

MATH 10

FINAL REVIEW

Chapters 2-7

Name: Key

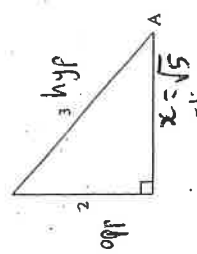
MATH 10

FINAL REVIEW

1977

Chapter 2

① Determine the ratio of $\cos A$.



$$\cos A = \frac{\sqrt{5}}{3}$$

$$x^2 + 2^2 = 3^2$$

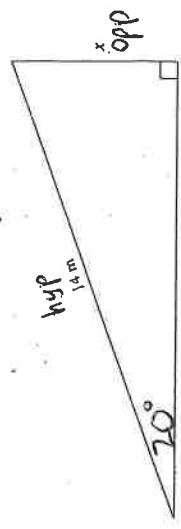
$$x^2 + 4 = 9$$

$$x^2 = 5$$

$$x = \sqrt{5}$$

- A. $\cos A = \frac{2}{3}$
- B. $\cos A = \frac{\sqrt{5}}{3}$
- C. $\cos A = \frac{\sqrt{13}}{3}$
- D. $\cos A = \frac{3}{\sqrt{5}}$

② Using a protractor, measure one of the unknown angles and determine the length of side x .



Note: This diagram is drawn to scale.

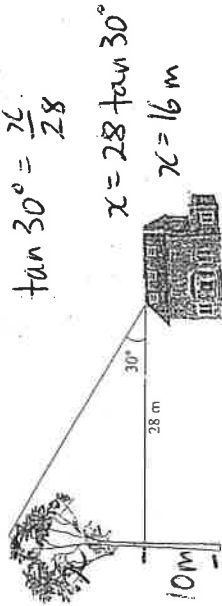
- A. 3.5 m
- B. 4.8 m
- C. 5.1 m
- D. 13.2 m

$$\sin 20^\circ = \frac{x}{14}$$

$$x = 14 \sin 20^\circ$$

$$x = 4.8 \text{ m}$$

- 3) A 10 metre tall farmhouse is located 28.0 m away from a tree with an eagle's nest. The angle of elevation from the roof of the farmhouse to the eagle's nest is 30° .

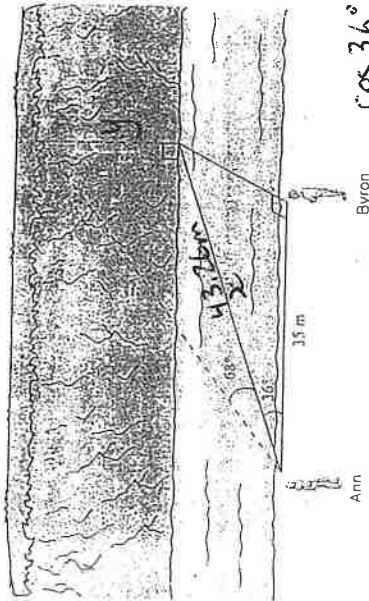


What is the height of the eagle's nest?

- A. 16 m
 B. 24 m
 C. 26 m
 D. 48 m

$16 \text{ m} + 10 \text{ m} = 26 \text{ m}$

- 4) Ann and Byron positioned themselves 35 m apart on one side of a stream. Ann measured the angles, as shown below.



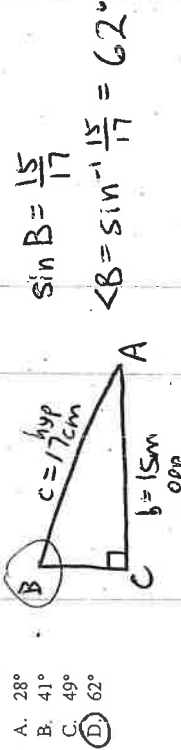
Calculate the height of the cliff on the other side of the stream.

- A. 17.5 m
 B. 62.9 m
 C. 70.1 m
 D. 107.1 m

$\tan 68^\circ = \frac{y}{43.26}$

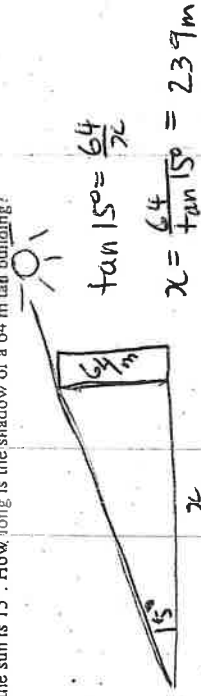
$y = 43.26 \tan 68^\circ = 107.1 \text{ m}$

- 5) In $\triangle ABC$, $\angle C = 90^\circ$, $AB = 17 \text{ cm}$ and $AC = 15 \text{ cm}$. Calculate the measure of $\angle B$.



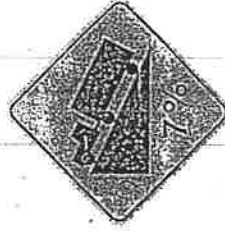
- A. 28°
 B. 41°
 C. 49°
 D. 62°

- 6) The angle of elevation of the sun is 15° . How long is the shadow of a 64 m tall building?

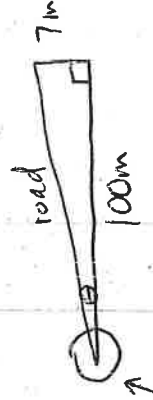


- A. 17 m
 B. 66 m
 C. 239 m
 D. 247 m

- 7) As Tracey is driving, she sees a sign telling her the road has a 7% grade (i.e., a rise of 7 metres for a horizontal change of 100 m). Which of the following expressions will calculate the angle between the road and the horizontal?

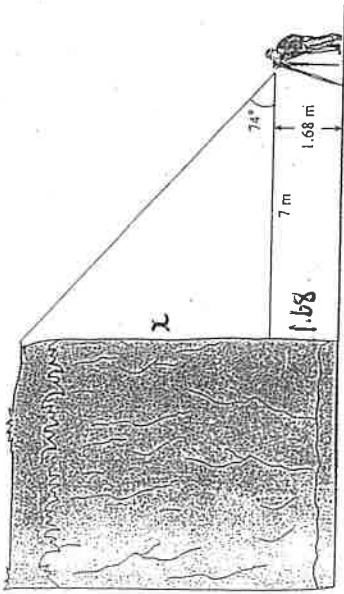


- A. $\tan \left(\frac{7}{100} \right)$
 B. $\sin \left(\frac{7}{100} \right)$
 C. $\tan^{-1} \left(\frac{7}{100} \right)$
 D. $\sin^{-1} \left(\frac{7}{100} \right)$



angle $\tan \theta = \frac{7}{100}$
 $\theta = \tan^{-1} \frac{7}{100}$

8 Mission's outdoor club collected the following data to determine the height of a cliff.



Calculate the height of the cliff.

- A. 3.7 m
- B. 8.4 m
- C. 24.4 m
- D. 26.1 m

$$\tan 74^\circ = \frac{x}{7}$$

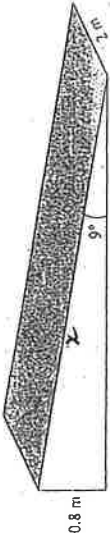
$$x = 7 \tan 74^\circ$$

$$x = 24.41$$

$$24.41 + 1.68 = 26.1 \text{ m}$$

Numerical Response

9 A ramp is set up using a rectangular piece of plywood (shaded region) as shown below.



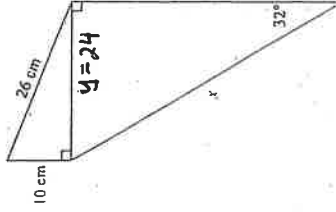
Calculate the area of the plywood. Answer in square metres to one decimal place.

