + 2 = 0$

(d)  $2x - y - 5 = 0$

(e)  $-6x + 3y - 12 = 0$

(f)  $7x - 14y + 42 = 0$



**SOLUTIONS****4.1**

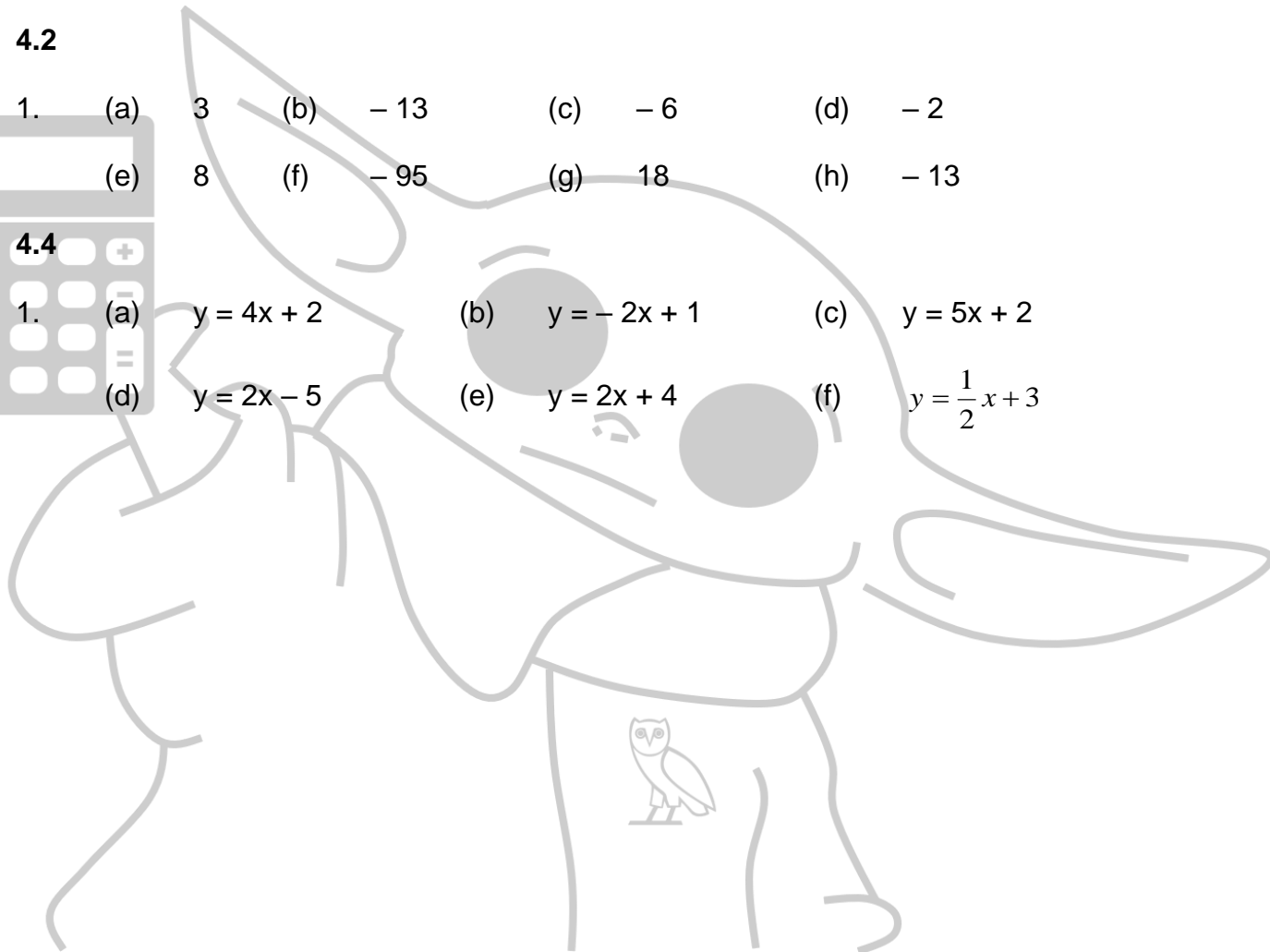
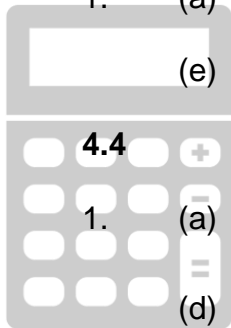
1. (a) 4 (b) 26 (c) 17 (d) 22 (e) -10  
(f) 7 (g) 48 (h) -45 (i) -77
2. (a) 8 (b) -9 (c) 6 (d) -45 (e) -5

**4.2**

1. (a) 3 (b) -13 (c) -6 (d) -2  
(e) 8 (f) -95 (g) 18 (h) -13

**4.4**

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



**FINAL EXAM REVIEW – CHAPTER 5****5.1 – SOLVE LINEAR EQUATIONS BY GRAPHING**

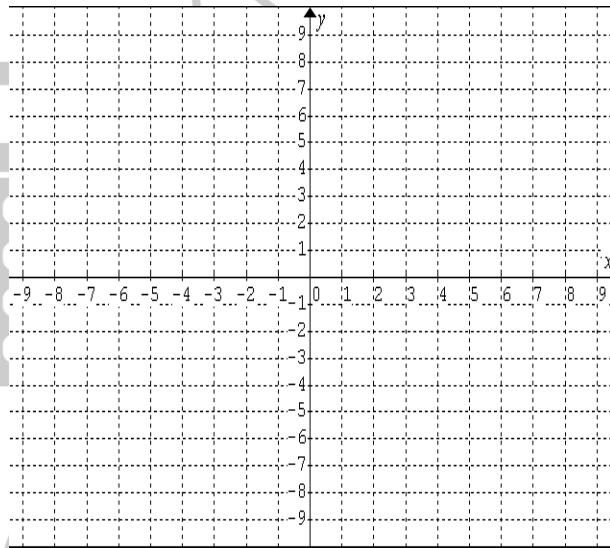
1. Solve each linear system by graphing both equations on the same grid

