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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.

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

(a) Graph the relationship on the grid provided

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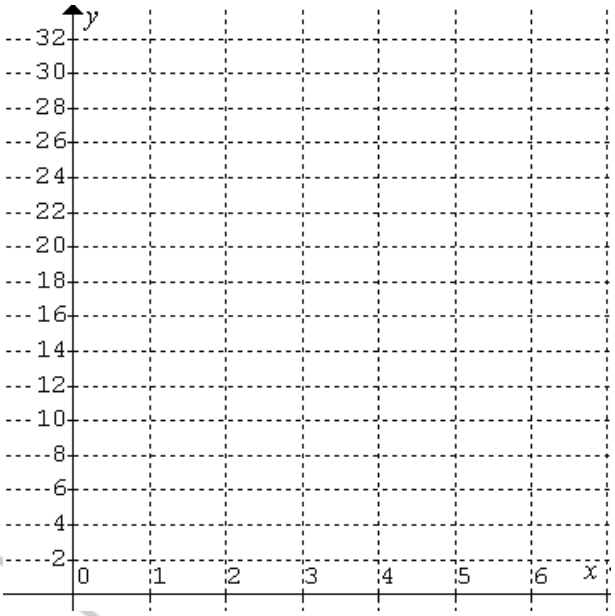
(b) Calculate the **slope** of the line



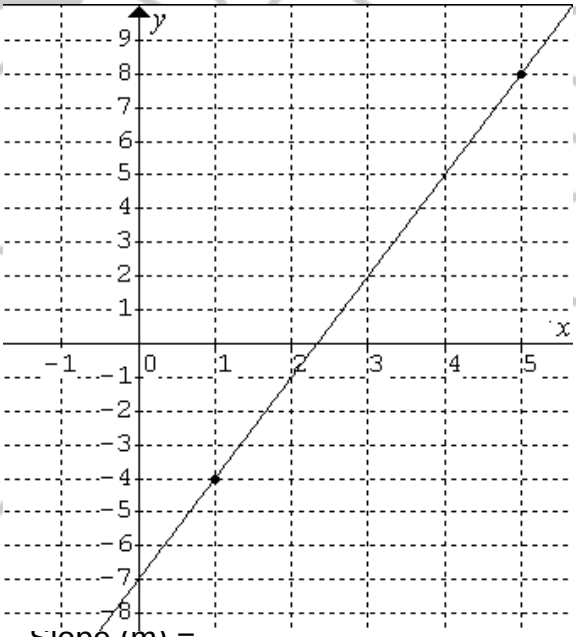
(c) Determine the **y-intercept** of the line

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

3. For each graph, use $slope(m) = \frac{RISE}{RUN}$ to calculate the slope of each line.

Determine the **y-intercept** and the equation of the line in form **y = mx + b**

(a)

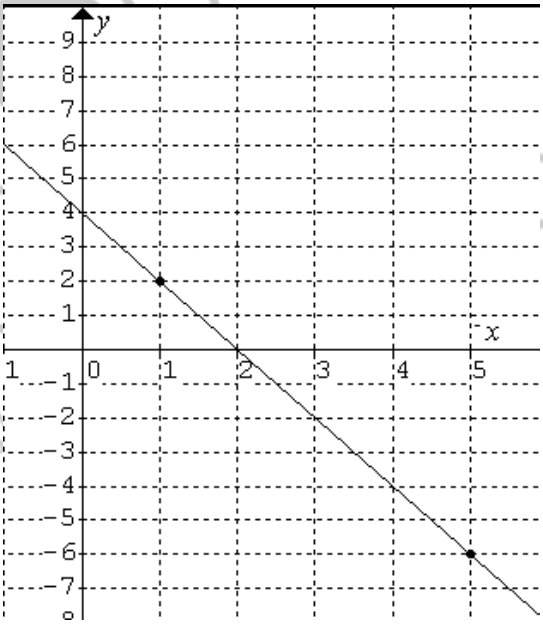


Slope (m) =

y-intercept (b) =

Equation (y = mx + b)

(b)



Slope (m) =

y-intercept (b) =

Equation (y = mx + b)

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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

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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 = 3 / 4, y-intercept = – 2 _____

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

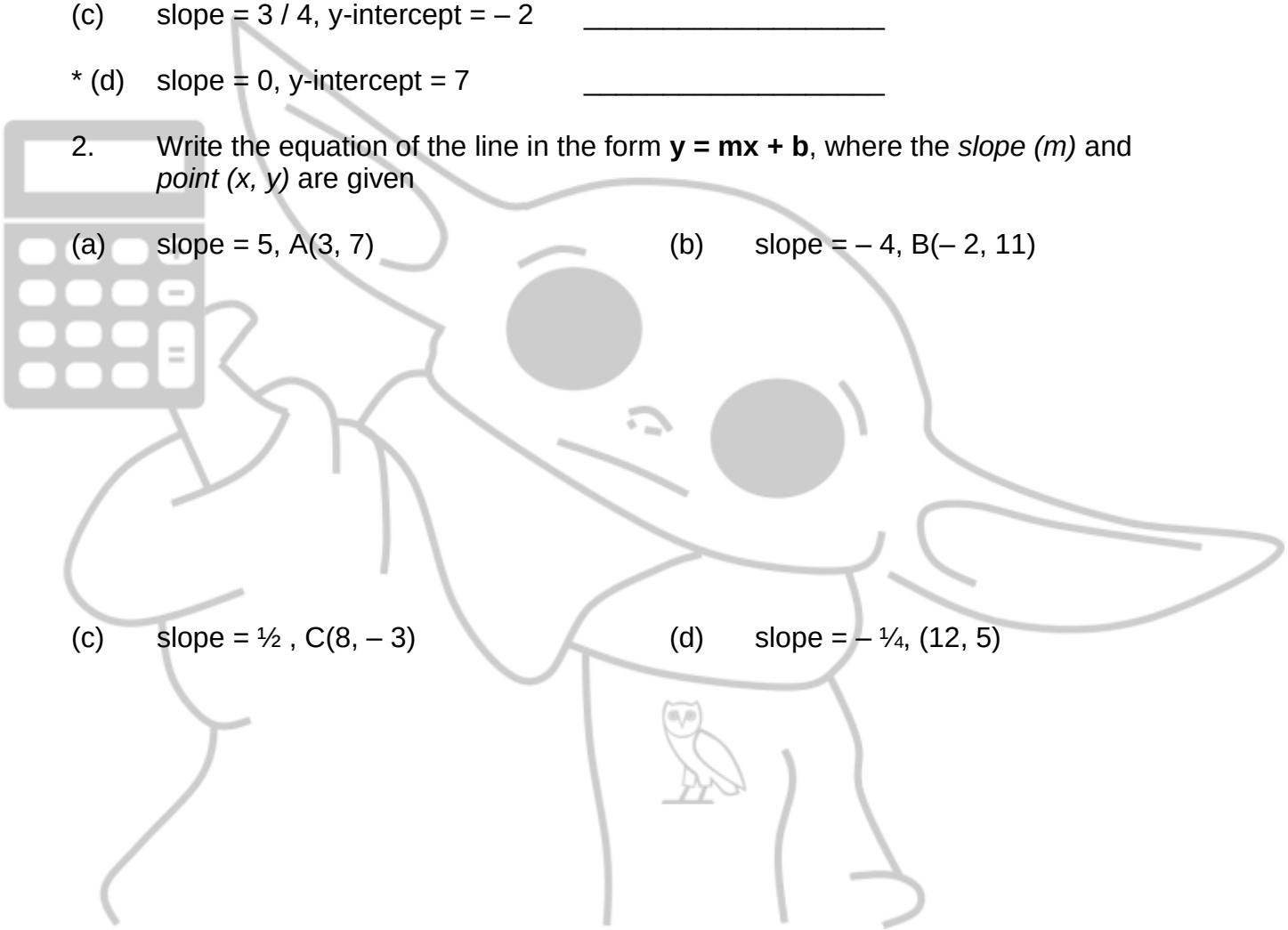
2. Write the equation of the line in the form **y = mx + b**, where the *slope (m)* and *point (x, y)* are given

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

(b) slope = – 4, B(– 2, 11)

(c) slope = ½ , C(8, – 3)

(d) slope = – ¼, (12, 5)