$$\sin 9^\circ = \frac{0.8}{x} \quad A = lw = (5.11)(2)$$

$$= 10.2 \text{ m}^2$$

$$x = \frac{0.8}{\sin 9^\circ} = 5.11 \text{ m}$$

10 Calculate the length of side x on the diagram below. Answer to the nearest centimetre.



$$y^2 + 10^2 = 26^2$$

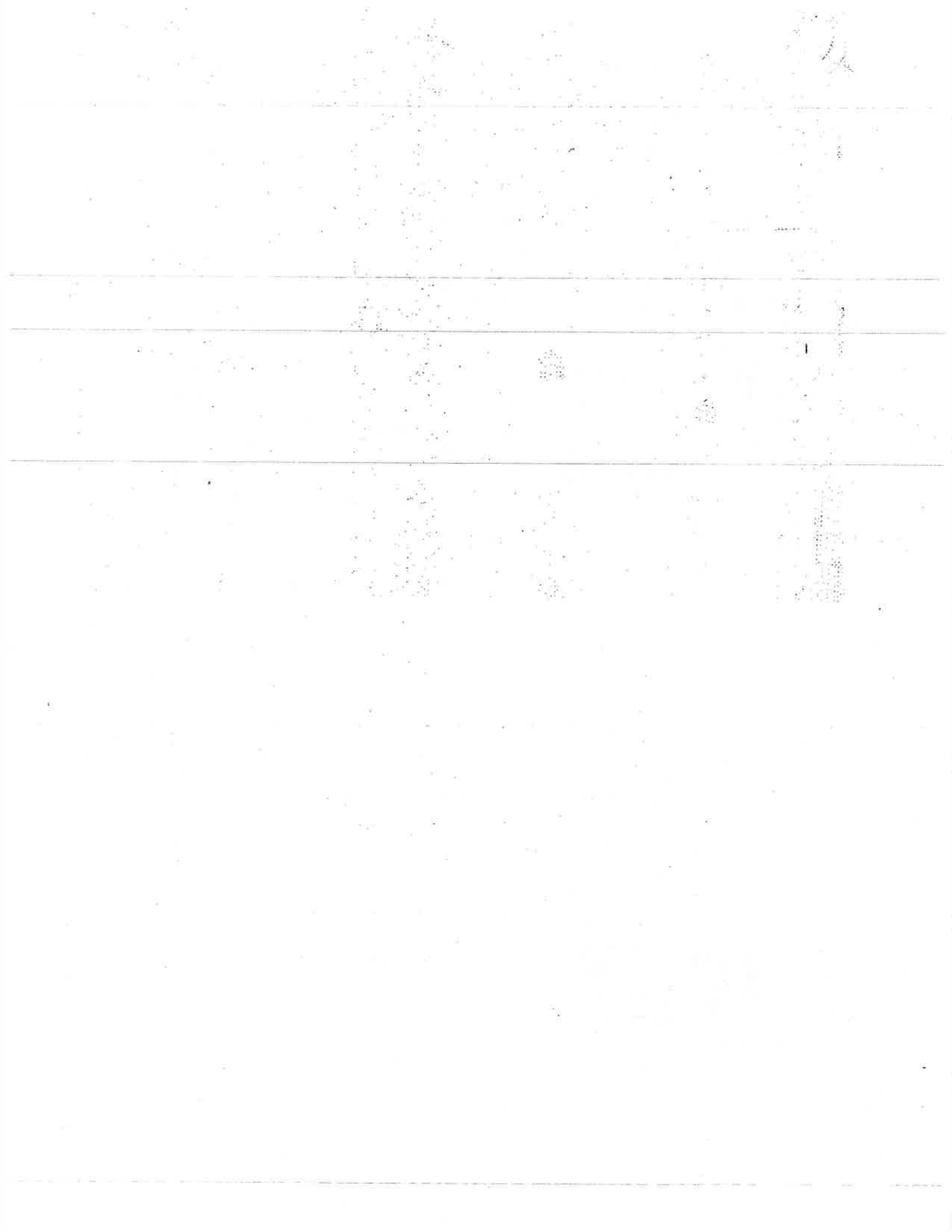
$$y^2 + 100 = 676$$

$$y^2 = 576$$

$$y = \sqrt{576} = 24$$

$$\sin 32^\circ = \frac{24}{x}$$

$$x = \frac{24}{\sin 32^\circ} = 45 \text{ cm}$$



CHAPTER 2
Answer Key

1. B

2. B

3. C

4. D

5. D

6. C

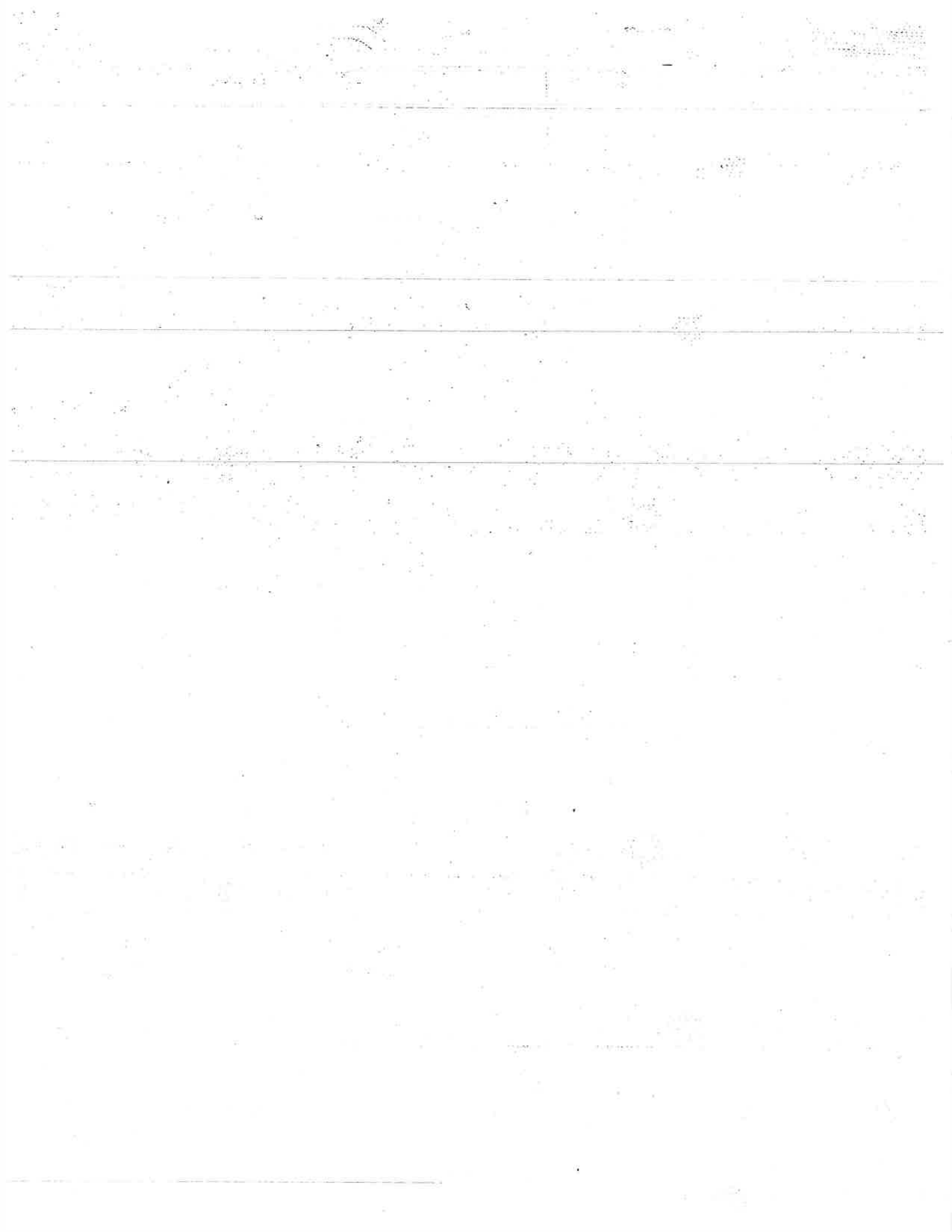
7. C

8. D

Numerical Response

9. 10.2m^2

10. 45cm

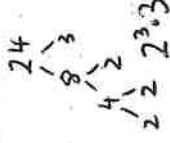


Chapter 3

① Which of the following statements are true?

I.	The factors of 24 are 2, 3, 4, 6, 8 and 12. <u>and 1 and 24</u> X
II.	The prime factorization of 24 is $2^3 \times 3^1$. ✓
III.	The prime factors of 24 are 2 and 3. ✓
IV.	$\sqrt{24}$ is an irrational number. ✓

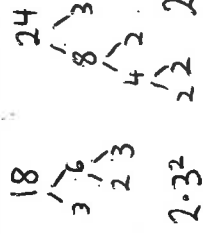
- A. I and IV only
 B. II and III only
 C. II, III and IV only
 D. I, II, III and IV



② What is the least common multiple of 18 and 24?