(a)  $y = 3x - 1$

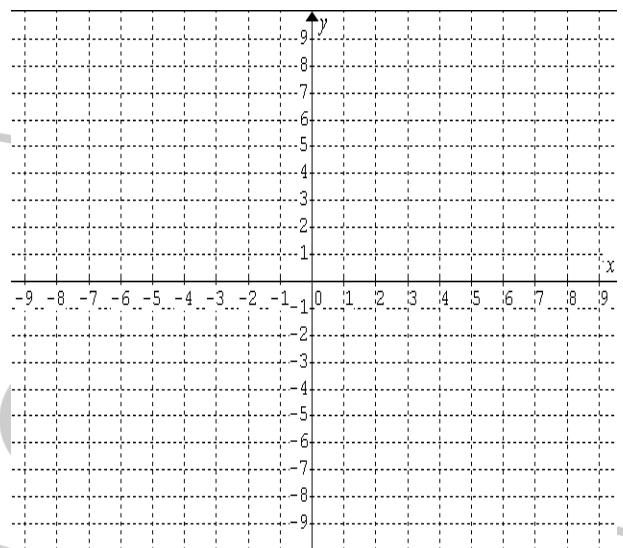
(b)  $y = x + 4$

$y = 2x + 1$

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



Point of intersection = \_\_\_\_\_

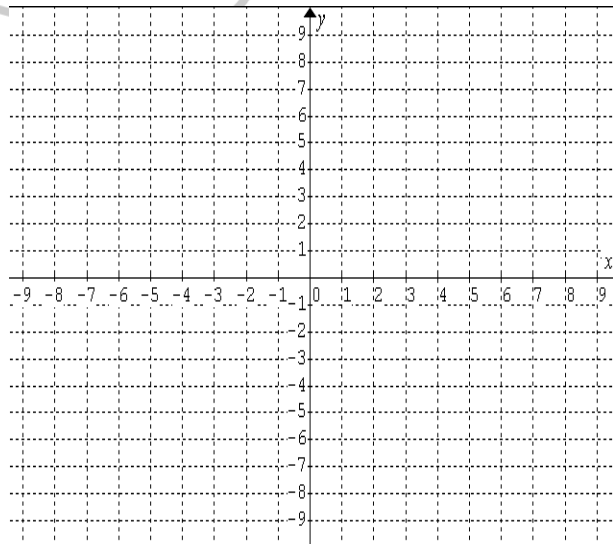


Point of intersection = \_\_\_\_\_

(c)  $y = -4x + 1$

$y = -2x - 3$

Point of intersection = \_\_\_\_\_



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## 5.2 – SOLVE LINEAR SYSTEMS BY SUBSTITUTION

1. Solve each linear system by **substitution**

(a)  $2x + y = 6$

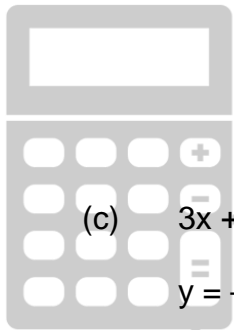
$$y = 3x + 1$$

(b)  $-5x + y = 20$

$$y = -x + 2$$

(c)  $3x + y = 5$

$$y = -x - 3$$



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### 5.3 – SOLVE LINEAR SYSTEMS BY ELIMINATION