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3. For each pair of points

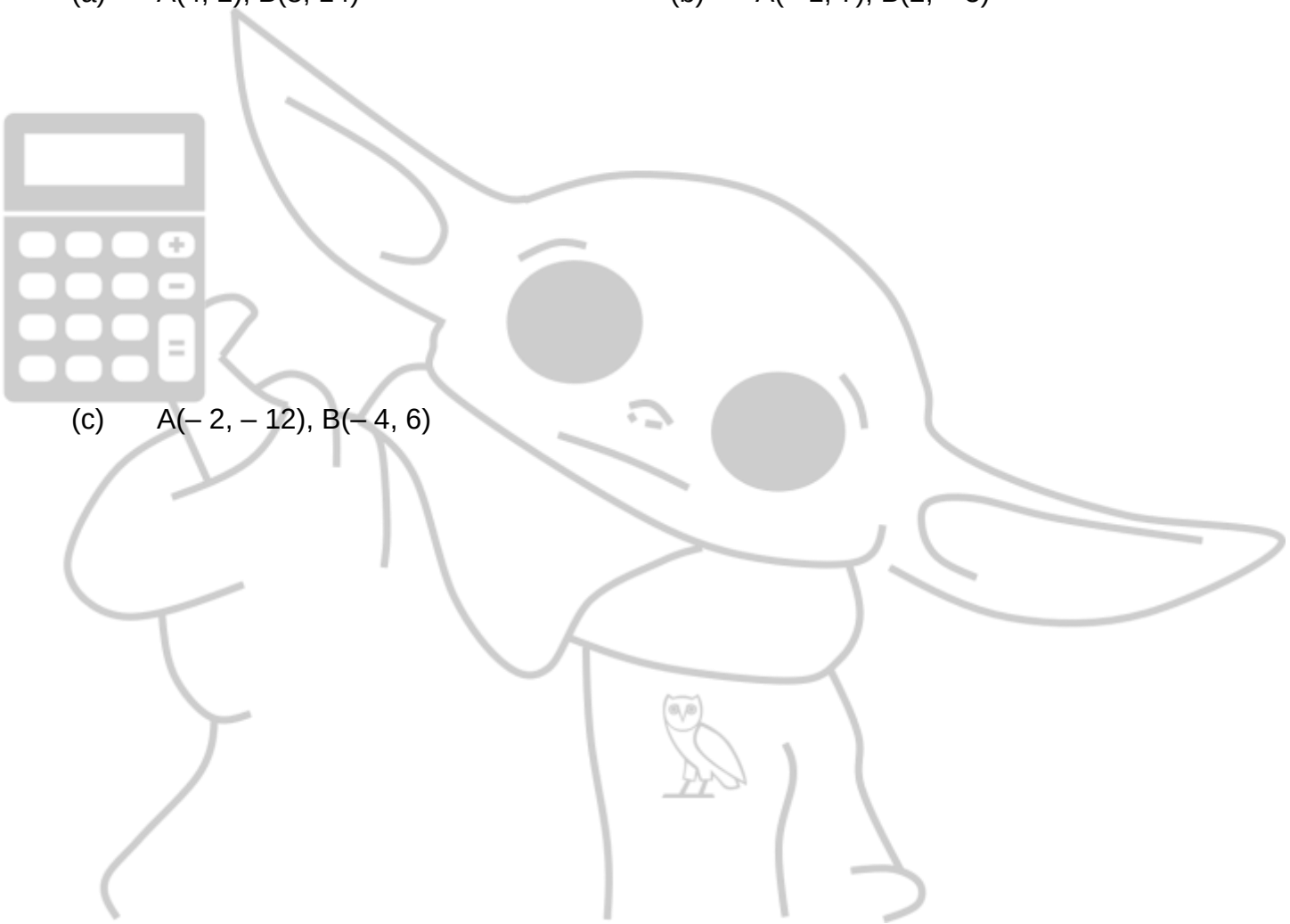
(i) Calculate the **slope** using the formula $slope(m) = \frac{y_2 - y_1}{x_2 - x_1}$

(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)

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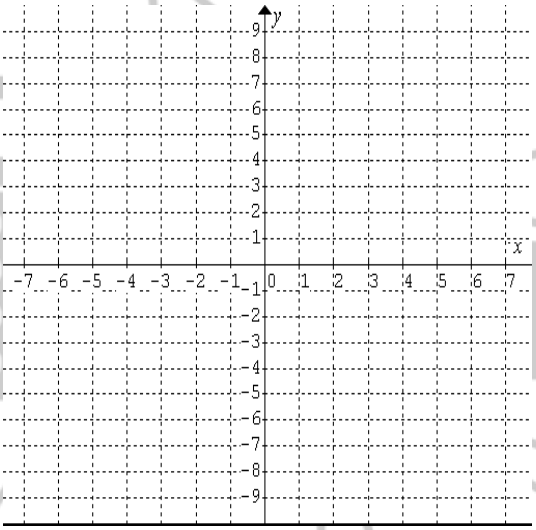
3.5 – GRAPH LINEAR RELATIONS BY HAND

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 = _____

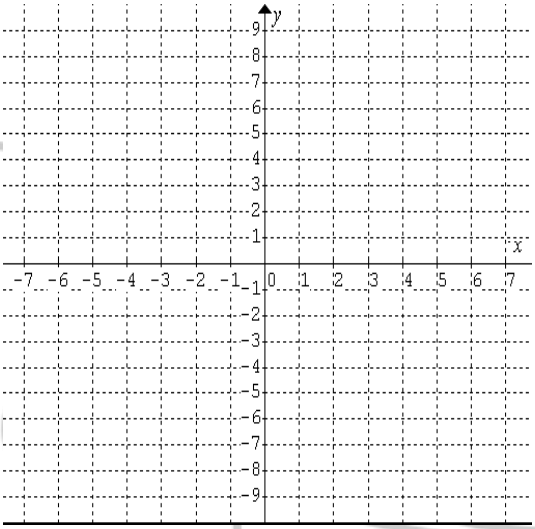
b = _____



(b) y = – 2x + 9

m = _____

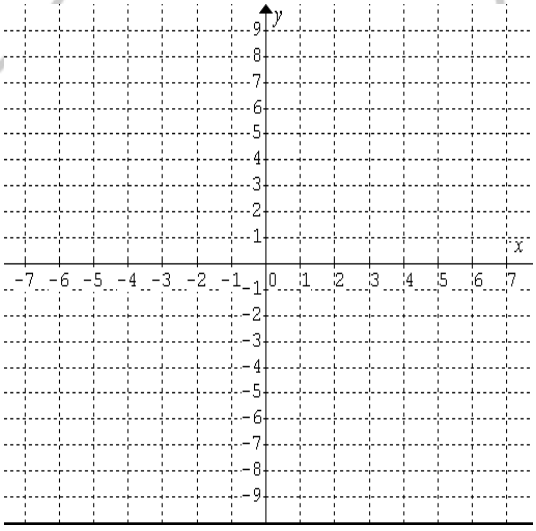
b = _____



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

m = _____

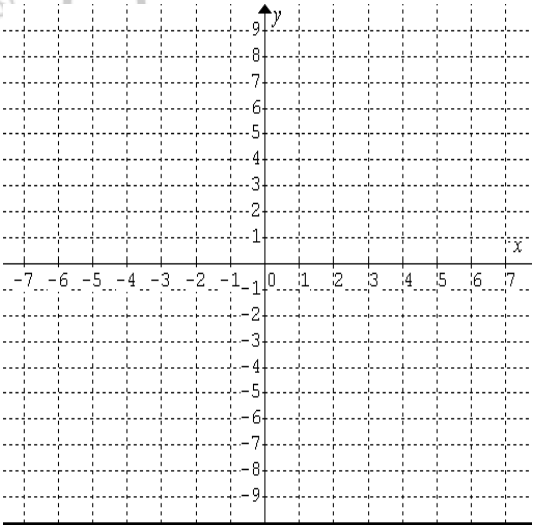
b = _____



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

m = _____

b = _____



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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

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

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4.2 – SOLVE MULTI-STEP LINEAR EQUATIONS

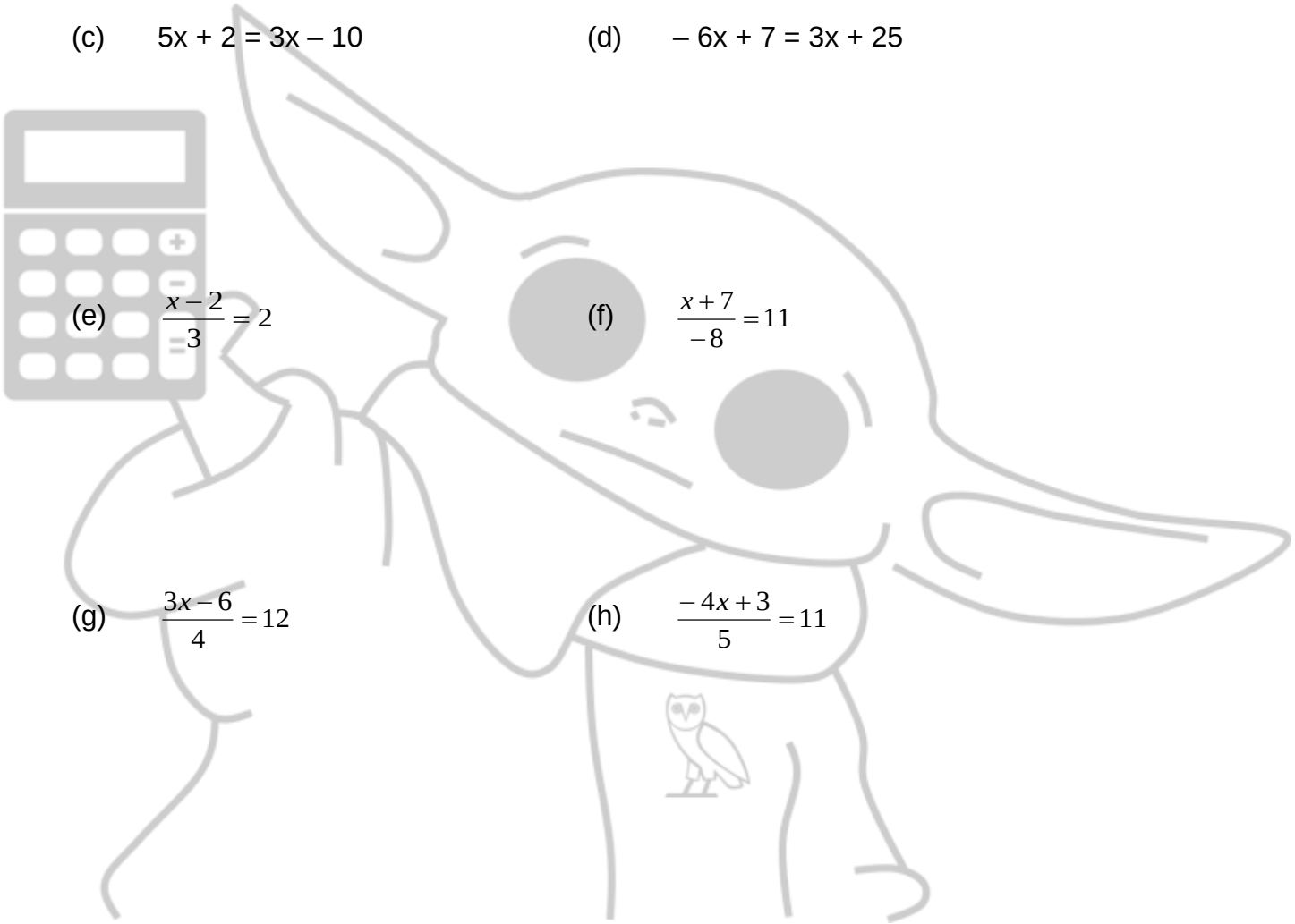
1. Solve for x for each equation:

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

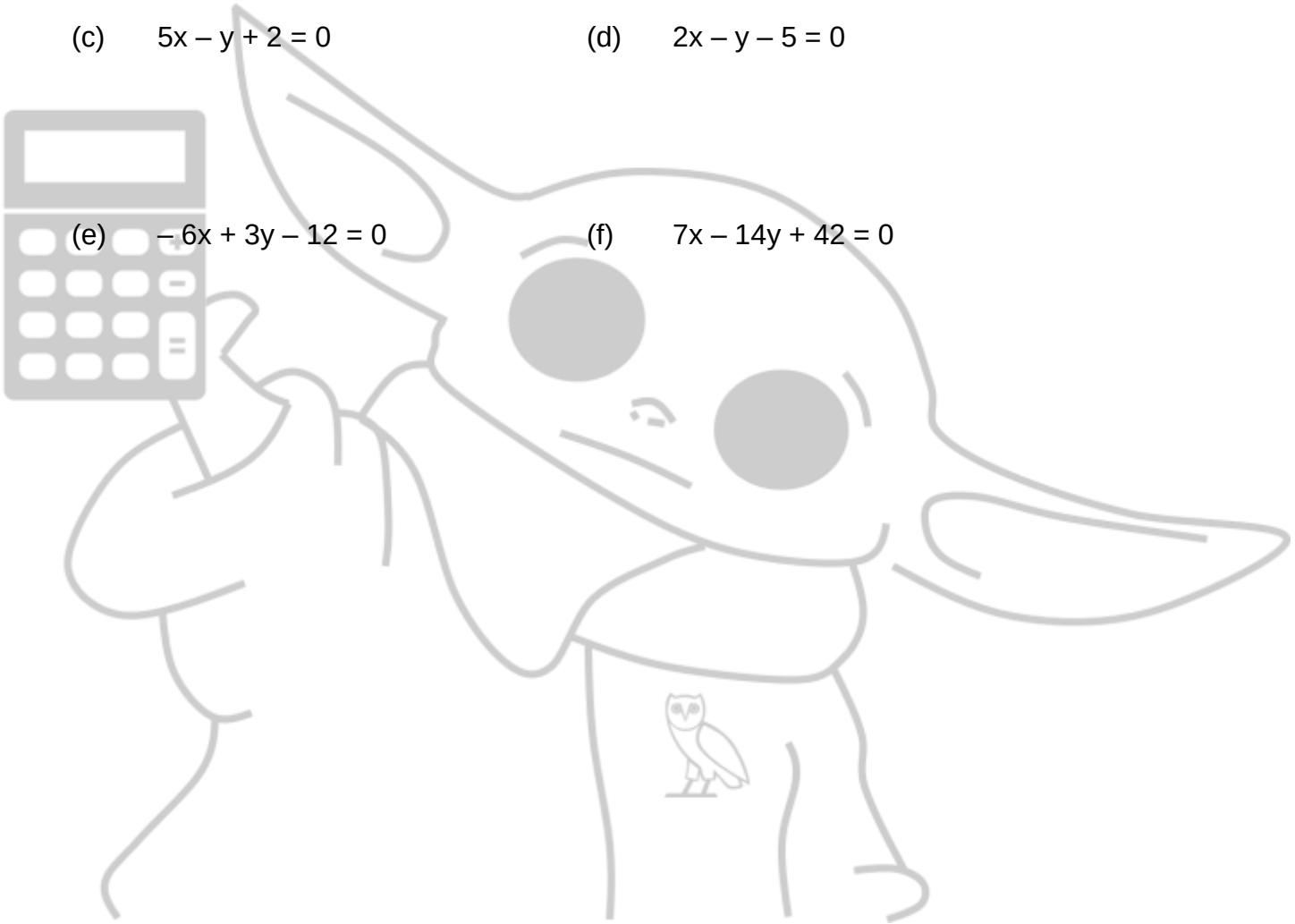
(b) $2x + y - 1 = 0$

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

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

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

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



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SOLUTIONS

4.1

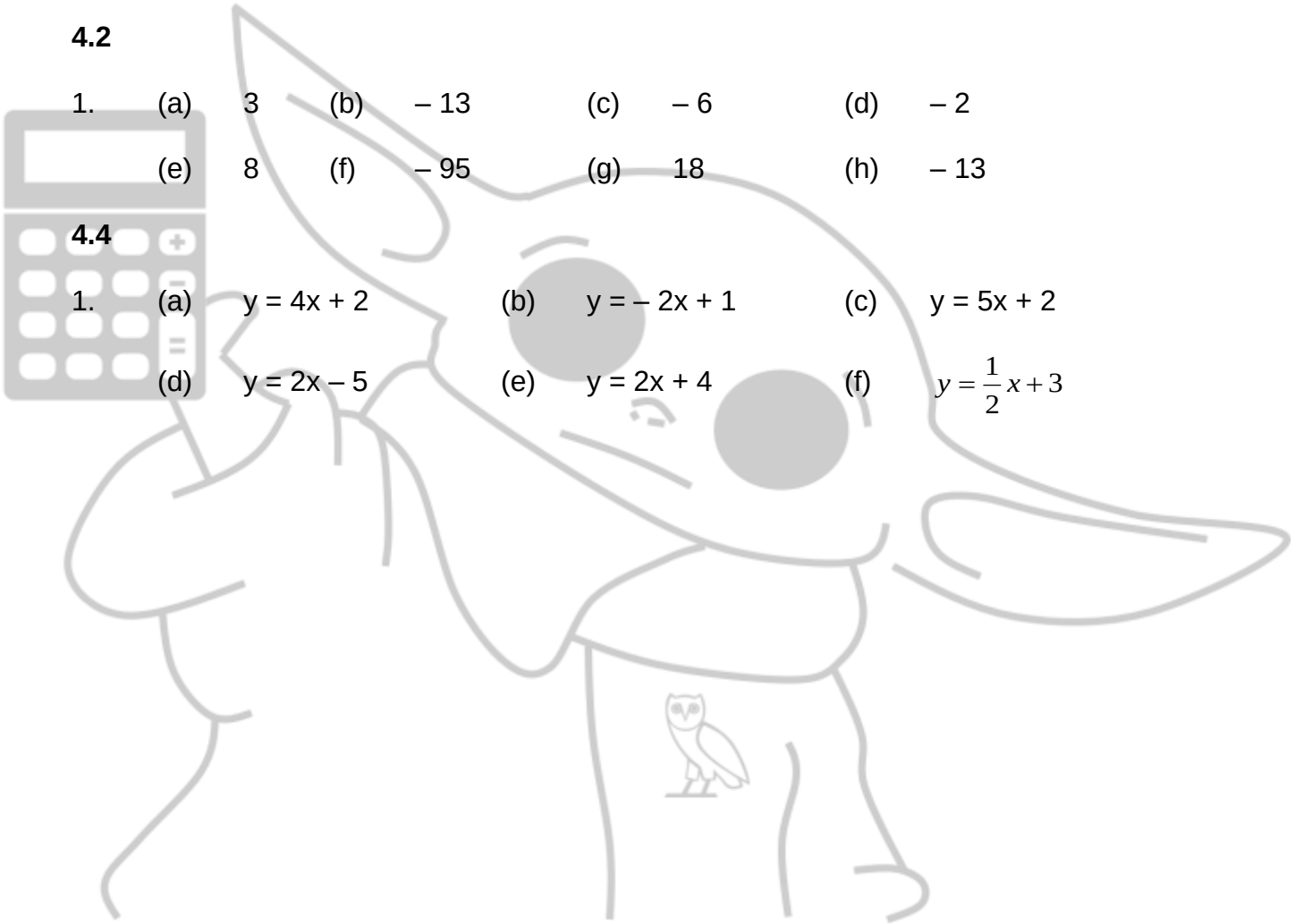
1.	(a)	4	(b)	26	(c)	17	(d)	22	(e)	– 10
	(f)	7	(g)	48	(h)	– 45	(i)	– 77		
2.	(a)	8	(b)	– 9	(c)	6	(d)	– 45	(e)	– 5

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



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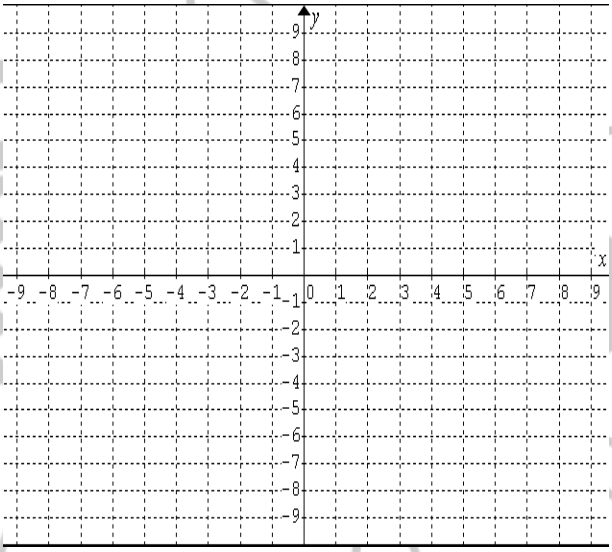
FINAL EXAM REVIEW – CHAPTER 5