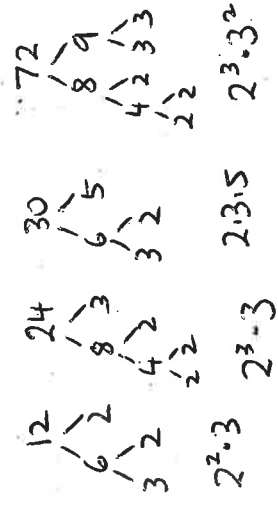
- A. 2×3
 B. $2^2 \times 3^3$
 C. $2^3 \times 3^2$
 D. $2^4 \times 3^3$

$$\begin{aligned}
 \text{LCM} &= 2^3 \cdot 3^2 \\
 &= 8 \cdot 9 \\
 &= 72
 \end{aligned}$$



③ What is the greatest common factor of 12, 24, 30, 72?

- A. 360
 B. 12
 C. 6
 D. 2



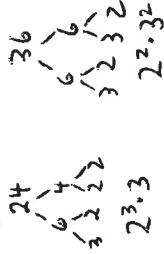
$$\text{GCF} = 2 \cdot 3 = 6$$

4) Which two numbers have the following properties?

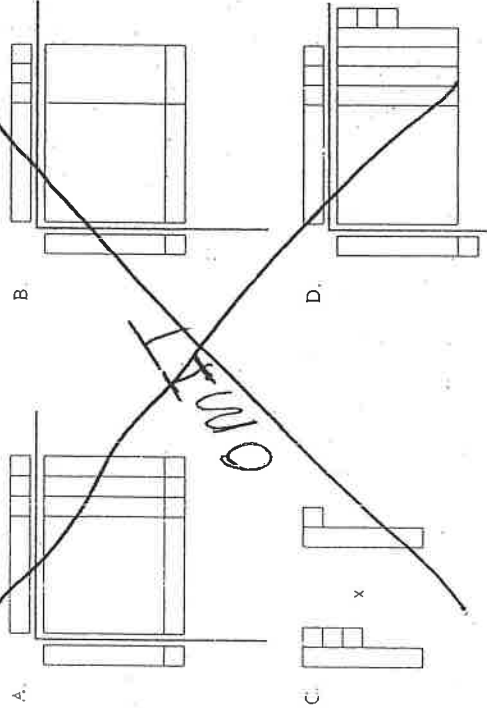
- Their GCF is 12.
- Their LCM is 72.

$GCF = 2^2 \cdot 3 = 12$
 $LCM = 2^3 \cdot 3^2 = 8 \cdot 9 = 72$

- A. 2 and 3 X
- B. 24 and 36 ✓
- C. 48 and 72 X
- D. 72 and 864 X



5) Which of the following diagrams best represents the expansion of $(x+3)(x+1)$ pictorially?



6) Expand and simplify: $(x-4)^3$

- A. $x^3 - 12x^2 + 48x - 64$ ✓
- B. $x^3 + 12x^2 + 48x + 64$
- C. $x^3 - 4x^2 + 16x + 64$
- D. $x^3 - 64$

$(x-4)(x-4)(x-4)$
 $(x^2 - 4x - 4x + 16)(x-4)$
 $(x^2 - 8x + 16)(x-4)$

$x^3 - 8x^2 + 16x - 4x^2 + 32x - 64$
 $x^3 - 12x^2 + 48x - 64$

7) Which of the following expressions have a factor of $x+2$?

I.	$x^2 - 4$
II.	$2x^2 - x - 10$
III.	$5x + 10$

$(x+2)(x-2)$
 $(x+2)(2x-5)$
 $5(x+2)$
 $x-20$
 $+ -1$
 $-5, 4$
 $2x^2 + 4x - 5x - 10$
 $2x(x+2) - 5(x+2)$
 $(x+2)(2x-5)$

- A. I only
- B. III only
- C. I and III only
- D. I, II and III

8) Factor: $y^2 - 81$

- A. $(y-9)^2$
- B. $(y+9)^2$
- C. $(y+9)(y-9)$ ✓
- D. $(y+3)(y-3)(y+9)$

diff of squares
 $(y+9)(y-9)$

9) Katie simplified the expression $(x+b)(x+c)$, where $b < 0$ and $c < 0$, to the form $x^2 + gx + k$. What must be true about g and k ?

- A. $g < 0$ and $k > 0$ ✓
- B. $g < 0$ and $k < 0$
- C. $g > 0$ and $k > 0$
- D. $g > 0$ and $k < 0$

$(x-2)(x-3)$
 $x^2 - 3x - 2x + 6$
 $x^2 - 5x + 6$
 $g < 0 \quad k > 0$

10) Expand and simplify: $(4x-3)^2$

- A. $16x^2 + 9$
- B. $16x^2 - 12x + 9$
- C. $16x^2 - 24x - 9$
- D. $16x^2 - 24x + 9$ ✓

$(4x-3)(4x-3)$
 $16x^2 - 12x - 12x + 9$
 $16x^2 - 24x + 9$

- 11 Given that the area of the rectangle below is $2x^2 + 9x - 5$, determine the length of the rectangle.



$$2x^2 + 9x - 5$$

$$2x^2 + 10x - x - 5$$

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

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

- A. $2x-1$
 B. $2x+1$
 C. $2x+9$
 D. $2x^2 + 8x - 10$

- 12 Pam expanded and simplified $(x-3)(x^2 + 2x - 4)$, as shown below.

Steps	
I.	$x(x^2 + 2x - 4) - 3(x^2 + 2x - 4)$
II.	$x^3 + 2x^2 - 4x - 3x^2 + 6x - 12$
III.	$x^3 - x^2 + 2x - 12$

In which step is Pam's first error?

- A. Step I
 B. Step II
 C. Step III
 D. There is no mistake.

- 13 Which of the following expressions is a factor of $x^2 - 8x - 20$?

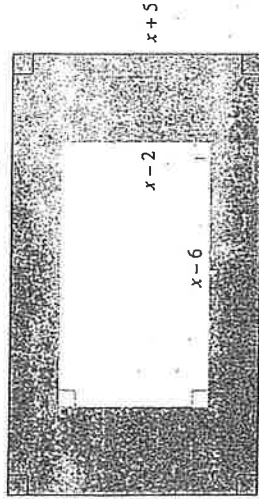
A. $x-2$
 B. $x-4$
 C. $x-5$
 D. $x-10$

$$(x-10)(x+2)$$

- 14 Determine the greatest common factor of $12x^3y$, $4x^3y^2$ and $6x^2y^4$.

- A. $2xy$
 B. $2x^2y$
 C. $4x^3y^2$
 D. $12x^3y^4$

- 15 Determine an expression to represent the shaded area below.



- A. $x^2 + 43$
 B. $x^2 + 13x + 67$
 C. $x^2 + 29x + 43$
 D. $3x^2 + 13x + 67$

$$(2x+11)(x+5) - (x-6)(x-2)$$

$$2x^2 + 10x + 11x + 55 - [x^2 - 2x - 6x + 12]$$

$$2x^2 + 21x + 55 - [x^2 - 8x + 12]$$

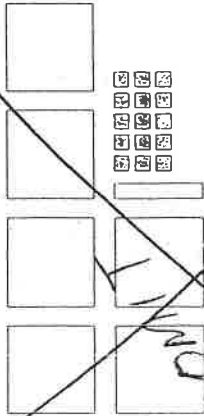
$$2x^2 + 21x + 55 - x^2 + 8x - 12$$

$$x^2 + 29x + 43$$

- 16 When completely factored, how many factors does $2x^4 - 24x^2 - 128$ have?

- A. 2
 B. 3
 C. 4
 D. 5
- $$2(x^4 - 12x^2 - 64)$$
- $$2(x^2 - 16)(x^2 + 4)$$
- $$2(x-4)(x+4)(x^2 + 4)$$

17) Joe was asked to factor $6x^2 + x - 15$ and represent it with math tiles.



What additional tiles would he need to represent the total area of the two factors?

- A. 8 each of and
- B. 9 each of and
- C. 10 each of and
- D. 11 each of and

Numerical Response

18) How many integer values are there for k for which $4x^2 + kx - 9y^2$ is factorable?