1. Solve each linear system by **elimination**

(a)  $7x - 2y = 3$

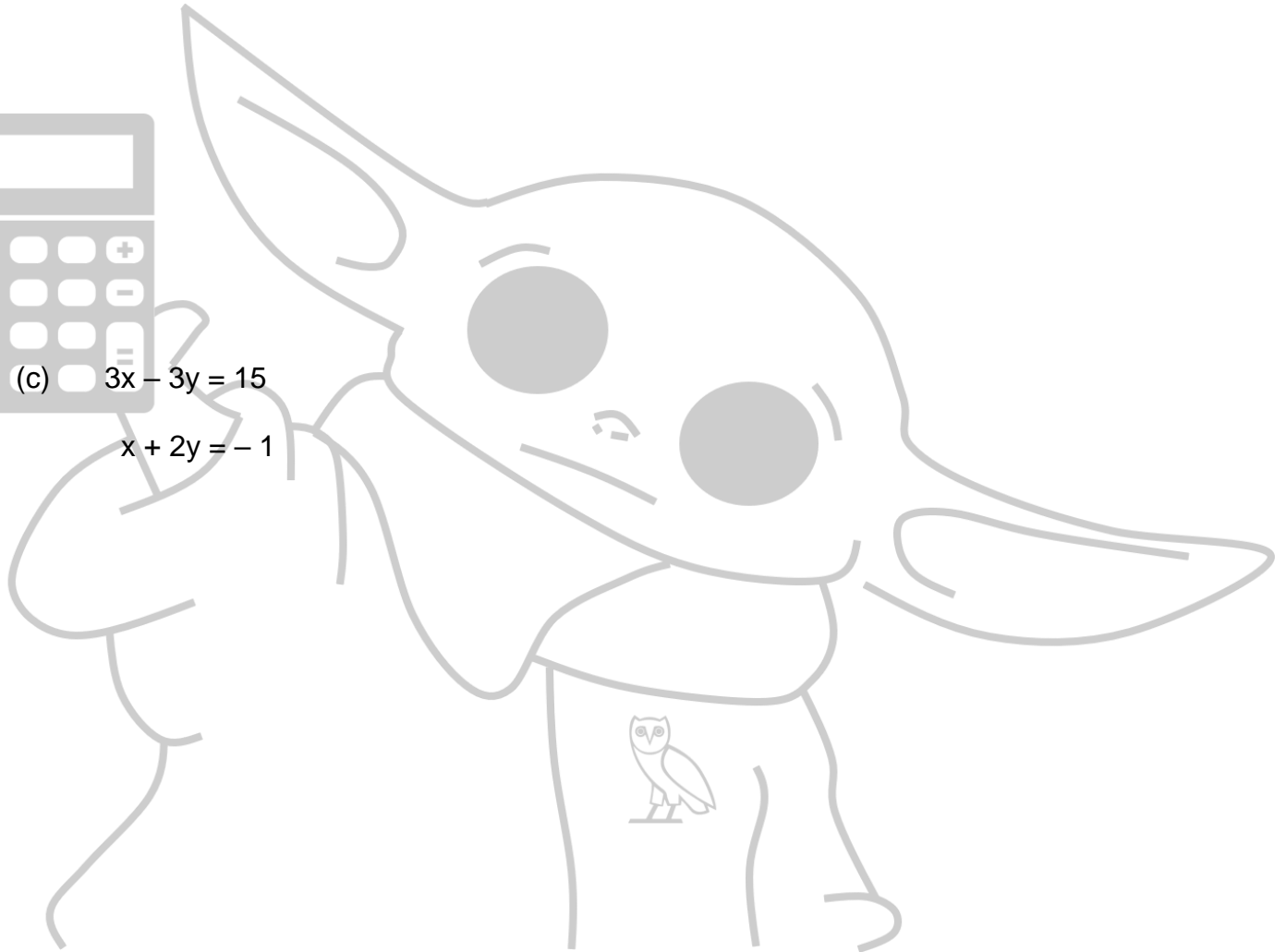
$$x + 2y = -11$$

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

$$x + 3y = -2$$

(c)  $3x - 3y = 15$

$$x + 2y = -1$$



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## SOLUTIONS

### 5.1

(a)  $(2, 5)$

(b)  $(-2, 2)$

(c)  $(2, -7)$

### 5.2

(a)  $(1, 4)$

(b)  $(-3, 5)$

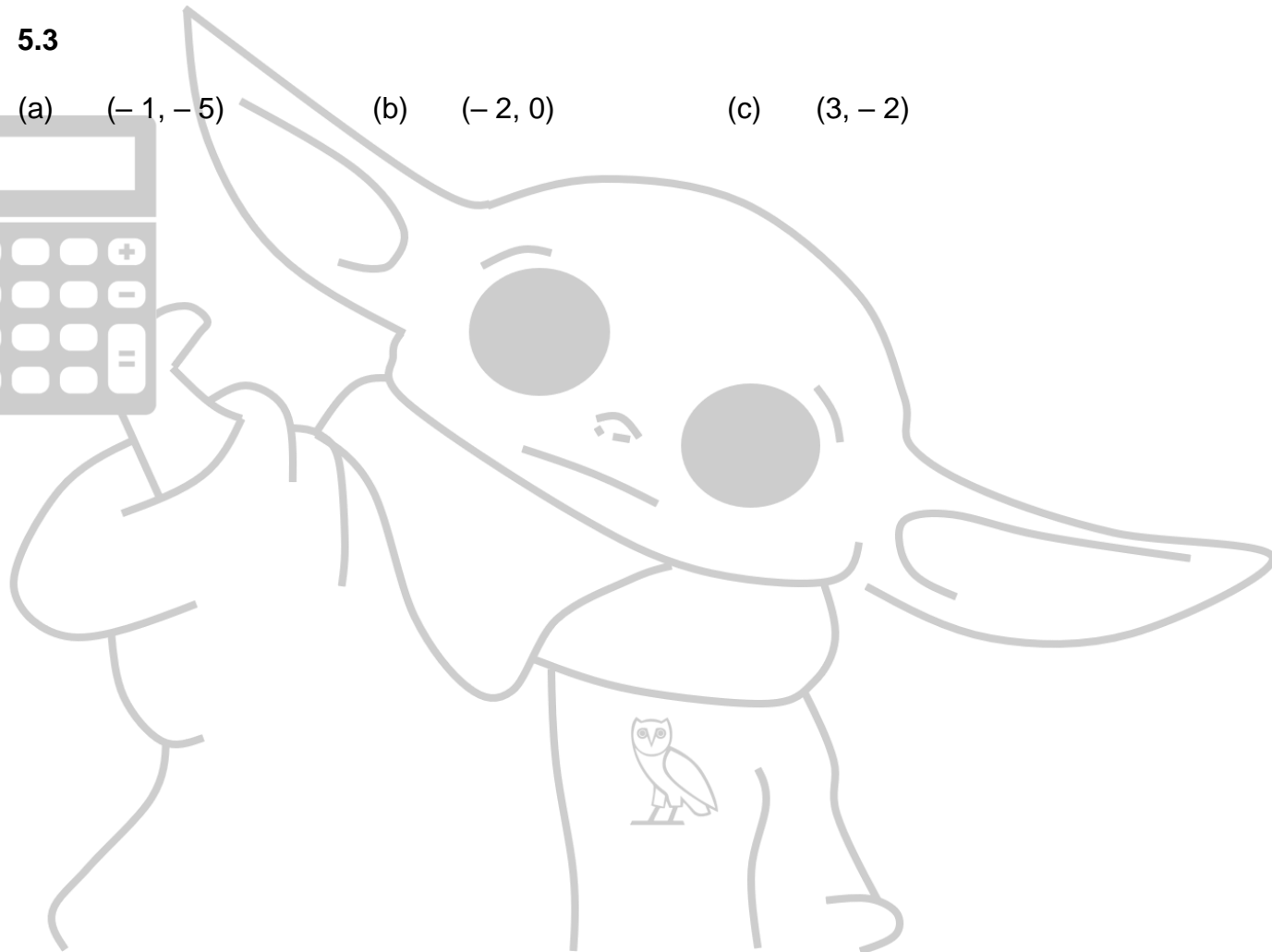
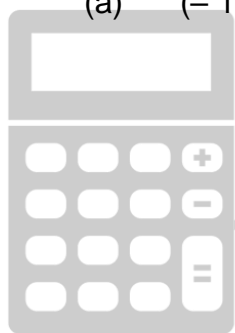
(c)  $(4, -7)$

### 5.3

(a)  $(-1, -5)$

(b)  $(-2, 0)$

(c)  $(3, -2)$





**FINAL EXAM REVIEW – CHAPTER 6**

**6.1 – EXPLORING NON-LINEAR RELATIONS**

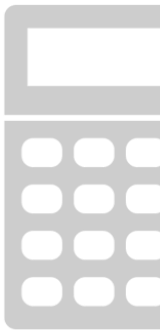
1. For each question, complete the table and graph the relation

(a)

x	y	1 <sup>st</sup> Diff.	2 <sup>nd</sup> Diff.
-2	4		
-1	1		
0	0		
1	1		
2	4		

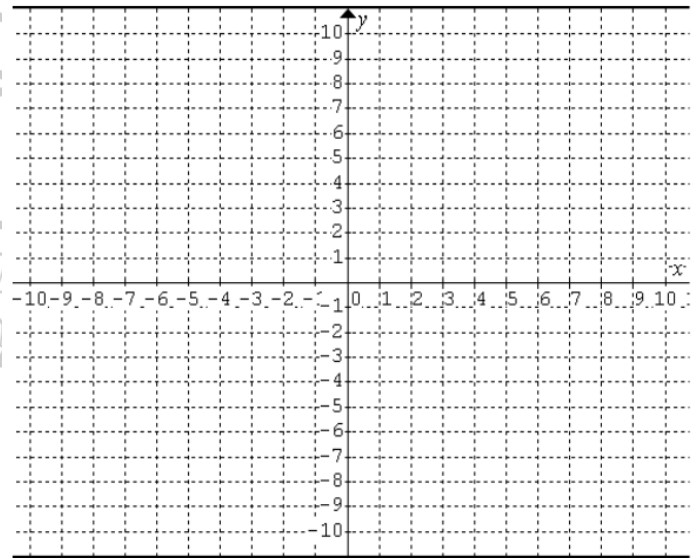
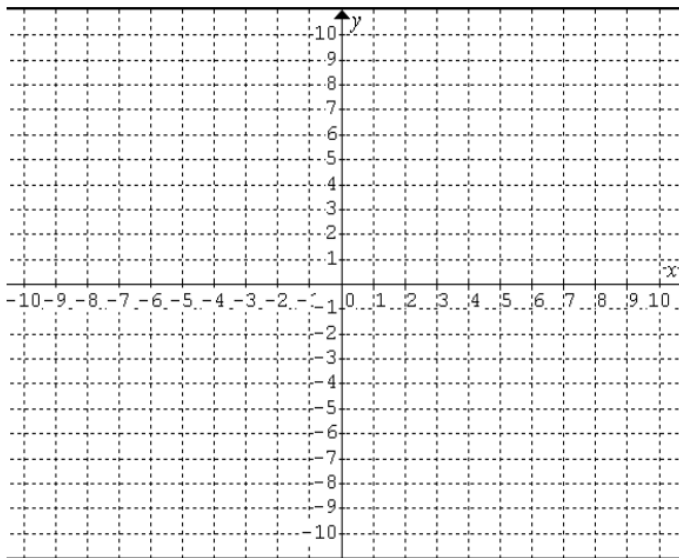
(b)

x	y	1 <sup>st</sup> Diff.	2 <sup>nd</sup> Diff.
-4	-8		
-2	-2		
0	0		
2	-2		
4	-8		



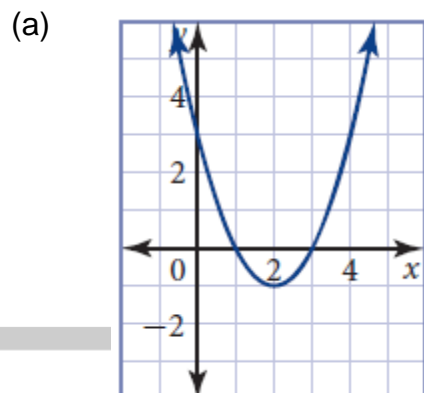
How do you know this is a **quadratic** relation?

How do you know this is a **quadratic** relation?