5.1 – SOLVE LINEAR EQUATIONS BY GRAPHING

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

(a) y = 3x – 1

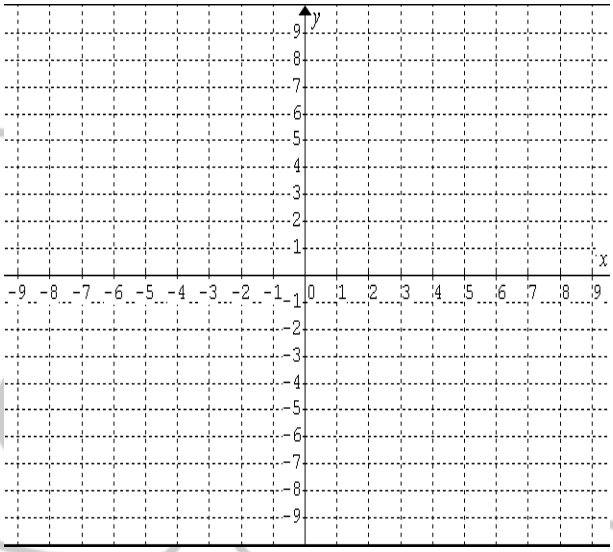
y = 2x + 1



Point of intersection = _____

(b) y = x + 4

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

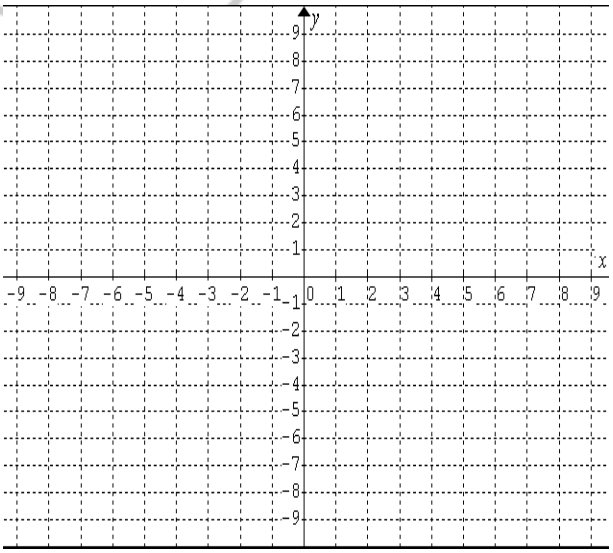


Point of intersection = _____

(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

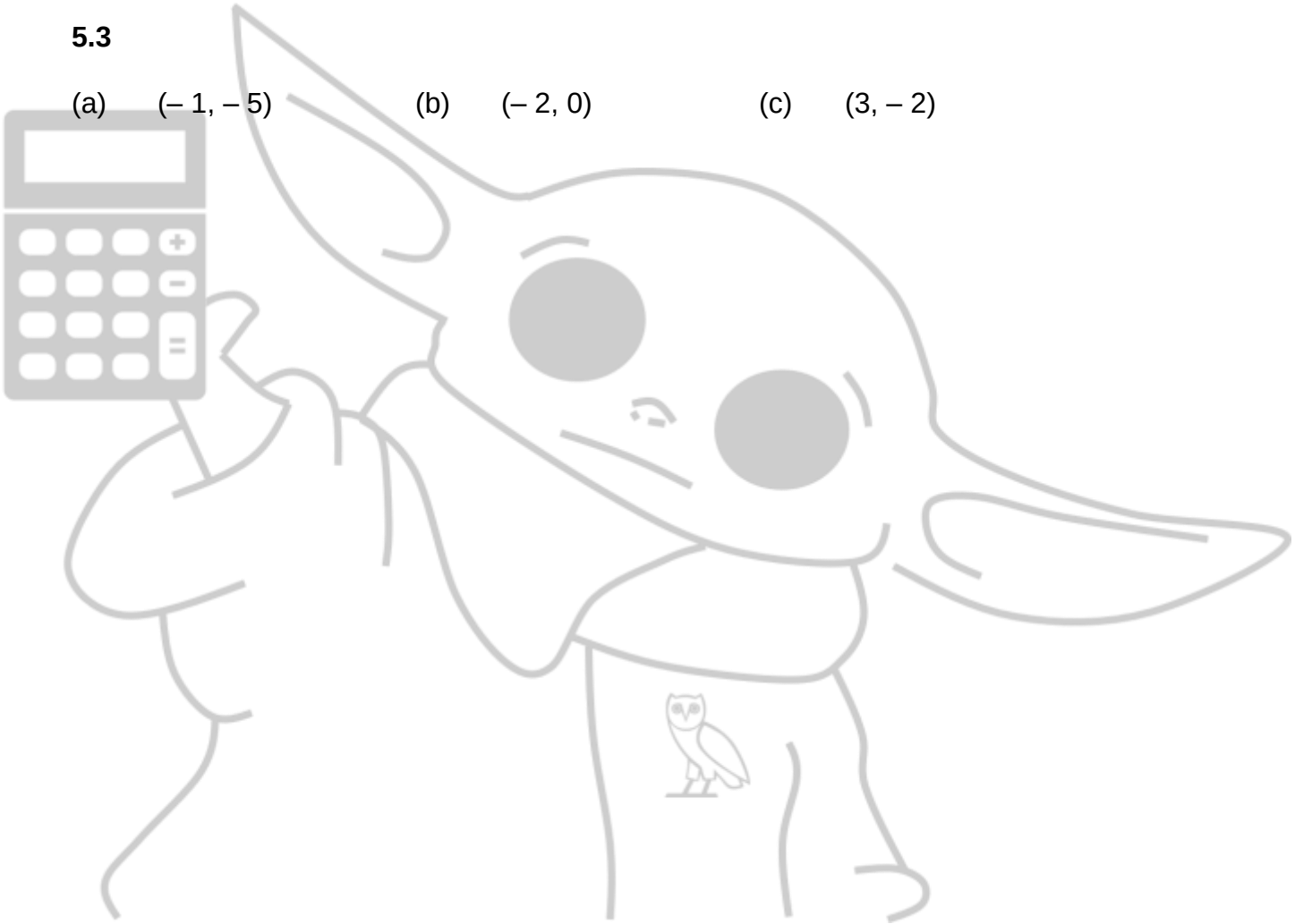
(a) (2, 5) (b) (– 2, 2) (c) (2, – 7)

5.2

(a) (1, 4) (b) (– 3, 5) (c) (4, – 7)

5.3

(a) (– 1, – 5) (b) (– 2, 0) (c) (3, – 2)



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FINAL EXAM REVIEW – CHAPTER 6

6.1 – EXPLORING NON-LINEAR RELATIONS

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

(a)

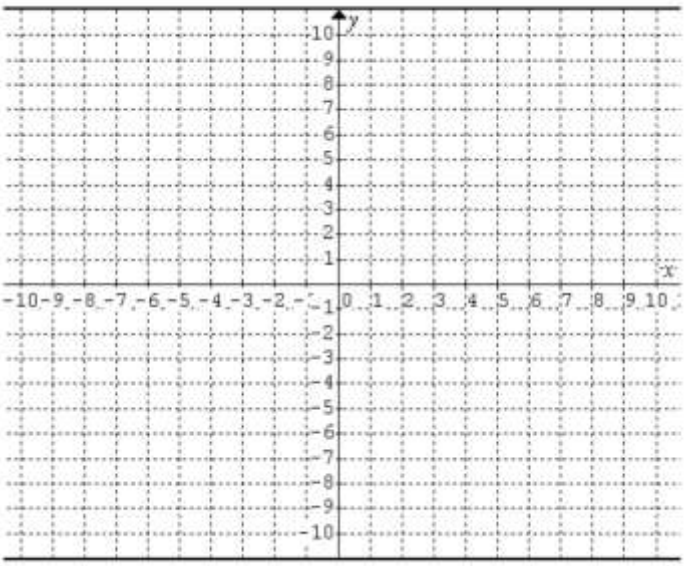
x	*y*	*1st Diff.*	*2nd Diff.*
– 2	4		
– 1	1		
0	0		
1	1		
2	4		

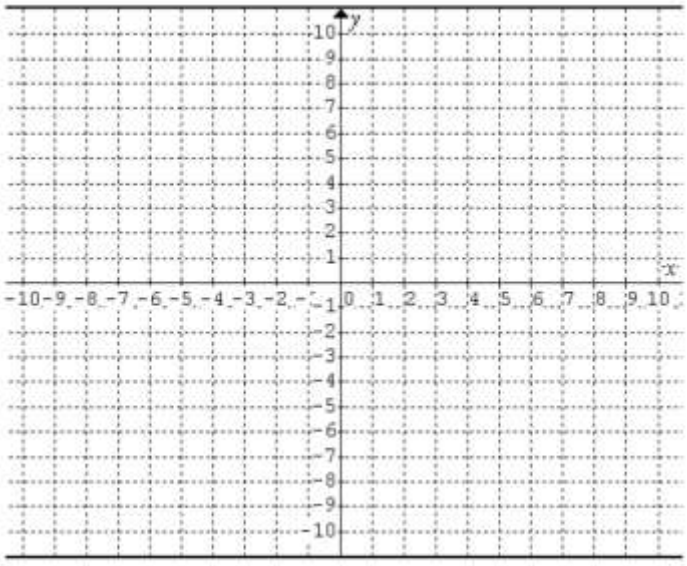
How do you know this is a **quadratic** relation?