X -36

- 36, 1
- 36, -1
- 18, 2
- 18, -2
- 12, 3
- 12, -3
- 9, 4
- 9, -4
- 6, -6

9 possibilities

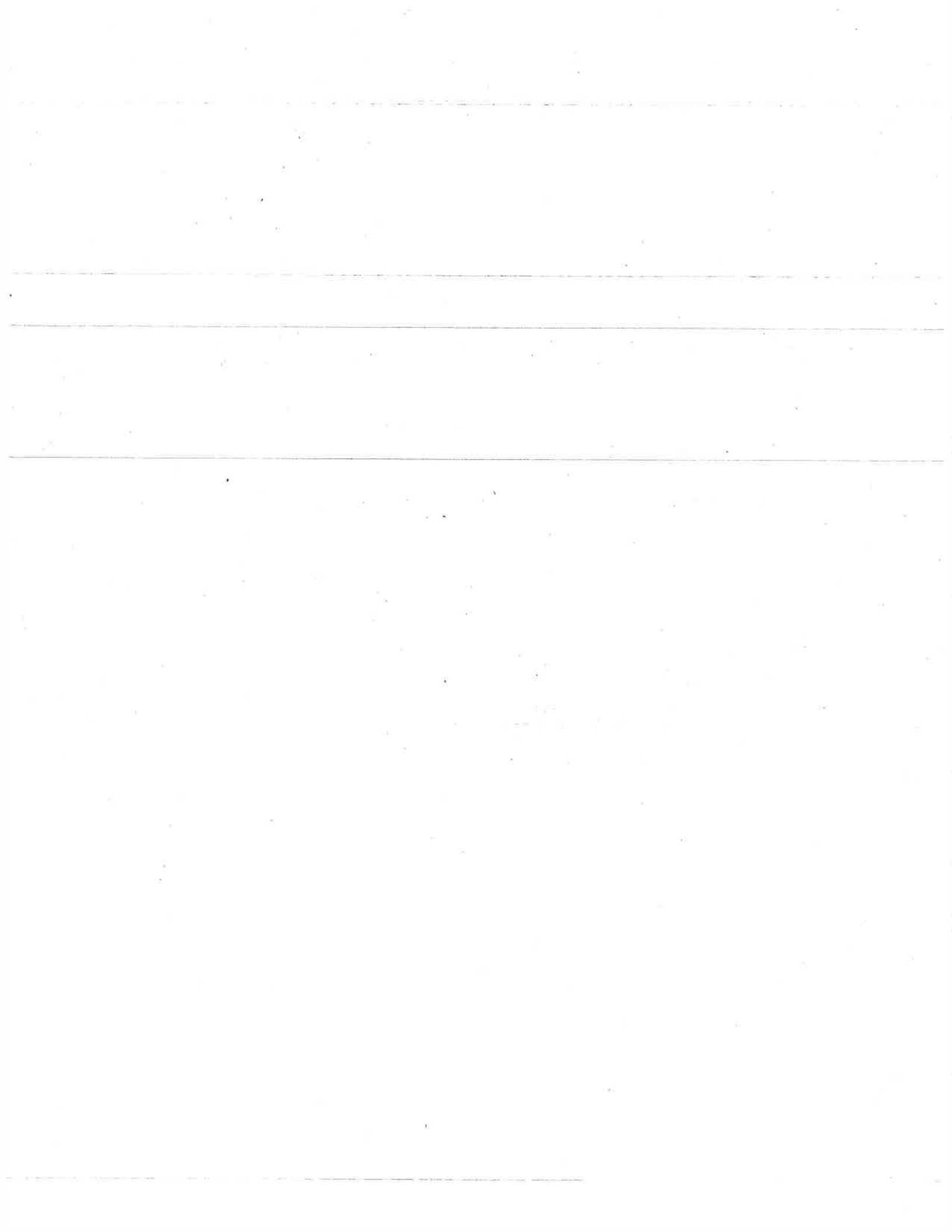
CHAPTER 3
Answer Key

- 1. C
- 2. C
- 3. C

- 4. B
- ~~5. A~~
- 6. A
- 7. D
- 8. C
- 9. A
- 10. D
- 11. A
- 12. B
- 13. D
- 14. B
- 15. C
- 16. C
- ~~17. B~~

Numerical Response

- 18. 9



Chapter 4

① Which of the following statements are true?

I.	$\sqrt{4} = 2$ since $2 \times 2 = 4$	✓
II.	$\sqrt{8} = 4$ since $4 + 4 = 8$	✗
III.	$\sqrt[3]{27} = 3$ since $3 \times 3 \times 3 = 27$	✓
IV.	$\sqrt[3]{81} = 9$ since $9 \times 9 = 81$	✗

- A. I and III only
- B. I and IV only
- C. II and III only
- D. II and IV only

② Simplify: $\sqrt{72}$

$$\begin{aligned} &\sqrt{36 \times 2} \\ &\sqrt{36} \times \sqrt{2} \\ &6 \times \sqrt{2} \\ &6\sqrt{2} \end{aligned}$$

- A. $2\sqrt{6}$
- B. $6\sqrt{2}$
- C. $18\sqrt{2}$
- D. $36\sqrt{2}$

③ Evaluate: $16^{-\frac{3}{4}}$

$$\frac{1}{16^{\frac{3}{4}}} = \frac{1}{(\sqrt[4]{16})^3} = \frac{1}{2^3} = \frac{1}{8}$$

- A. -8
- B. $\frac{1}{8}$
- C. $\frac{1}{2}$
- D. 2

④ Express $2\sqrt{5}$ as an entire radical.

$$\begin{aligned} &2 \times \sqrt{5} \\ &\sqrt{4} \times \sqrt{5} \\ &\sqrt{4 \times 5} \\ &\sqrt{20} \end{aligned}$$

- A. $\sqrt{10}$
- B. $\sqrt{20}$
- C. $\sqrt{50}$
- D. $\sqrt{100}$

5 Order the numbers from the smallest value to the largest value.

I.	$-3\sqrt{2}$
II.	$\sqrt{9}$
III.	$2\sqrt{3}$
IV.	$-2\sqrt{7}$

$-\sqrt{18}$ 2nd smallest
 $\sqrt{9}$ second largest
 $\sqrt{12}$ largest
 $-\sqrt{28}$ smallest

- A. I, IV, II, III
- B. I, IV, III, II
- C. IV, I, II, III
- D. IV, I, III, II

IV, I, II, III

6 Simplify: $(2x^3)^4 \cdot 3x^4$
 $16x^{12} \cdot 3x^4 = 48x^{16}$
 A. $24x^{16}$
 B. $48x^{16}$
 C. $18x^{16}$
 D. $6x^{13}$

7 Simplify: $(3a^2)^3 (4a^3)^0$

- A. $9a^6$
 - B. $27a^6$
 - C. $36a^8$
 - D. $108a^9$
- $3^3 a^6 4^0 a^0$
 $27a^6(1)(1)$
 $27a^6$

8 Simplify: $\left(\frac{25x^0}{125x^3}\right)^3$
 $\left(\frac{x^{0-3}}{5}\right)^3 = \frac{x^{3(0-3)}}{5^3} = \frac{x^{-9}}{125}$
 A. $\frac{x^{30-9}}{125}$
 B. $\frac{x^{0-3}}{5}$
 C. $125x^{30-9}$
 D. $\frac{x^{270}}{5}$

9 Which pattern could be used to predict 3^{-4} ?

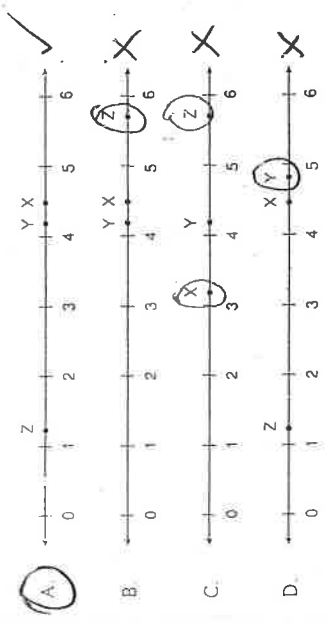
- A. 3^3 ✓
- B. 3^2 ✓
- C. 3^1 ✓
- D. 3^0 ✓
- E. 3^{-1} ✓
- F. 3^{-2} ✓
- G. 3^{-3} ✓

- B. 3^3 9 X
- 3^2 6 X
- 3^1 3
- 3^0 0
- 3^{-1} $-\frac{1}{3}$ X
- 3^{-2} $-\frac{1}{6}$ X
- 3^{-3} $-\frac{1}{9}$ X

- C. 3^3 27
- 3^2 9
- 3^1 3
- 3^0 1
- 3^{-1} -3 X
- 3^{-2} -9 X
- 3^{-3} -27 X

- D. 3^3 9 X
- 3^2 6 X
- 3^1 3
- 3^0 0
- 3^{-1} -3 X
- 3^{-2} -6 X
- 3^{-3} -9 X

- 10) Which of the following number lines best represents the placement of X, Y, Z, given:
 $X = 2\sqrt{5} = 2 \times \sqrt{5} = \sqrt{4 \times 5} = \sqrt{20} = 4.5$
 $Y = \text{cube root of } 68 \approx \sqrt[3]{68} = 4.1$
 $Z = \sqrt{2} = 1.2$



- 11) Chantal made a mistake in her simplification of $\frac{(3a^5)^{-2}}{a^4}$.