### 6.3 – KEY FEATURES OF QUADRATIC RELATIONS

1. Answer the questions for each graph below

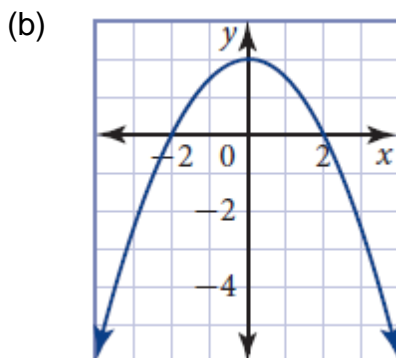


(i) Coordinates of the vertex = \_\_\_\_\_

(ii) Axis of symmetry = \_\_\_\_\_

(iii) y-intercept = \_\_\_\_\_

(iv) How many **x-intercepts**? \_\_\_\_\_ Identify them = \_\_\_\_\_

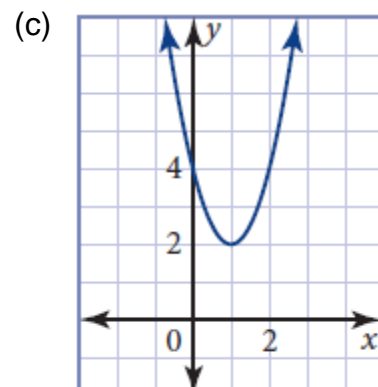


(i) Coordinates of the vertex = \_\_\_\_\_

(ii) Axis of symmetry = \_\_\_\_\_

(iii) y-intercept = \_\_\_\_\_

(iv) How many **x-intercepts**? \_\_\_\_\_ Identify them = \_\_\_\_\_



(i) Coordinates of the vertex = \_\_\_\_\_

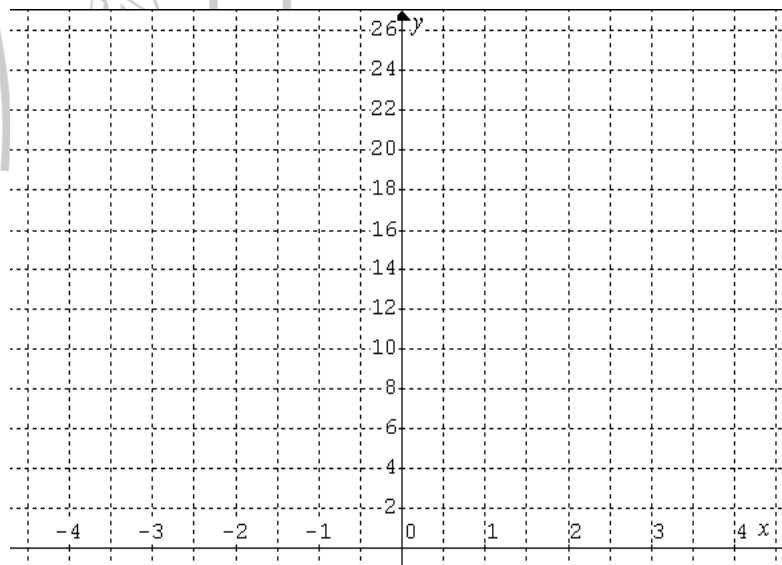
(ii) Axis of symmetry = \_\_\_\_\_

(iii) y-intercept = \_\_\_\_\_

(iv) How many **x-intercepts**? \_\_\_\_\_ Identify them = \_\_\_\_\_

2. Complete the table of values below for the quadratic relation  $y = 25 - 2x^2$ . The first one is done for you. Graph the data on the grid provided and join the points with a smooth curve

x	y	1 <sup>st</sup> Diff.	2 <sup>nd</sup> Diff.
-2	17		
-1			
0			
1			
2			



**SOLUTIONS****6.1**

1. (a)

$x$	$y$	1 <sup>st</sup> Diff.	2 <sup>nd</sup> Diff.
-2	4	-3	4
-1	1		
0	0	1	4
1	1	1	4
2	4	3	4

(b)

$x$	$y$	1 <sup>st</sup> Diff.	2 <sup>nd</sup> Diff.
-4	-8	6	-4
-2	-2		
0	0	2	-4
2	-2	-2	-4
4	-8	-6	-4

How do you know this is a **quadratic** relation?

1<sup>st</sup> differences not constant, 2<sup>nd</sup> differences constant

How do you know this is a **quadratic** relation?

1<sup>st</sup> differences not constant, 2<sup>nd</sup> differences constant

**6.3**

1. (a) (i)  $(3, -1)$  (ii)  $x = 2$  (iii)  $y = 3$   
 (iv)  $2, x = 1$  and  $x = 3$
- (b) (i)  $(0, 2)$  (ii)  $x = 0$  (iii)  $y = 2$   
 (iv)  $2, x = -2$  and  $x = 2$
- (c) (i)  $(1, 2)$  (ii)  $x = 1$  (iii)  $y = 4$   
 (iv) No x-intercepts

2.

$x$	$y$	1 <sup>st</sup> Diff.	2 <sup>nd</sup> Diff.
-2	17	6	-4
-1	23		
0	25	2	-4
1	23	-2	-4
2	17	-6	-4

**FINAL EXAM REVIEW – CHAPTER 7****7.1 – MULTIPLYING TWO BINOMIALS**1. Expand and simplify the following using **FOIL**

(a)  $(x + 2)(x + 5)$

(b)  $(x - 4)(x - 6)$

(c)  $(2x + 5)(3x - 1)$

(d)  $(4x - 3)(3x + 2)$

2. Expand and simplify each square

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

(b)  $(x - 7)^2$

(c)  $(5x + 4)^2$

**7.2 – COMMON FACTORING**1. For each, identify the **greatest common factor** and factor the expression by **common factoring**

(a)  $5x + 40$       GCF = \_\_\_\_\_

(b)  $30x^2 + 6x$       GCF = \_\_\_\_\_

(c)  $12x^2 - 36x$       GCF = \_\_\_\_\_

(d)  $42x^2 - 7x$       GCF = \_\_\_\_\_

**7.3 – FACTORING BY DIFFERENCE OF SQUARES**1. Factor each **difference of squares**

(a)  $x^2 - 121$

(b)  $4x^2 - 49$

(c)  $9x^2 - 25$

(d)  $100 - 9x^2$

**7.4 – FACTORING SIMPLE TRINOMIALS ( $x^2 + bx + c$ )**1. Factor each trinomial using the “**product and sum**” method

(a)  $x^2 + 9x + 18$

P =

S =

(b)  $x^2 - 13x + 36$

P =

S =

(c)  $x^2 - 8x - 20$

P =

S =

(d)  $x^2 + 4x - 21$

P =

S =



**SOLUTIONS****7.1**

1. (a)  $x^2 + 7x + 10$  (b)  $x^2 - 10x + 24$  (c)  $6x^2 + 13x - 5$   
(d)  $12x^2 - x - 6$
2. (a)  $x^2 + 2x + 1$  (b)  $x^2 - 14x + 49$  (c)  $25x^2 + 40x + 16$

**7.2**

1. (a) GCF = 5,  $5(x + 8)$  (b) GCF =  $6x$ ,  $6x(5x + 1)$   
(c) GCF =  $12x$ ,  $12x(x - 3)$  (d) GCF =  $7x$ ,  $7x(6x - 1)$

**7.3**

1. (a)  $(x + 11)(x - 11)$  (b)  $(2x + 7)(2x - 7)$   
(c)  $(3x + 5)(3x - 5)$  (d)  $(10 + 3x)(10 - 3x)$