(b)

x	*y*	*1st Diff.*	*2nd Diff.*
– 4	– 8		
– 2	– 2		
0	0		
2	– 2		
4	– 8		

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





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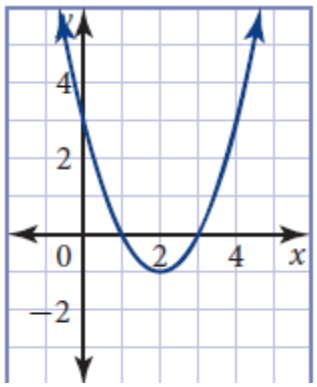
6.3 – KEY FEATURS OF QUADRATIC RELATIONS

1. Answer the questions for each graph below

(a)



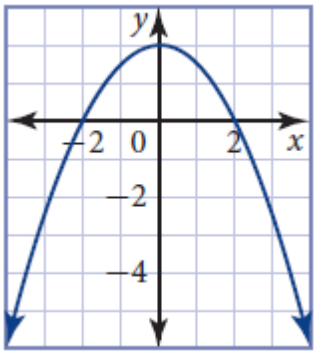
(i) Coordinates of the vertex = _____

(ii) Axis of symmetry = _____

(iii) y-intercept = _____

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

(b)



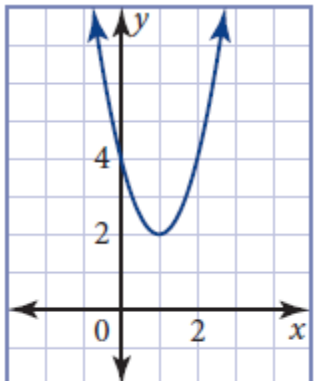
(i) Coordinates of the vertex = _____

(ii) Axis of symmetry = _____

(iii) y-intercept = _____

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

(c)



(i) Coordinates of the vertex = _____

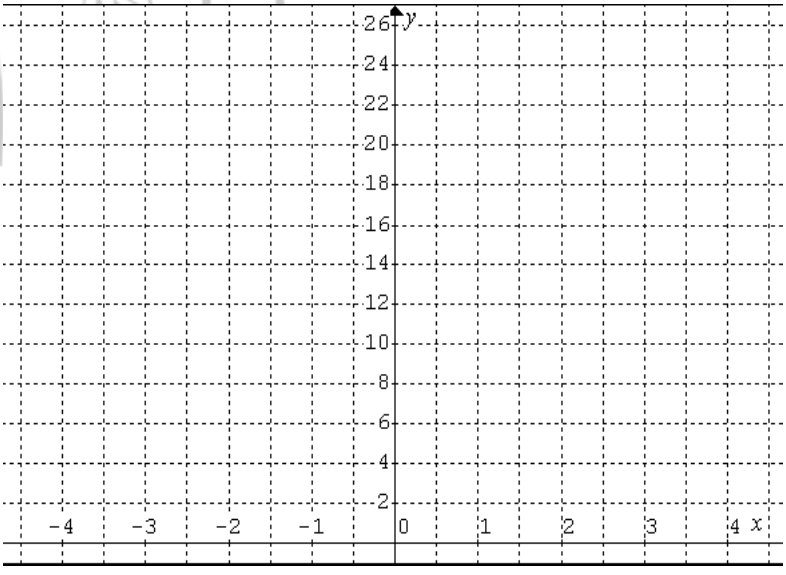
(ii) Axis of symmetry = _____

(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***	***1st Diff.***	***2nd Diff.***
– 2	17		
– 1			
0			
1			
2			



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SOLUTIONS

6.1

1. (a)

x	*y*	*1st Diff.*	*2nd Diff.*
– 2	4		
		– 3	
– 1	1		4
		– 1	
0	0		4
		1	
1	1		4
		3	
2	4		

How do you know this is a **quadratic** relation?
1st differences not constant, 2nd differences constant

(b)

x	*y*	*1st Diff.*	*2nd Diff.*
– 4	– 8		
		6	
– 2	– 2		– 4
		2	
0	0		– 4
		– 2	
2	– 2		– 4
		– 6	
4	– 8		

How do you know this is a **quadratic** relation?
1st differences not constant, 2nd 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*	*1st Diff.*	*2nd Diff.*
– 2	17		
		6	
– 1	23		– 4
		2	
0	25		– 4
		– 2	
1	23		– 4
		– 6	
2	17		

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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 buy **common factoring**

(a) $5x + 40$ GCF = _____ (b) $30x^2 + 6x$ GCF = ____

(c) $12x^2 – 36x$ GCF = _____ (d) $42x^2 – 7x$ GCF = ____

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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 =

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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

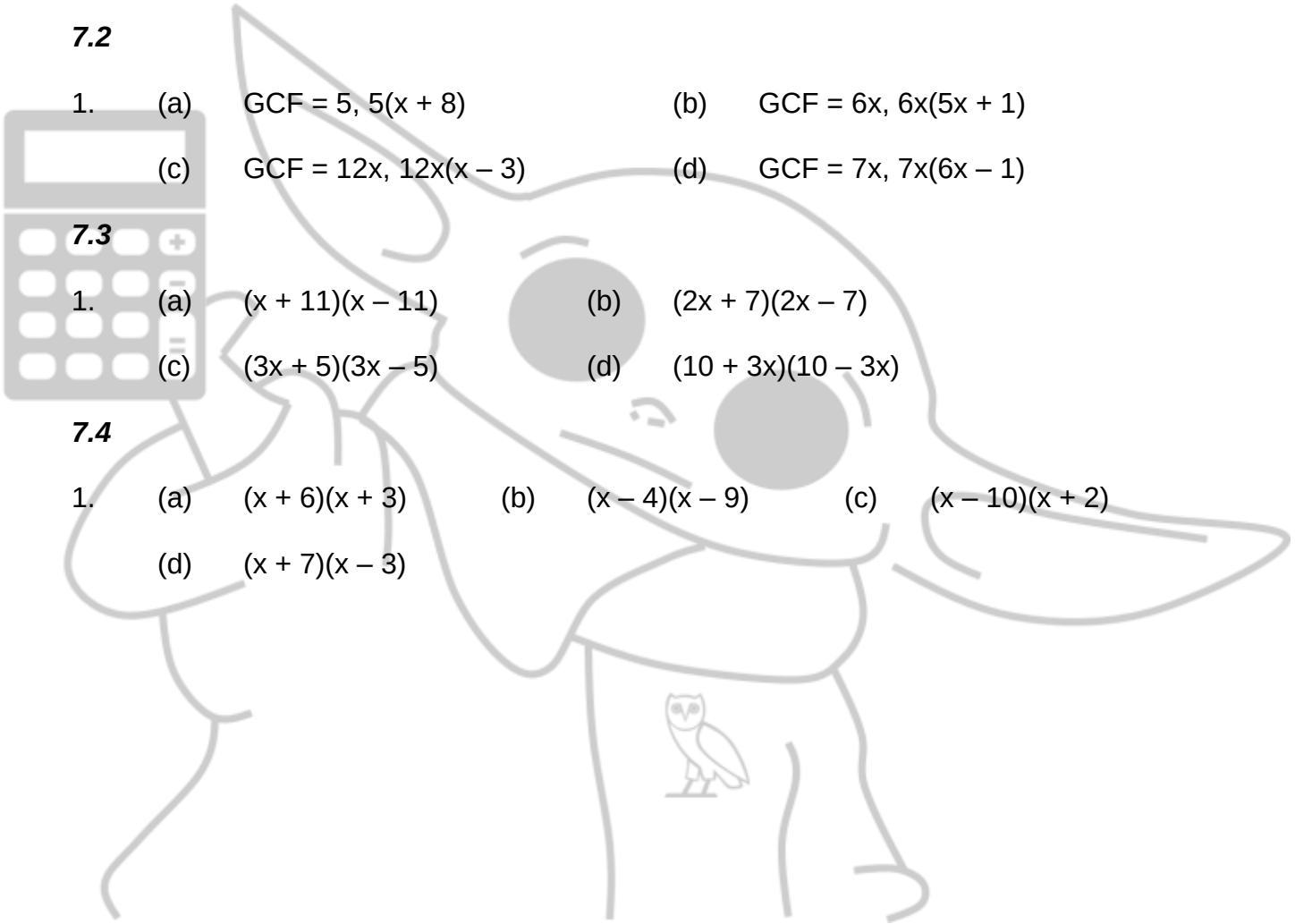
1. (a) $(x + 11)(x – 11)$ (b) $(2x + 7)(2x – 7)$

   (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) $(x + 7)(x – 3)$



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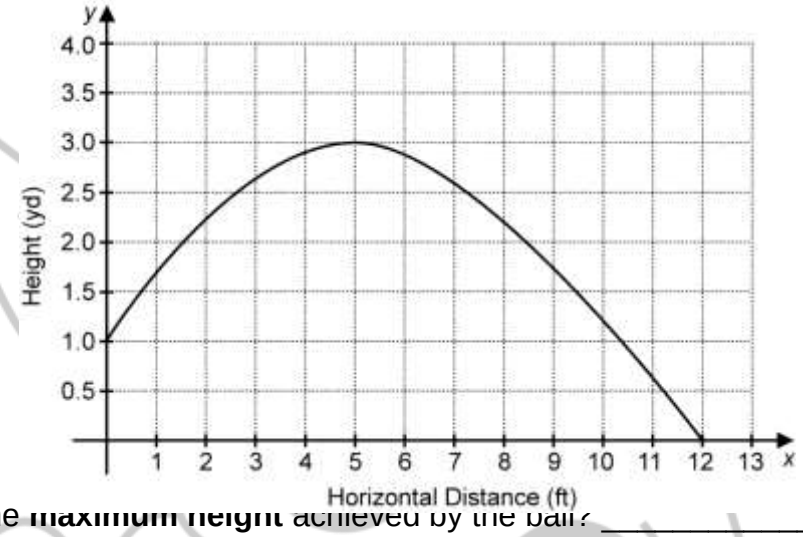
FINAL EXAM REVIEW – CHAPTER 8