Steps	
I.	$\frac{(3a^5)^2}{(a^4)}$
II.	$\frac{1}{(3)^2(a^5)^2(a^4)}$
III.	$\frac{1}{(9)(a^5)(a^4)}$
IV.	$\frac{1}{9a^{28}}$

- Which step contains her first mistake?
 A. Step I
 B. Step II
 C. Step III
 D. Step IV

- 12) A research assistant calculated the brain mass, b , of an 8 kg cat. She used the formula $b = 0.07m^{\frac{2}{3}}$, where m is the total mass of the cat.

Steps	
I.	$b = 0.01\sqrt[3]{8^2}$
II.	$b = 0.01\sqrt[3]{16}$
III.	$b \approx 0.01(2.52)$
IV.	$b \approx 0.025$

- In which step did the research assistant first make a mistake?
 A. Step I
 B. Step II
 C. Step III
 D. Step IV

- 13) Which one of the following sets of numbers contains only rational numbers?

- A. $\{-\frac{1}{4}, 7.1, \sqrt{16}\}$
 B. $\{\frac{1}{2}, -6, \frac{\sqrt{5}}{2}\}$
 C. $\{-3, 4\sqrt{3}, 4.12\overline{3}14\dots\}$
 D. $\{\sqrt{10}, 3\sqrt[3]{9}, \pi\}$

14) Simplify: $\sqrt{x^3} + \sqrt{x^4}$

A. $\sqrt[3]{x}$
 B. $\sqrt[3]{x^2}$
 C. $\sqrt[3]{x^8}$
 D. $\sqrt[3]{x}$

Handwritten work:
 $x^{\frac{3}{2}} + x^2$
 $x^{\frac{3}{2}} - \frac{4}{3}x^2$
 $x^{\frac{3}{2}} - \frac{4}{3}x^2 = \frac{1}{6}$

15 Simplify: $\sqrt[3]{1080}$

- A. $2\sqrt[3]{35}$
- B. $3\sqrt[3]{40}$
- C. $6\sqrt[3]{5}$
- D. $6\sqrt[3]{30}$

$$\sqrt[3]{216 \cdot 5}$$

$$\sqrt[3]{216} \cdot \sqrt[3]{5}$$

$$6 \cdot \sqrt[3]{5} = 6\sqrt[3]{5}$$

16 Which expression is equivalent to $(-c^2)^{\frac{1}{3}}$?

- A. $\frac{1}{\sqrt[3]{-c^2}}$
- B. $\frac{1}{\sqrt[3]{c^2}}$
- C. $\frac{1}{\sqrt{-c^3}}$
- D. $\sqrt[3]{c^2}$

(A) $\frac{1}{(-c^2)^{\frac{1}{3}}}$ index

$\frac{1}{\sqrt[3]{-c^2}}$

Numerical Response

17 A bacteria culture doubles every hour. If there are 10,000 bacteria now, how many bacteria were there 4 hours ago? Answer to the nearest bacterium.

Now 10,000

1 hour ago 5,000

2 hours ago 2,500

3 hours ago 1,250

4 hours ago 625

CHAPTER 4

Answer Key

1. A
2. B
3. B
4. B
5. C
6. B

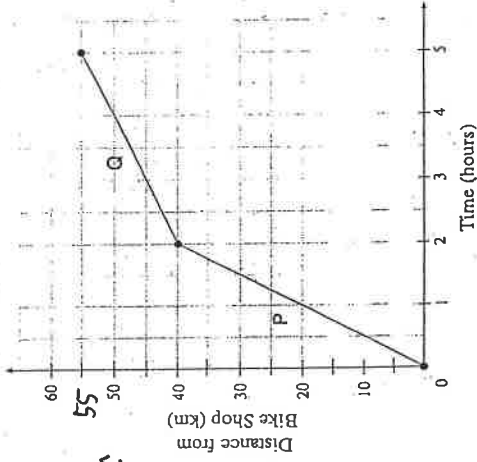
7. B
8. A
9. A
10. A
11. C
12. B
13. A
14. A
15. C
16. A

Numerical Response

17. 625

Chapter 5

① The graph below models a bicyclist's distance from a bike shop over time.



$$P = \frac{40 \text{ km}}{2 \text{ h}} = \frac{20 \text{ km}}{\text{h}}$$

$$Q = \frac{15 \text{ km}}{3 \text{ h}} = \frac{5 \text{ km}}{\text{h}}$$

Calculate the change in the speed of the bike from segment P to segment Q.

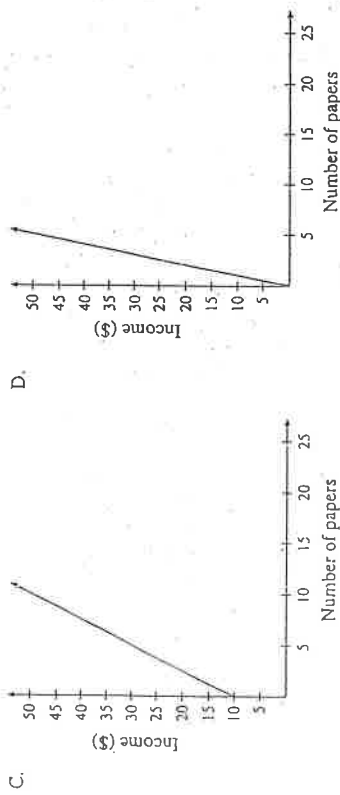
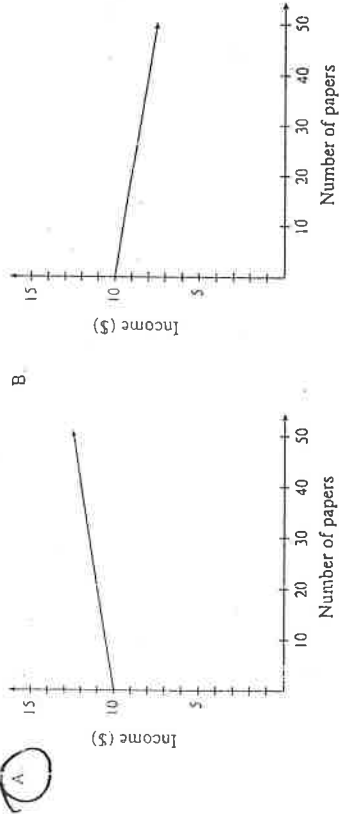
- A. decreased by 15 km/h
- B. decreased by 5 km/h
- C. increased by 15 km/h
- D. increased by 11 km/h

② The cost C , in dollars, of renting a hall for the prom is given by the formula $C(n) = 500 + 4n$, where n is the number of students attending the prom. Calculate the cost of renting the hall if 70 students attend.

- A. \$108
- B. \$500
- C. \$780
- D. \$970

$$\begin{aligned} C(70) &= 500 + 4(70) \\ &= 500 + 280 \\ &= 780 \end{aligned}$$

- 3 Jim delivers newspapers. He gets paid 10 dollars for every day of work, plus 5 cents for every paper he delivers. Which of the following graphs best represents Jim's possible income for one day?