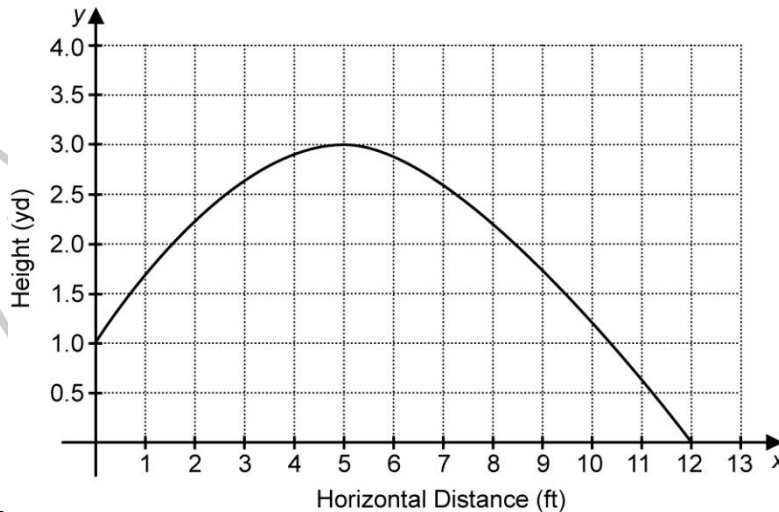
**7.4**

1. (a)  $(x + 6)(x + 3)$  (b)  $(x - 4)(x - 9)$  (c)  $(x - 10)(x + 2)$   
(d)  $(x + 7)(x - 3)$

**FINAL EXAM REVIEW – CHAPTER 8**

**8.1 – INTERPRET QUADRATIC RELATIONS**

1. The graph below shows the height and horizontal distance of a volleyball after it was served



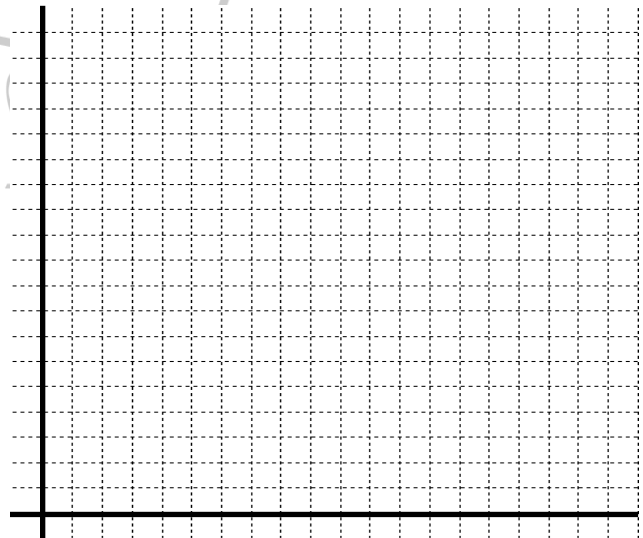
(a) What was the **maximum height** achieved by the ball? \_\_\_\_\_

(b) **How long** did it take the ball to reach this maximum height? \_\_\_\_\_

(c) From **what height** was the ball served? \_\_\_\_\_

2. The table shows the height of a cyclist over time as she travels from one side of a bridge, over its peak, to the other side

Time (s)	Height (m)
0	0
10	3
20	5
30	6
40	5



(a) Graph the data on the grid to the right

(b) What is the **height** of the bridge at its highest point? \_\_\_\_\_

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(c) **How long** did it take the cyclist to reach the highest point? \_\_\_\_\_

### 8.2 – REPRESENT QUADRATIC RELATIONS IN DIFFERENT WAYS

1. Consider the quadratic relation  $y = x^2 - 13x + 30$ .

(a) Does this relation have a **maximum** or **minimum** value? \_\_\_\_\_.

Explain

(b) Identify the **y-intercept** \_\_\_\_\_

(c) **Factor** the relation completely (use “**product and sum**”)

(d) Identify the **zeros** of the relation

### 8.3 – THE QUADRATIC RELATION $y = ax^2 + c$

1. A skydiver jumped out of an airplane. The path of the skydiver can be modelled by the relation  $h = -50t^2 + 5000$ , where  $h$  represents the height of the skydiver (in metres) and  $t$  represents time (in seconds)

(a) **From what height** did the skydiver jump out of the plane?

(b) **How long** did it take the skydiver to reach the ground?

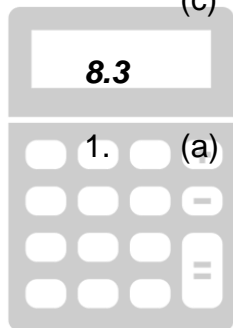


**SOLUTIONS****8.1**

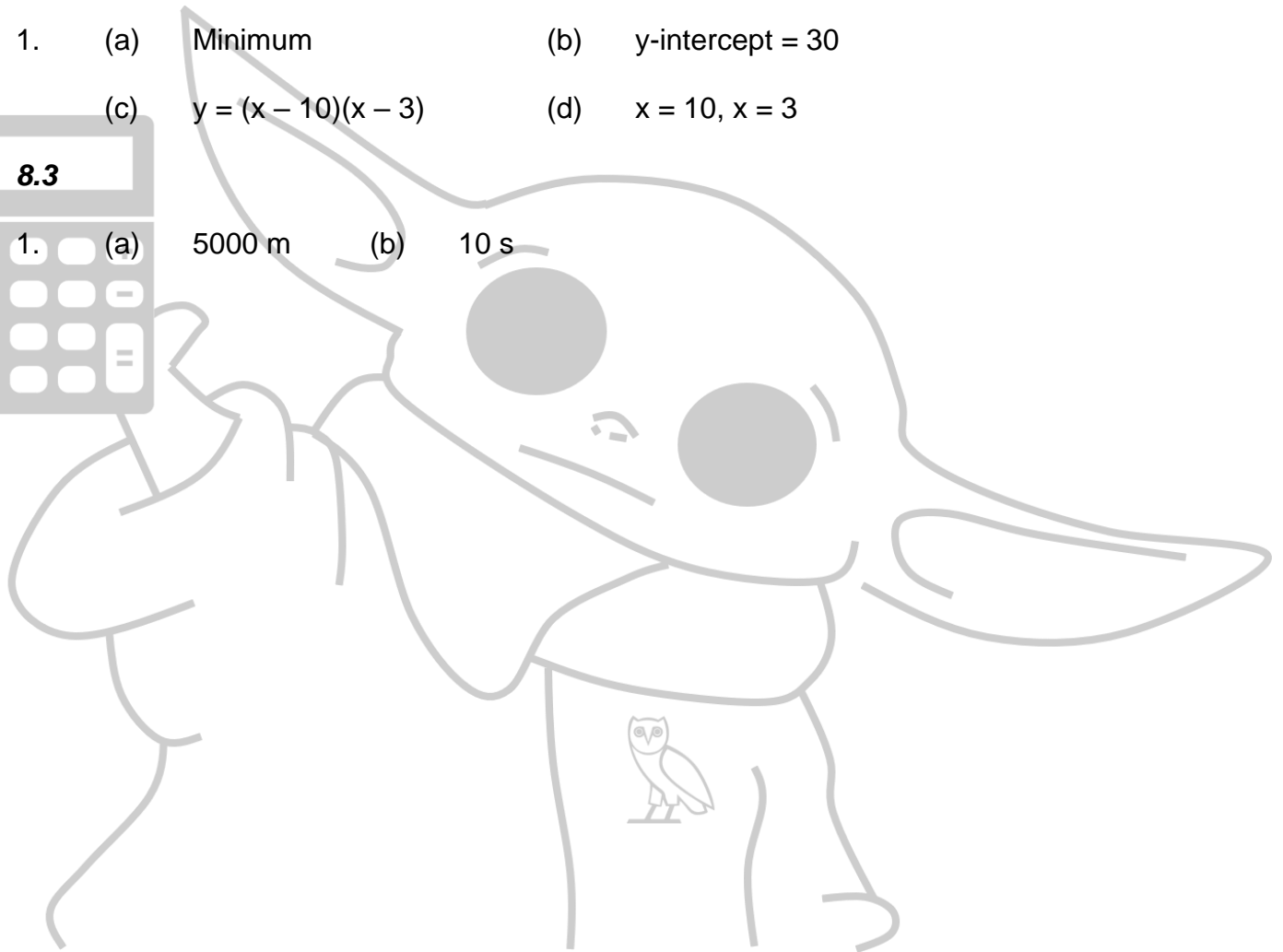
1. (a) 3 m (b) 5 s (c) 1 m  
2. (b) 6 m (c) 30 s