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? _____

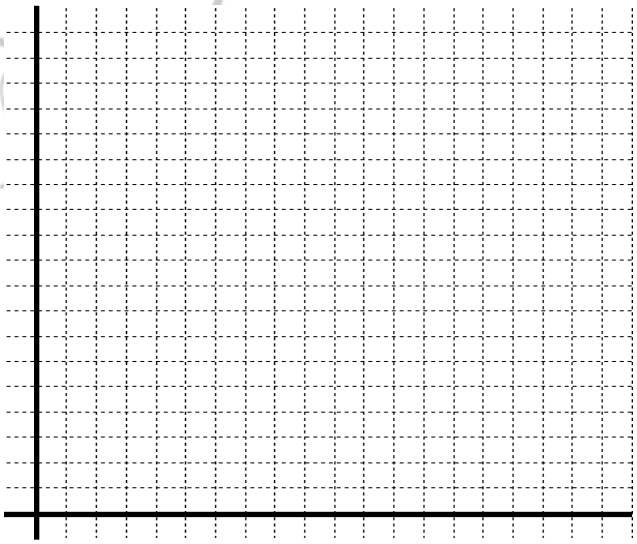
(b) **How long** did it take the ball to reach this maximum height? _____

(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?

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SOLUTIONS

8.1

1. (a) 3 m (b) 5 s (c) 1 m

2. (b) 6 m (c) 30 s

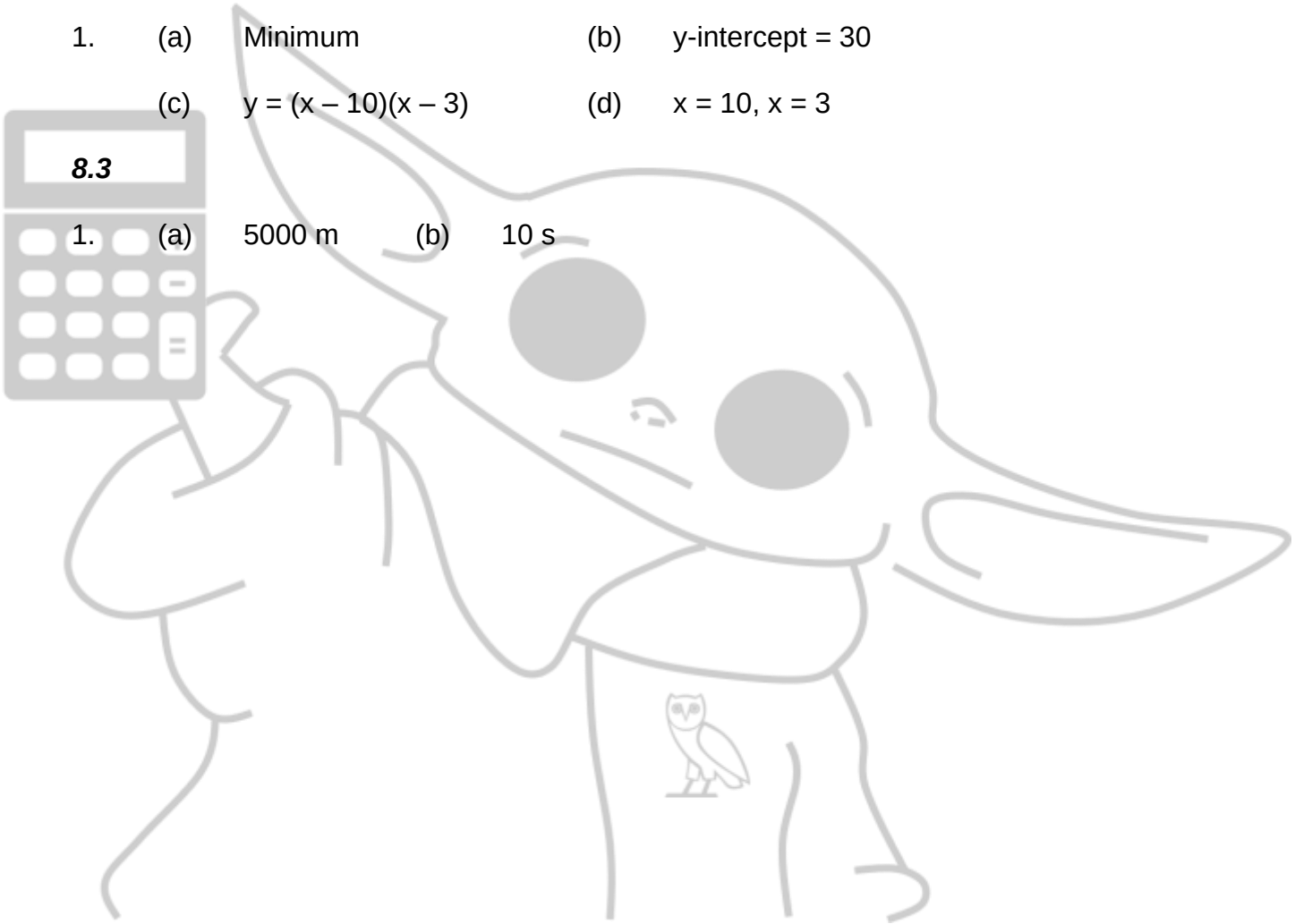
8.2

1. (a) Minimum (b) y-intercept = 30

   (c) $y = (x - 10)(x - 3)$ (d) $x = 10, x = 3$

8.3

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



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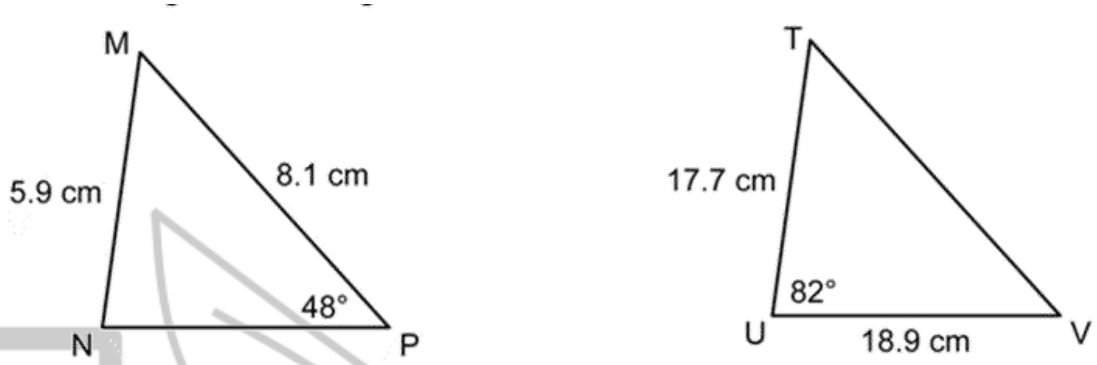
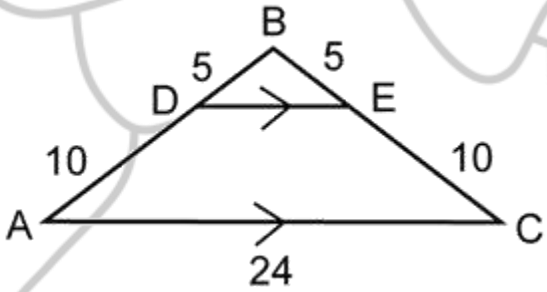
FINAL EXAM REVIEW – CHAPTER 1 (SIMILAR TRIANGLES)

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 <u>one decimal place</u>.



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 cm, ∠M = 50°, ∠N = 82°, TV = 24.3 cm, ∠T = 50°, ∠V = 48°

2. DE = 8

3. 2.67 m

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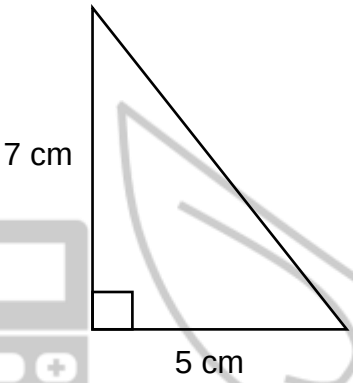
FINAL EXAM REVIEW – CHAPTER 2

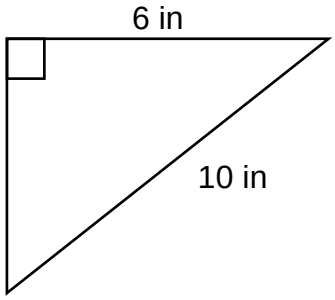
2.1 - THE PYTHAGOREAN THEOREM

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 <u>four decimal places</u>

(a) sin 85° = _____ (b) cos 24° = _____

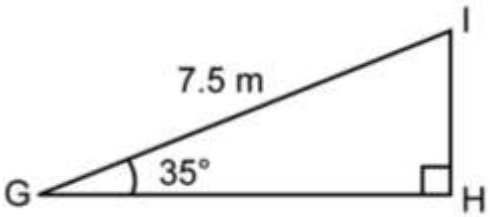
(c) cos 64° = _____

2. Use a calculator to determine the measure of ∠A. Express your answer to the <u>nearest degree</u>

(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 <u>one decimal place</u>



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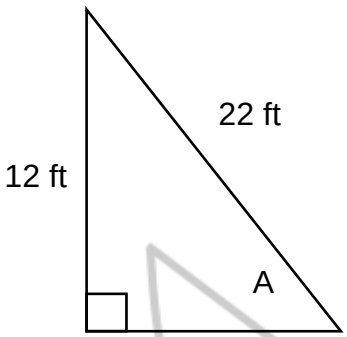
4. Use a trigonometric ratio to calculate the measure of ∠**A**. Express your answer to the nearest whole number