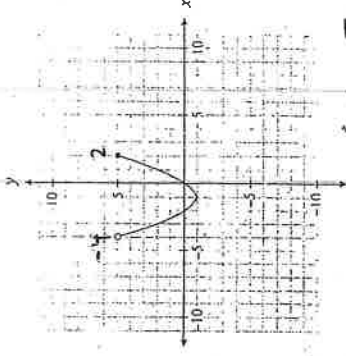


- 4 Alex bought 144 bagels for \$80. His profit was \$75 once he had sold 100 bagels. Which equation below represents Alex's profit, P , as a function of the number sold, n ?

- A. $P = -0.05n + 80$ X
 B. $P = 0.05n - 80$
 C. $P = 0.75n$
 D. $P = 1.55n - 80$

He made $80 + 75 = 155$ profit!
 after selling 100 bagels
 so $\frac{155}{100} = 1.55$ per bagel

- 5 Determine the domain of the relation graphed below.



- A. $(-4, 2]$
 B. $[-4, 2)$
 C. $[-1, 5]$
 D. $[-1, 5]$

$(-4, 2]$
 not included so rounded bracket
 included so square bracket

- 6 Which of the following coordinates are intercepts of the linear relation $2x - 3y + 30 = 0$?

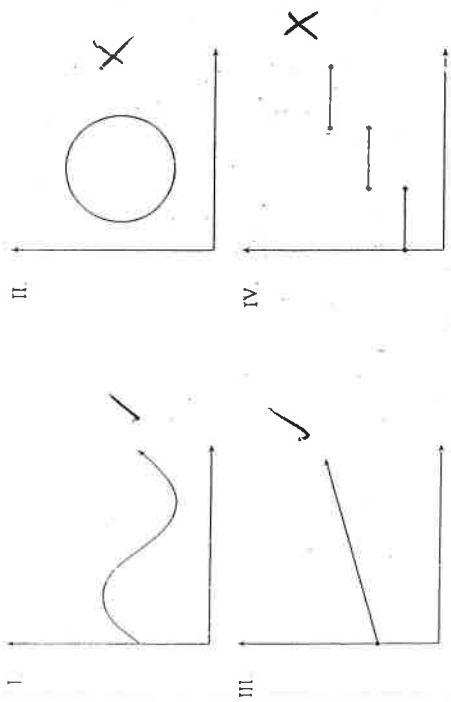
I.	$(0, 10)$
II.	$(0, \frac{2}{3})$
III.	$(-10, 0)$
IV.	$(-15, 0)$

x -int
 set $y = 0$
 $2x - 3(0) + 30 = 0$
 $2x + 30 = 0$
 $2x = -30$
 $x = -15$
 $(-15, 0)$

y -int
 set $x = 0$
 $2(0) - 3y + 30 = 0$
 $-3y + 30 = 0$
 $-3y = -30$
 $y = 10$
 $(0, 10)$

- A. I only
 B. I and IV only
 C. II and III only
 D. II and IV only

7 Which of the following relations are also functions?

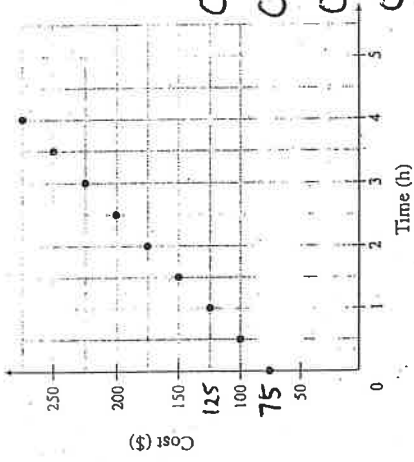


- A. III only
- B. I and III only
- C. II and IV only
- D. I, III and IV only

8 The cost to insure jewellery is a fixed amount plus a percentage of the value of the jewellery. It costs \$32 to insure \$1000 worth of jewellery or \$44.50 to insure \$3500 worth of jewellery. What is the fixed amount to insure jewellery?

- A. \$27.00
- B. \$31.25
- C. \$44.65
- D. \$58.82

Cost of Hiring an Electrician vs. Time



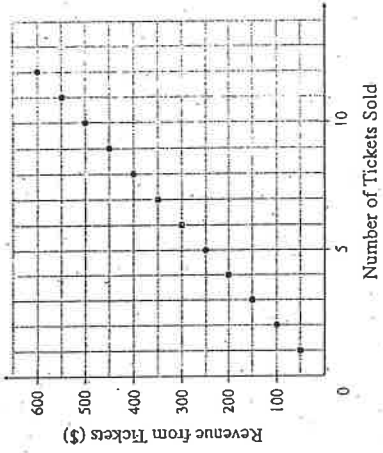
$1 \text{ hr} = \$50$
 $y\text{-int} = 75$
 $C = 50h + 75$
 $C = 50(8) + 75$
 $C = 400 + 75$
 $C = 475$

use f for #9

9 What is the cost of hiring an electrician for 8 hours?

- A. \$550
- B. \$475
- C. \$400
- D. \$275

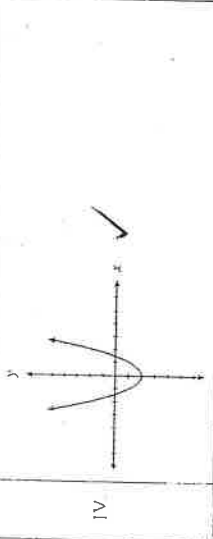
10 What does the slope represent in the graph below?



Price per ticket

- A. price per ticket
- B. profit from tickets
- C. revenue from tickets
- D. number of tickets sold

11) Which of the following relations are also functions?

I	$\{(0, 2), (1, 4), (3, 6), (4, 5), (4, 3), (7, -8)\}$	<input checked="" type="checkbox"/>
II	$y = 2x + 5$	<input checked="" type="checkbox"/>
III	The output is 6 more than half the input.	<input checked="" type="checkbox"/>
IV		<input checked="" type="checkbox"/>

repeat in domain

- A. I only
- B. I and IV only
- C. II and III only
- D. II, III and IV only

12) Damien has a list of 37 potential customers for his house-painting business. In order to get a business grant, he must graph his income versus the number of customers. Determine the domain of the graph.

- A. $\{0, 1, 2, 3, \dots\}$
- B. $\{0, 1, 2, 3, \dots, 37\}$
- C. all real numbers
- D. all real numbers between 0 and 37

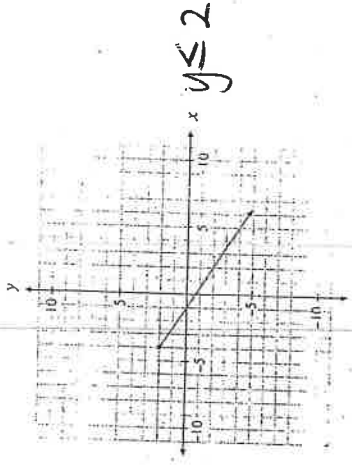
customers are discrete, whole numbers

13) A hot-dog stand owner makes a profit of \$100 when he sells 90 hot dogs a day. He has a loss of \$30 when he sells 25 hot dogs a day. Which linear relation represents his profit?

- A. $y = 0.5x + 55$
- B. $y = 1.08x + 3.08$
- C. $y = 1.11x$
- D. $y = 2x - 80$

for y to be -30 if x is 25, only D will work (only eqn with a negative involved)

14) Determine the range of the linear relation graphed below.



- A. $y \leq -4$
- B. $y \leq 2$
- C. $y \geq -4$
- D. $y \geq 2$

15) Which ordered pair represents $f(3) = -5$?