**8.2**

1. (a) Minimum (b) y-intercept = 30  
(c)  $y = (x - 10)(x - 3)$  (d)  $x = 10, x = 3$

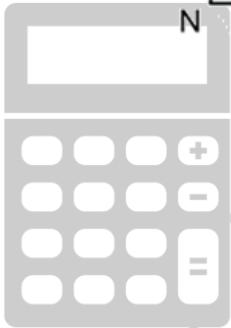
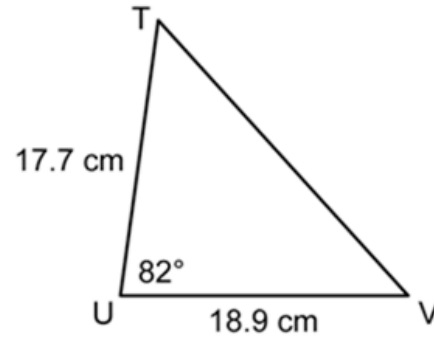
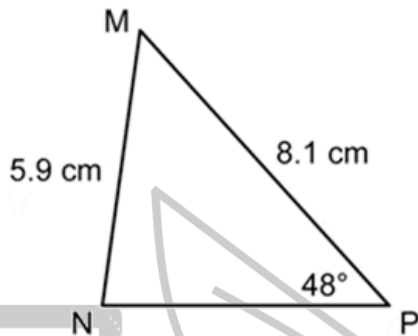


1. (a) 5000 m (b) 10 s

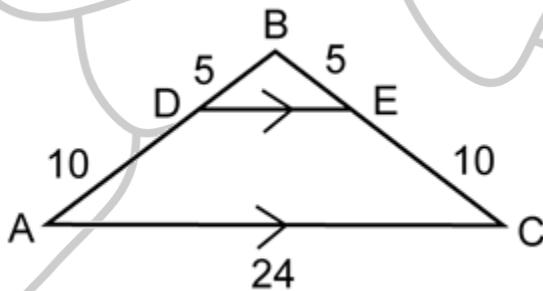


**FINAL EXAM REVIEW – CHAPTER 1 (SIMILAR TRIANGLES)**

1. Triangles MNP and TUV are similar. Find the **missing side** and **angle measures**.



2. Segment AC is *parallel* to segment DE. Determine the length of **DE** to one decimal place.



3. James is **1.2 m tall**, while his teacher is **1.6 m tall**. If James' **shadow is 2 m long**, how long is his teacher's shadow?

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## SOLUTIONS

### 1.3 / 1.4

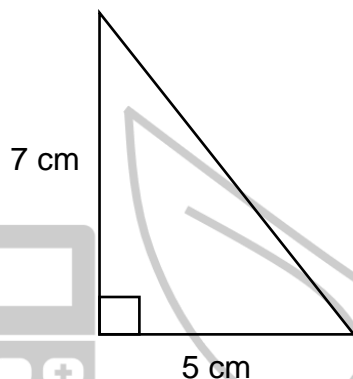
1.  $NP = 6.3 \text{ cm}$ ,  $\angle M = 50^\circ$ ,  $\angle N = 82^\circ$ ,  $TV = 24.3 \text{ cm}$ ,  $\angle T = 50^\circ$ ,  $\angle V = 48^\circ$
2.  $DE = 8$
3.  $2.67 \text{ m}$



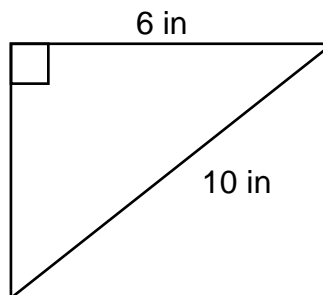
**FINAL EXAM REVIEW – CHAPTER 2****2.1 - THE PYTHAGOREAN THEOREM**

1. Use the *Pythagorean Theorem* ( $c^2 = a^2 + b^2$ ) to calculate the measure of the unknown sides

(a)



(b)

**2.3 – THE SINE and COSINE RATIOS**

1. Use a calculator to determine each value to four decimal places

(a)  $\sin 85^\circ = \underline{\hspace{2cm}}$

(b)  $\cos 24^\circ = \underline{\hspace{2cm}}$

(c)  $\cos 64^\circ = \underline{\hspace{2cm}}$

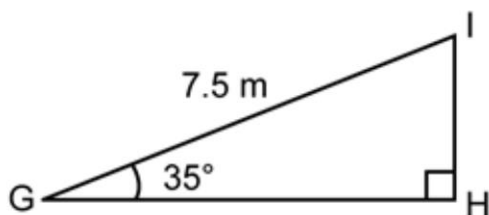
2. Use a calculator to determine the measure of  $\angle A$ . Express your answer to the nearest degree

(a)  $\sin A = 0.3420$

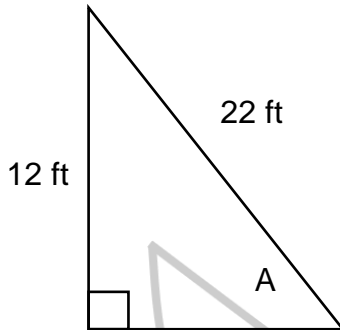
(b)  $\sin A = 0.8480$

(c)  $\cos A = 0.5299$

3. Use a trigonometric ratio to calculate the length **GH**. Express your answer to one decimal place



4. Use a trigonometric ratio to calculate the measure of  $\angle A$ . Express your answer to the nearest whole number



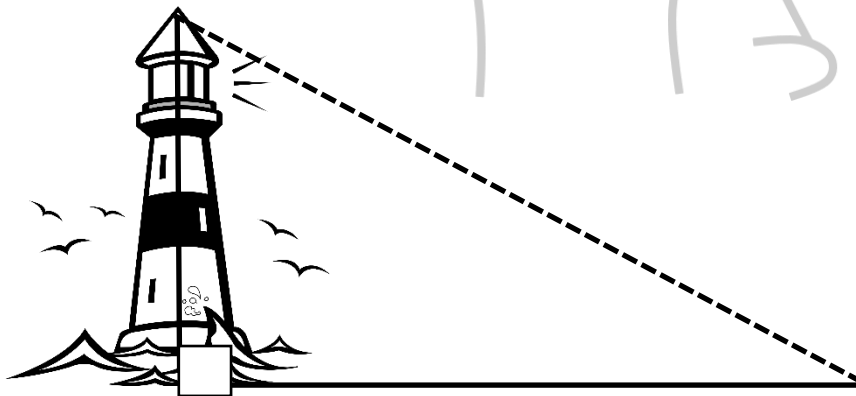
### 2.4 – THE TANGENT RATIO

1. Use a calculator to determine each value to four decimal places

(a)  $\tan 26^\circ =$  \_\_\_\_\_ (b)  $\tan 66^\circ =$  \_\_\_\_\_

2. Use a calculator to determine the measure of  $\angle A$  if  $\tan A = 0.6745$ . Express your answer to the nearest whole number