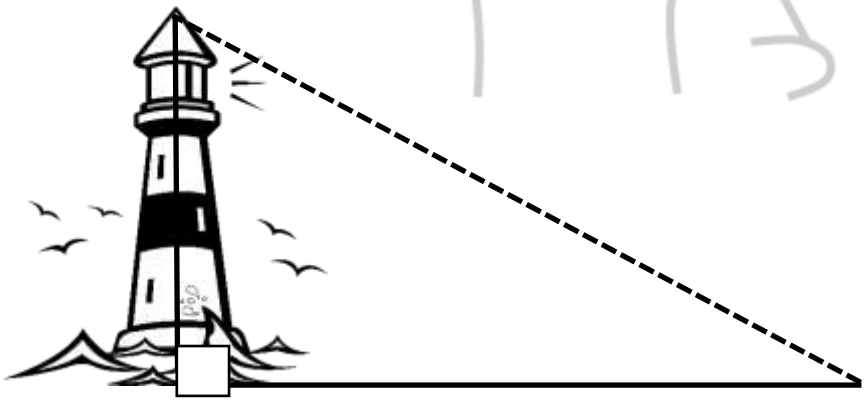
2.4 – THE TANGENT RATIO

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

(a) tan 26° = _____ (b) tan 66° = _____

2. Use a calculator to determine the measure of ∠**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°**. **How tall is the lighthouse**?



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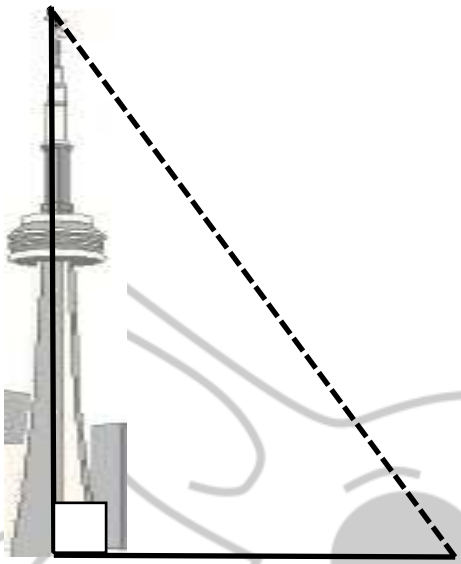
4. Ahmed looks up at the CN Tower while standing **400 m** in front of the **550 m** tower. Calculate the *angle of elevation*. Express your answer to the nearest whole number



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SOLUTIONS

2.1

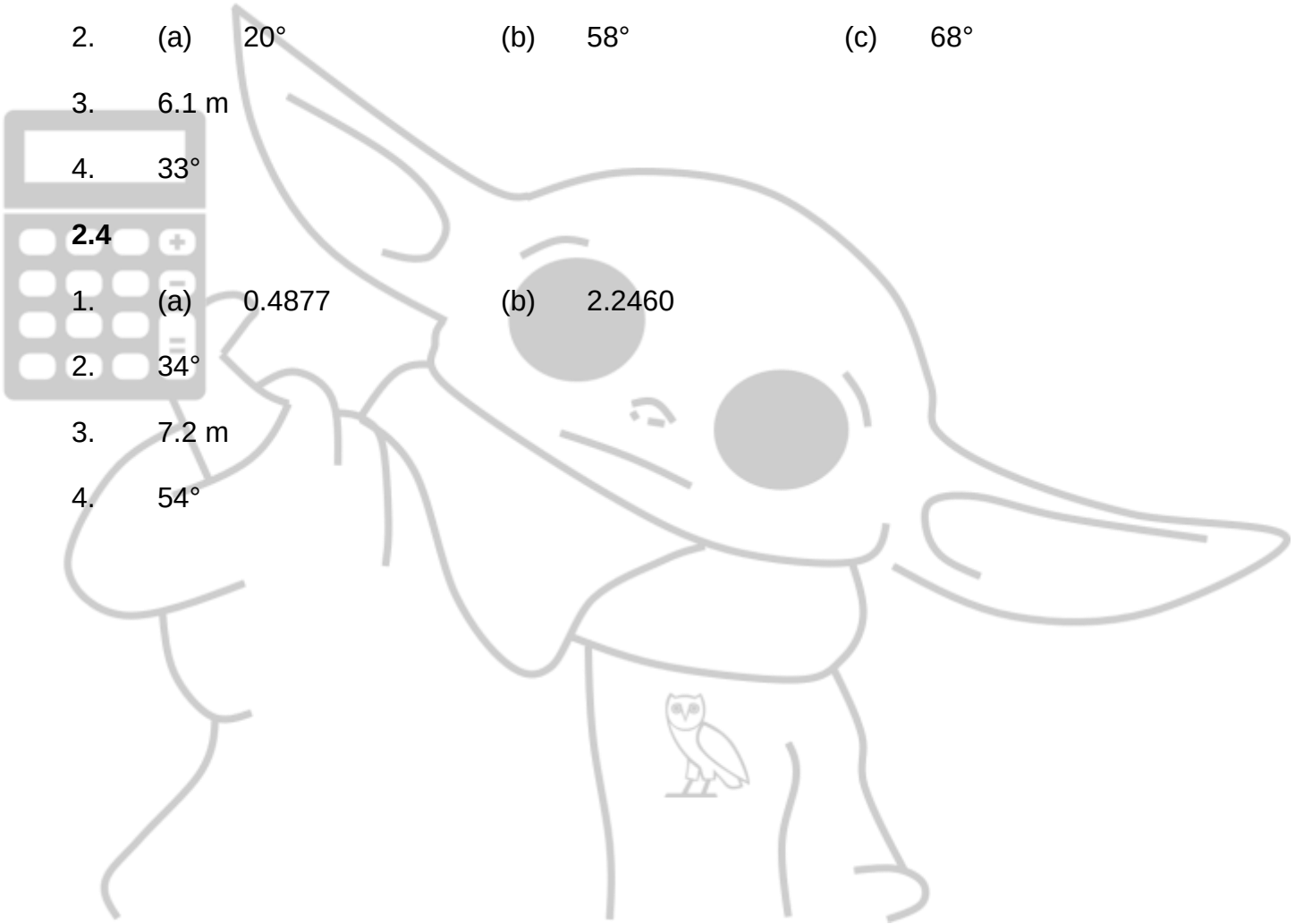
1. (a) 8.6 cm (b) 8 in

2.3

1. (a) 0.9962 (b) 0.9135 (c) 0.4384
2. (a) 20° (b) 58° (c) 68°
3. 6.1 m
4. 33°

2.4

1. (a) 0.4877 (b) 2.2460
2. 34°
3. 7.2 m
4. 54°



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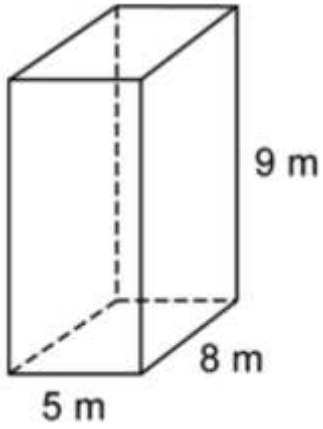
FINAL EXAM REVIEW – CHAPTER 9

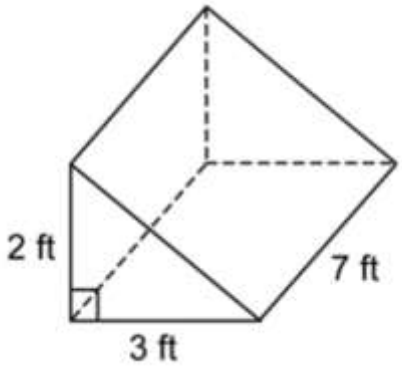
9.1 – VOLUME OF PRISMS and PYRAMIDS

Calculate the **volume** of each *prism* below

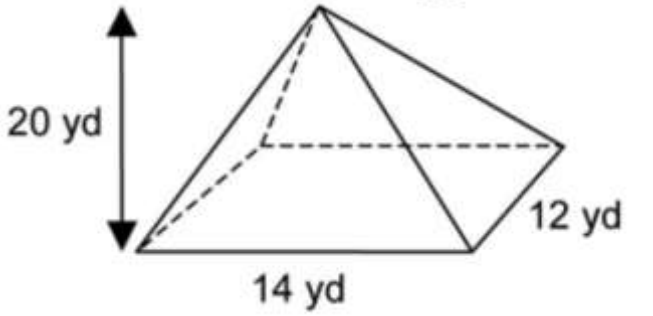
1. (a)



(b)



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



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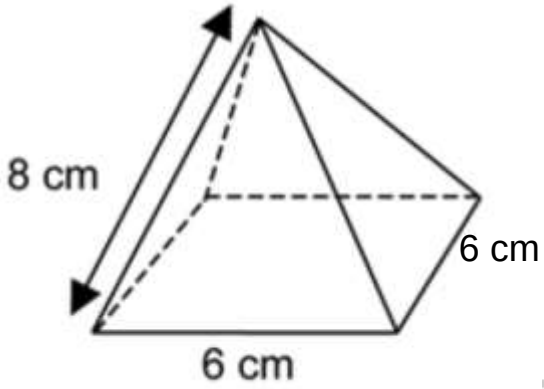
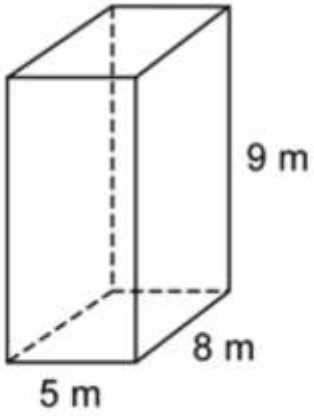
9.2 – SURFACE AREA OF PRISMS and PYRAMIDS