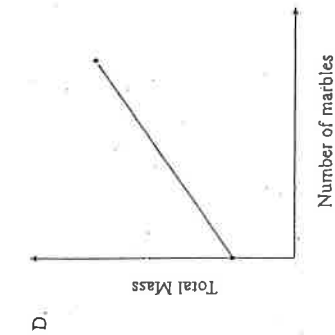
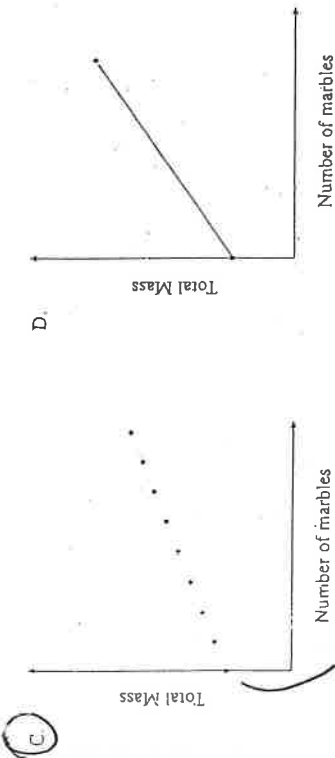
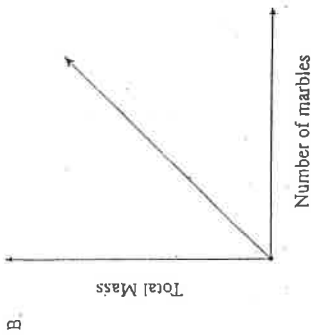
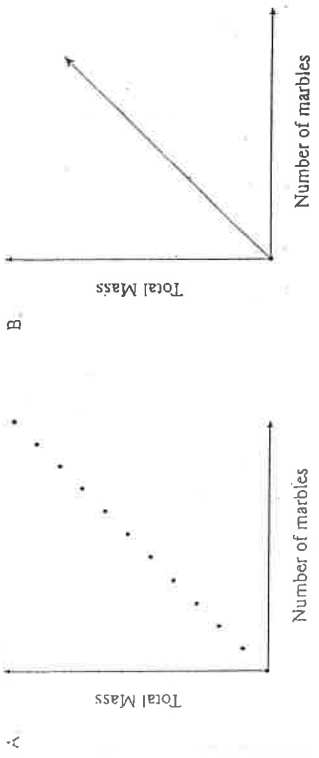
- A. $(-5, 3)$
- B. $(-3, 5)$
- C. $(3, -5)$
- D. $(5, -3)$

↑ x ↑ y

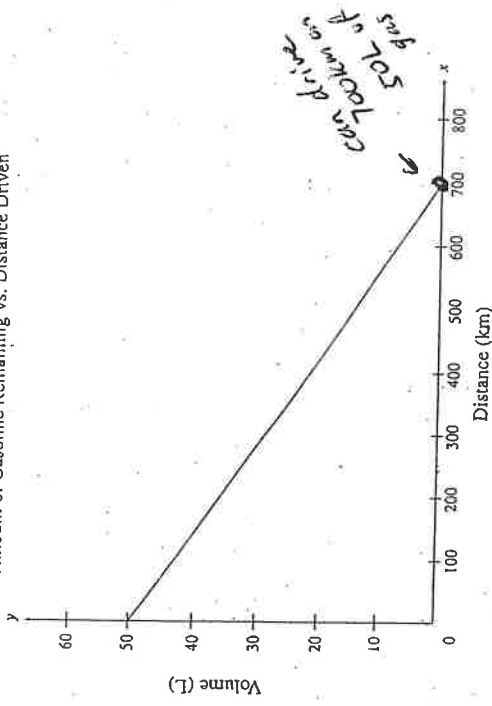
16) Which of the following scenarios is not linear?

- A. the height of a football thrown over time **X**
- B. the total weight of a jar of pennies as more pennies are added
- C. the distance travelled by a car moving at a constant speed over time
- D. the pay of a truck driver who earns \$2,500 a month, plus \$0.50 for every kilometre he drives

17 Marbles are placed in a jar one at a time. Which graph below best represents the total mass of the jar and marbles as the marbles are added?



Amount of Gasoline Remaining vs. Distance Driven



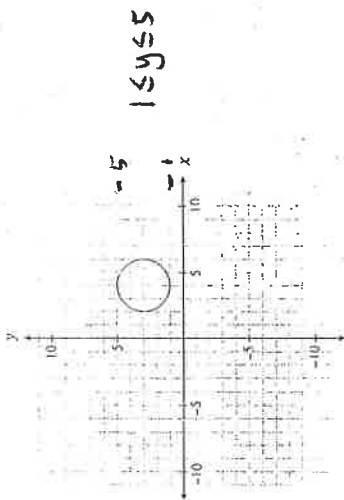
18 The graph above shows the relationship between the amount of gasoline remaining in a 50 L tank and the distance driven for a certain car.

What does the x-intercept represent in this situation?

- A. fuel capacity of the gasoline tank
- B. total distance travelled during a long trip
- C. total distance driven until the car is out of gas
- D. number of kilometres driven per litre of gasoline

Numerical Response

19. What is the range of the graph below?

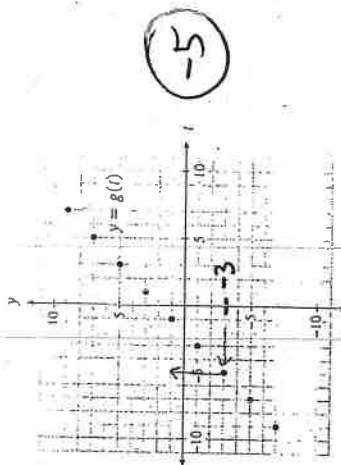


I.	All x values between 2 and 6 inclusive.	<input checked="" type="checkbox"/>
II.	$(2, 6)$	<input checked="" type="checkbox"/>
III.	$[1, 5]$	<input checked="" type="checkbox"/>
IV.	$1 \leq y \leq 5$	<input checked="" type="checkbox"/>

- A. III only
- B. IV only
- C. I and II only
- D. III and IV only

20.

Given the graph of $y = g(t)$ below, determine the value of t for which $g(t) = -3$. Answer as an integer.



21.

The cost C , in dollars, to rent a car is determined by the formula $C(k) = 0.15k + 22$, where k is the number of kilometres driven. Calculate the value of k if $C(k) = 166$. Answer to the nearest kilometre.

$$166 = 0.15k + 22$$

$$-22$$

$$144 = 0.15k$$

$$k = \frac{144}{0.15} = 960 \text{ km}$$

CHAPTER 5

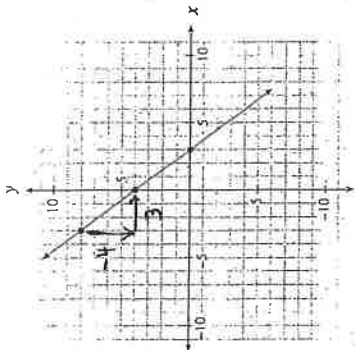
Answer Key

1. A
2. C

3. A
4. D
5. A
6. B
7. B
8. A
9. B
10. A
11. D
12. B
13. D
14. B
15. C
16. A
17. C
18. C
19. D

Numerical Response

20. -5
21. 960km



Slope = $-\frac{4}{3}$

y-int = 4

$y = -\frac{4}{3}x + 4$

① Which of the following equations describes the linear relation graphed above?

I.	$y = \frac{4}{3}x + 4$	<input checked="" type="checkbox"/>
II.	$y - 8 = -\frac{4}{3}(x + 3)$	<input checked="" type="checkbox"/>
III.	$4x + 3y - 12 = 0$	<input checked="" type="checkbox"/>

Chapter 6

$y - 8 = -\frac{4}{3}x - \frac{12}{3}$
 $y - 8 = -\frac{4}{3}x - 4$
 $+8 \quad +8$
 $y = -\frac{4}{3}x + 4$ ✓

$\frac{3}{3}y = -\frac{4}{3}x + \frac{12}{3}$
 $y = -\frac{4}{3}x + 4$

- A. II only
- B. I and II only
- C. I and III only
- D. II and III only

② Determine the equation of a line, in slope-intercept form, that passes through the points (6, 1) and (-10, 9).

$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{9 - 1}{-10 - 6} = \frac{8}{-16} = -\frac{1}{2}$

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

$y = -\frac{1}{2}x + 4$

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

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

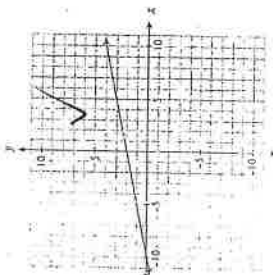
$1 = -3 + b$

$4 = b$

- A. $y = -\frac{1}{2}x + 4$
- B. $y = -\frac{1}{2}x - 2$
- C. $y = -2x + 8$
- D. $y = -2x + 13$

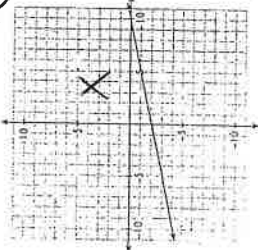
3 Which graph represents the relation $x - 5y + 10 = 0$?