3. At a point **8.6 m** from the base of a lighthouse, the *angle of elevation* to the top of lighthouse is  **$40^\circ$** . **How tall is the lighthouse?**

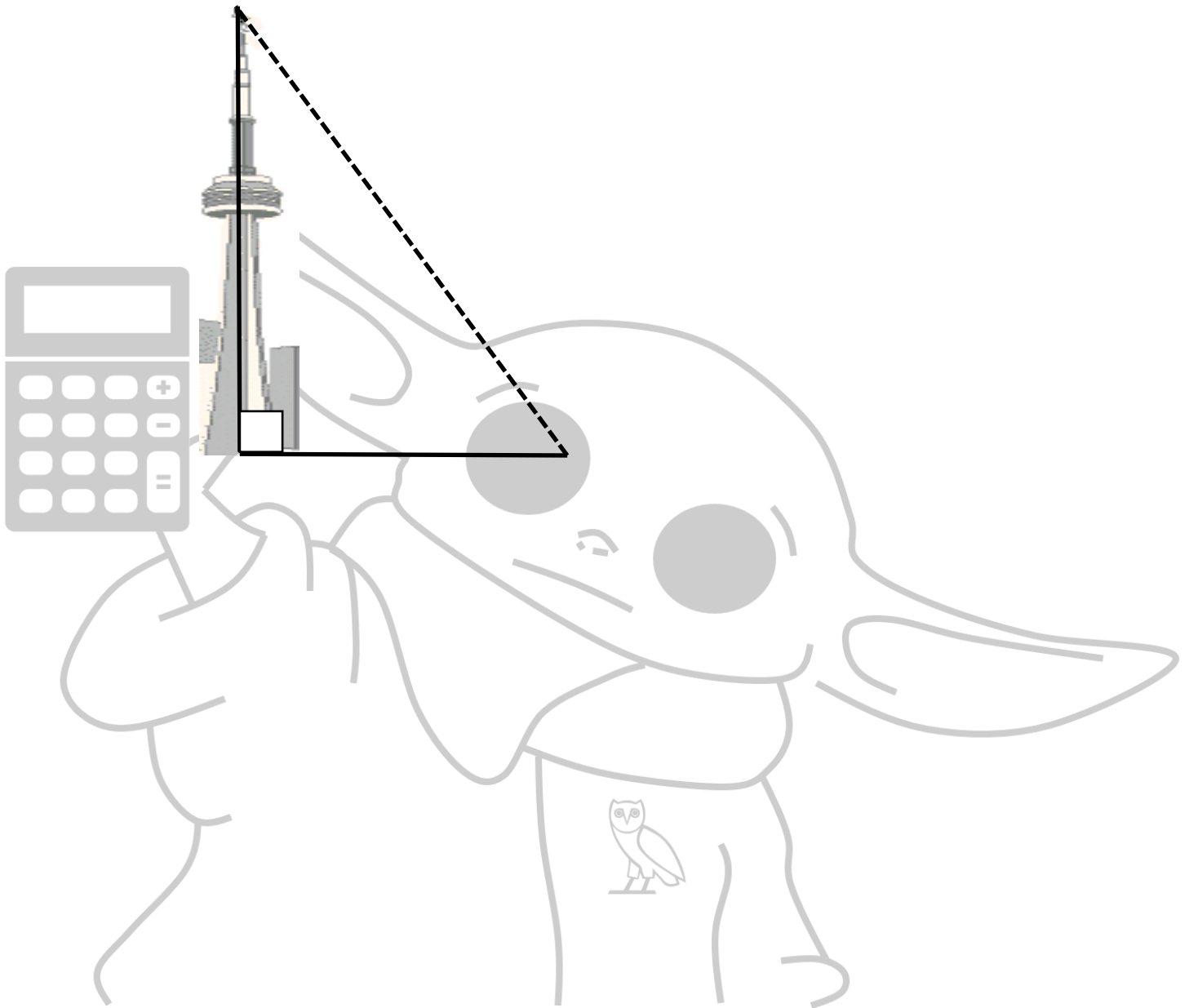


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4. Ahmed looks up at the CN Tower while standing **400 m** in front of the **550 m** tower. Calculate the *angle of elevation*. Express your answer to the nearest whole number



**SOLUTIONS**

**2.1**

1. (a) 8.6 cm (b) 8 in

**2.3**

1. (a) 0.9962 (b) 0.9135 (c) 0.4384

2. (a)  $20^\circ$  (b)  $58^\circ$  (c)  $68^\circ$

3. 6.1 m

4.  $33^\circ$

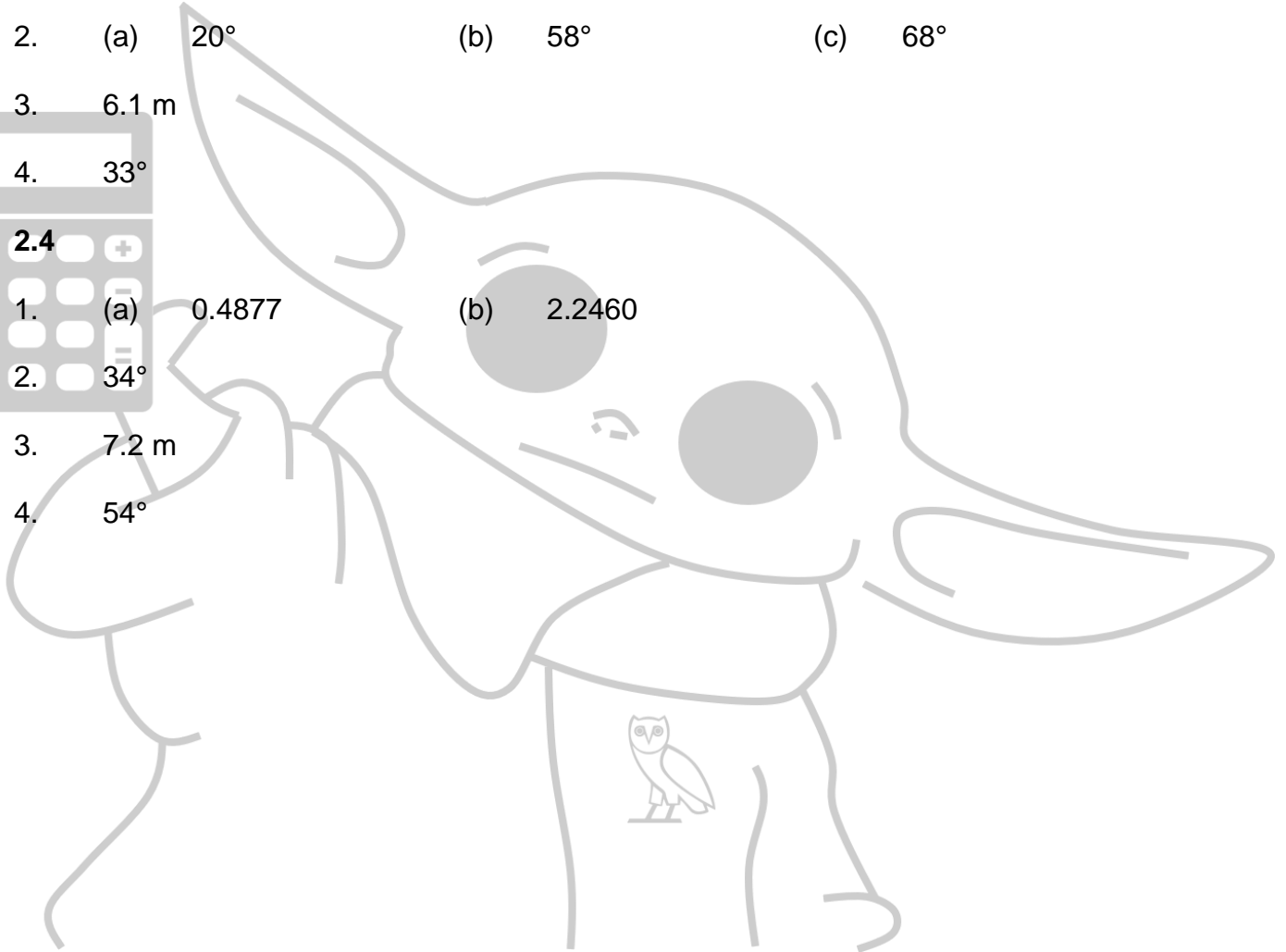
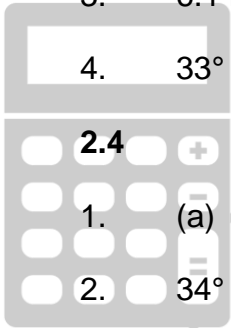
**2.4**