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

(a)



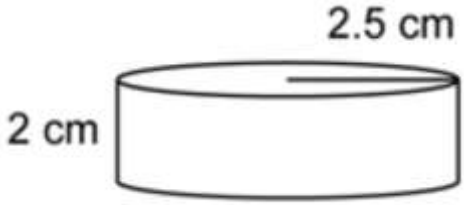
(b)



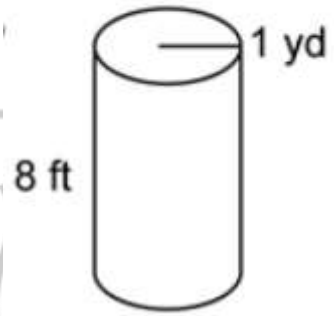
9.3 – SURFACE AREA and VOLUME OF CYLINDERS

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

(a)



(b)



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9.4 – VOLUME OF CONES and SPHERES

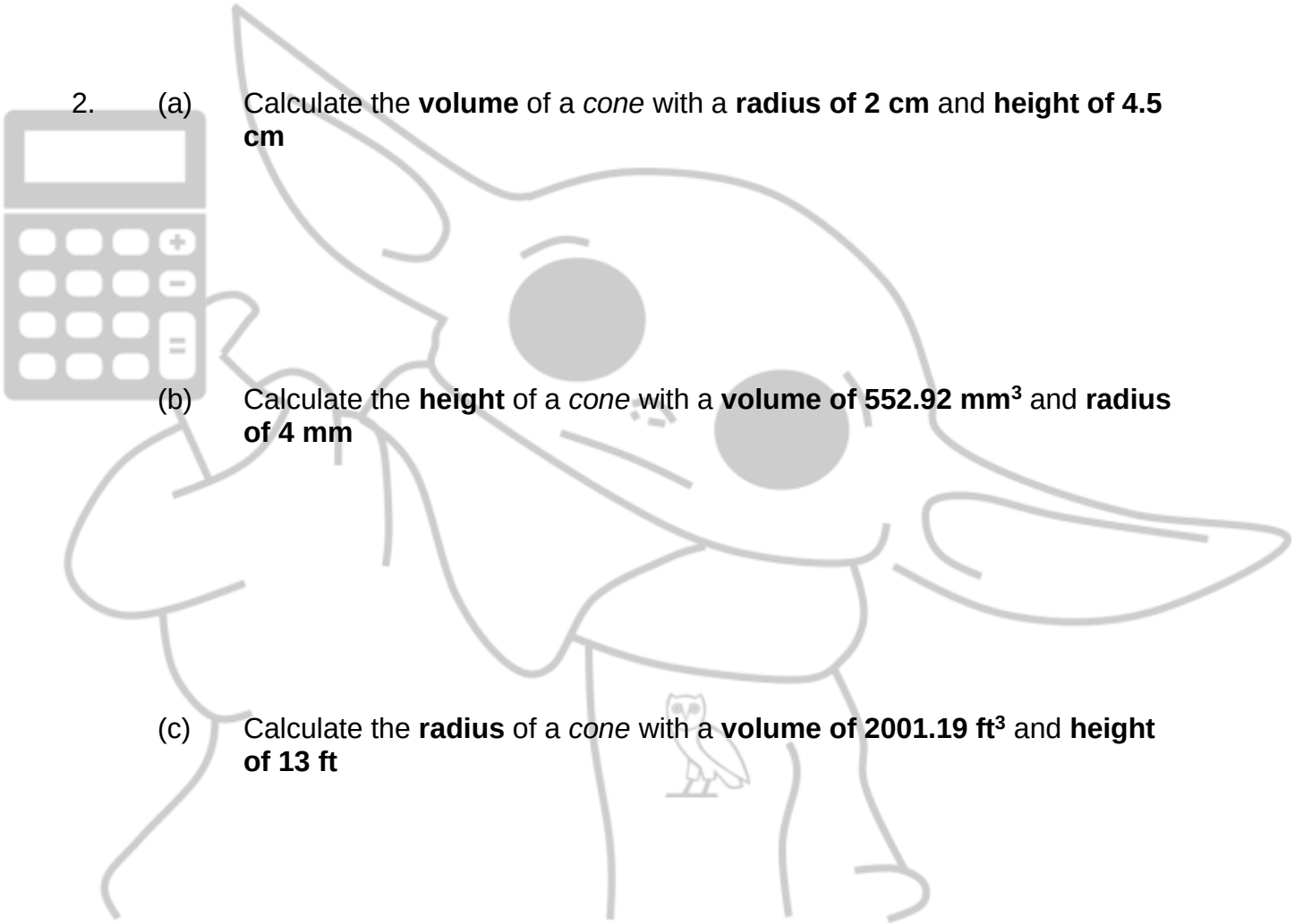
1. (a) Calculate the **volume** of a *sphere* with a **radius of 3 cm**

(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 mm^3** and **radius of 4 mm**

(c) Calculate the **radius** of a *cone* with a **volume of 2001.19 ft^3** and **height of 13 ft**



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SOLUTIONS

9.1

1. (a) 360 m^3 (b) 42 ft^3

2. (a) 1120 yd^3

9.2

1. (a) 125 cm^2 (b) 314 m^2

9.3

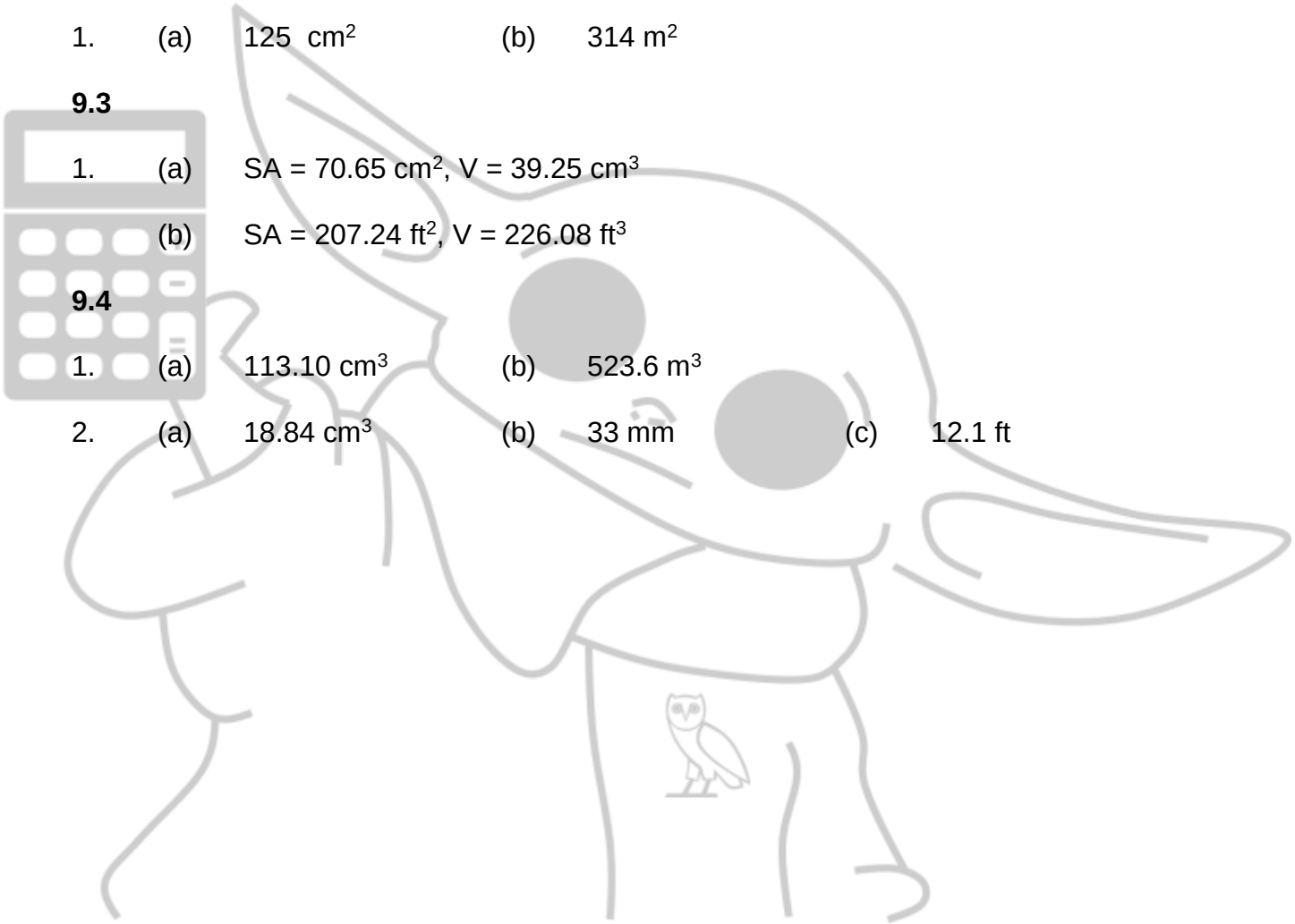
1. (a) SA = 70.65 cm^2, V = 39.25 cm^3

   (b) SA = 207.24 ft^2, V = 226.08 ft^3

9.4

1. (a) 113.10 cm^3 (b) 523.6 m^3

2. (a) 18.84 cm^3 (b) 33 mm (c) 12.1 ft



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