1. (a) 0.4877

- (b) 2.2460

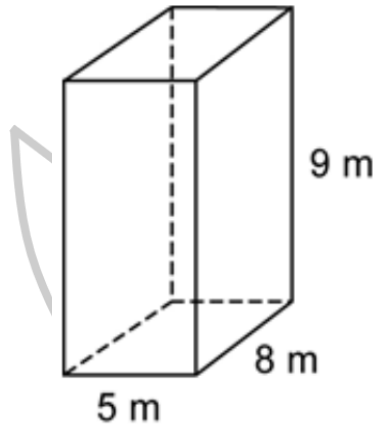
3. 7.2 m

4.  $54^\circ$

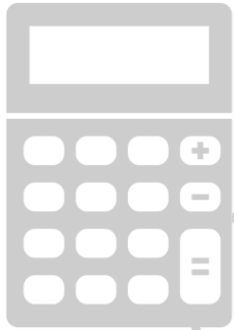
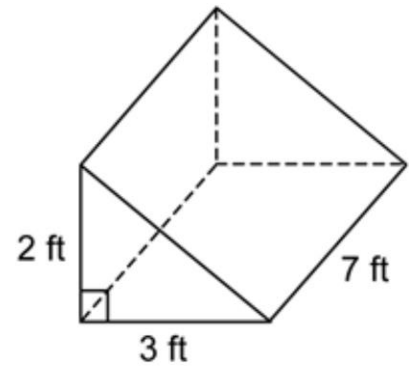
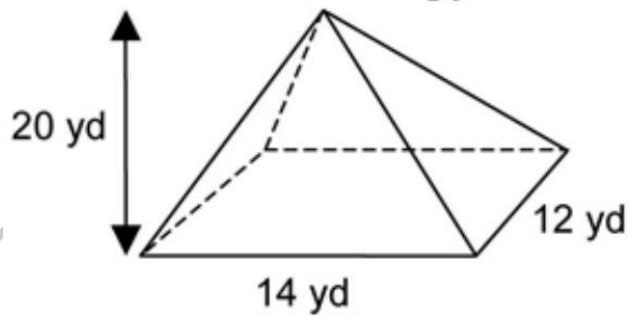


**FINAL EXAM REVIEW – CHAPTER 9****9.1 – VOLUME OF PRISMS and PYRAMIDS**Calculate the **volume** of each *prism* below

1. (a)



(b)

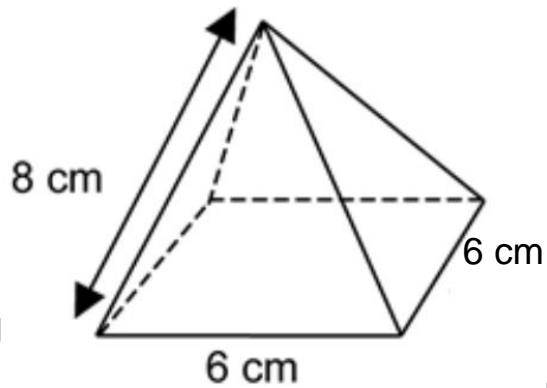
2. (a) Calculate the **volume** of the *pyramid*



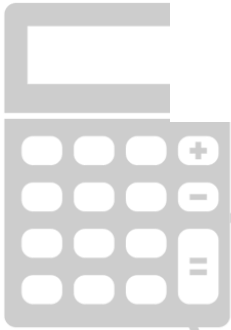
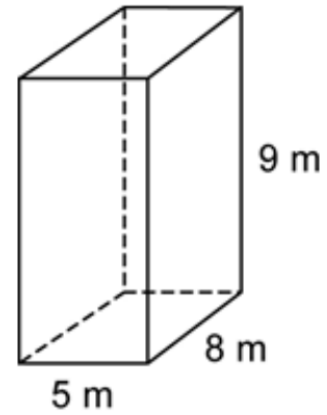
**9.2 – SURFACE AREA OF PRISMS and PYRAMIDS**

1. Calculate the **surface area** of the objects below

(a)



(b)

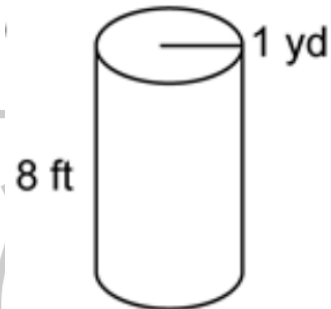
**9.3 – SURFACE AREA and VOLUME OF CYLINDERS**

1. Calculate the **surface area** and **volume** of the cylinders below

(a)



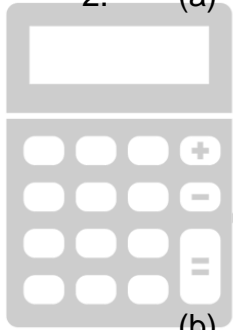
(b)



**9.4 – VOLUME OF CONES and SPHERES**

1. (a) Calculate the **volume** of a *sphere* with a **radius of 3 cm**
- (b) Calculate the **volume** of a *sphere* with a **diameter of 10 m**

2. (a) Calculate the **volume** of a *cone* with a **radius of 2 cm** and **height of 4.5 cm**



- (b) Calculate the **height** of a *cone* with a **volume of  $552.92 \text{ mm}^3$**  and **radius of 4 mm**

- (c) Calculate the **radius** of a *cone* with a **volume of  $2001.19 \text{ ft}^3$**  and **height of 13 ft**

**SOLUTIONS****9.1**

1. (a)  $360 \text{ m}^3$  (b)  $42 \text{ ft}^3$
2. (a)  $1120 \text{ yd}^3$

**9.2**

1. (a)  $125 \text{ cm}^2$  (b)  $314 \text{ m}^2$

**9.3**

1. (a)  $SA = 70.65 \text{ cm}^2, V = 39.25 \text{ cm}^3$

(b)  $SA = 207.24 \text{ ft}^2, V = 226.08 \text{ ft}^3$

**9.4**

1. (a)  $113.10 \text{ cm}^3$  (b)  $523.6 \text{ m}^3$
2. (a)  $18.84 \text{ cm}^3$  (b)  $33 \text{ mm}$  (c)  $12.1 \text{ ft}$