A

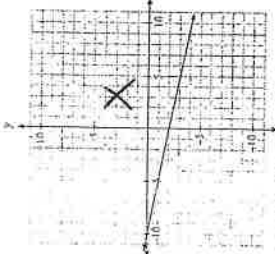


B.

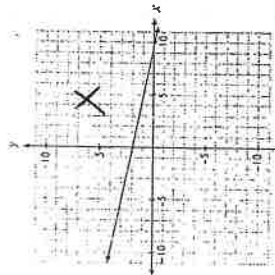
$y = \frac{1}{5}x + 2$
 pos (rise to right)



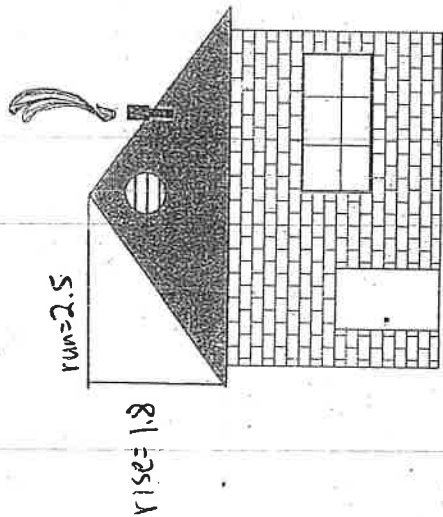
C.



D.



5 Use a ruler to determine the slope of the roof shown below.



Note: This diagram is drawn to scale.

A. $\frac{3}{8} = 0.375$

B. $\frac{3}{4} = 0.75$

C. $\frac{4}{5} = 0.8$

D. $\frac{4}{3} = 1.3$

$\frac{1.8}{2.5} = 0.72$

6 Calculate the slope between the points $(7, -3)$ and $(4, 3)$.

A. -2

B. $-\frac{1}{2}$

C. 2

D. 10

$slope = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - (-3)}{4 - 7} = \frac{6}{-3} = -2$

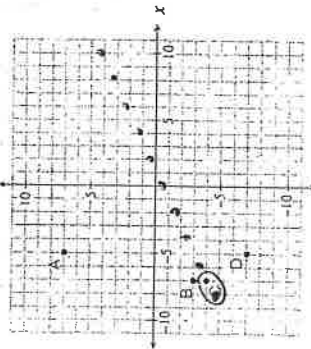
4 The line $y - 2 = \frac{1}{2}(x - 5)$ passes through which point on the graph?

- A. A
- B. B
- C. C
- D. D

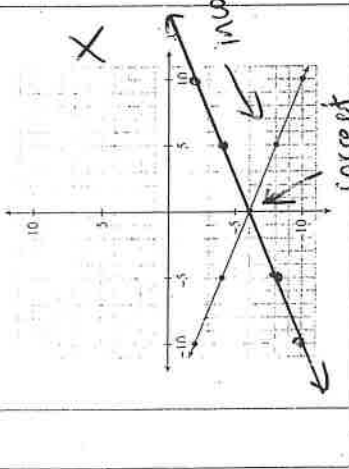
$y - 2 = \frac{1}{2}x - \frac{5}{2}$

$y - 2 = \frac{1}{2}x - 2.5$

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



7 Which of the following relations could be produced by $y = \frac{2}{5}x - 6$?

I.	$2x - 5y - 30 = 0$	✓
II.	$\{(15, 0), (10, 2), (-5, -8), (-10, -10)\}$	on line ✓ on line ✓ on line ✓
III.		incorrect slope of $-\frac{2}{5}$

graph $y = \frac{2}{5}x - 6$ on grid below
 $(15, 0)$
 $0 = \frac{2}{5}(15) - 6$
 $0 = \frac{30}{5} - 6$
 $0 = 6 - 6$ ✓

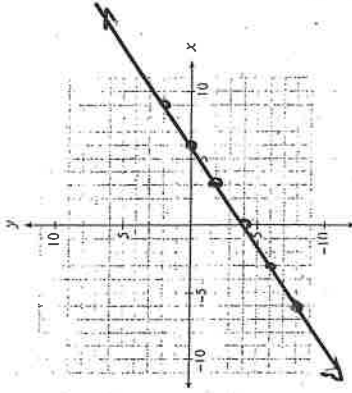
- A. I only
 B. II only
 C. I and II only
 D. I, II and III

8 Determine the slope of the linear relation $3x + 5y + 15 = 0$.

- A. $\frac{5}{3}$
 B. $\frac{3}{5}$
 C. $-\frac{3}{5}$
 D. $-\frac{5}{3}$

A switch sign
 B

$-\frac{3}{5}$



Use for #9

9 A line has a slope of $\frac{2}{3}$ and passes through the point $(6, 0)$. Which of the following points must also be on the line?

- A. $(-3, -6)$ ✓
 B. $(3, 8)$ ✗
 C. $(4, -3)$ ✗
 D. $(9, 3)$ ✗

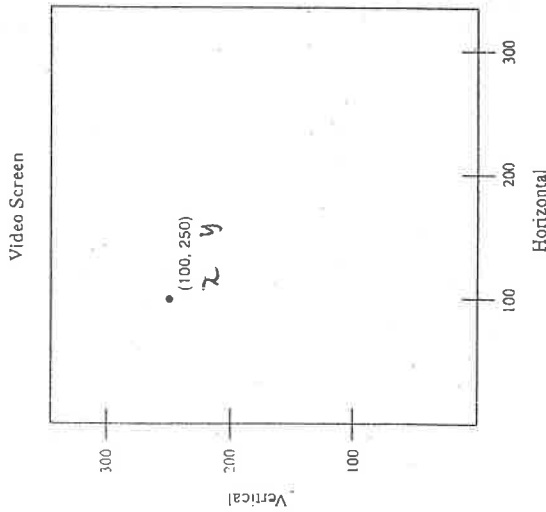
10 Kelly explained her method for graphing the linear relation $y = -\frac{2}{3}x + 7$ as follows:

Steps	
I.	Place a dot on the y-axis at positive 7. ✓
II.	Move up two on the y-axis to positive 9. } up 2, left 3
III.	From the positive 9, move to the left three spots and place a dot there. } same as
IV.	Draw a line through the two dots. } down 2, right 3

Where did Kelly make the first mistake in her explanation?

- A. Step I
 B. Step II
 C. Step III
 D. There is no mistake.

- 11) A video game programmer needs to simulate a shot on a gaming screen. The shot needs to have a slope of $\frac{6}{5}$ to a target at $(100, 250)$. If the shooter has a horizontal position of 65, what would be the shooter's position on the screen?



$$y = \frac{6}{5}x + b$$

$$250 = \frac{6}{5}(100) + b$$

$$250 = \frac{600}{5} + b$$

$$250 = 120 + b$$

$$130 = b$$

$$y = \frac{6}{5}x + 130$$

sub 65 in for x

$$y = \frac{6}{5}(65) + 130$$

$$y = \frac{390}{5} + 130$$

$$y = 78 + 130 = 208$$

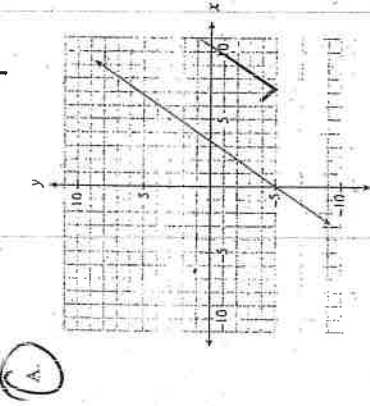
- A. (65, 78)
 B. (65, 125)
 C. (65, 208)
 D. (65, 220.8)

- 12) A line with an undefined slope passes through the points $(-2, 1)$ and (p, q) . Which of the following points could be (p, q) ?

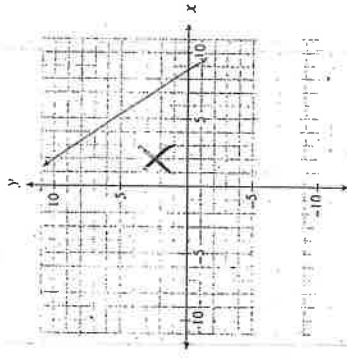
- A. (1, 0)
 B. (0, 1)
 C. (0, -2)
 D. (-2, 0)

undefined slope is a vertical line,
 so x coordinate will be the same

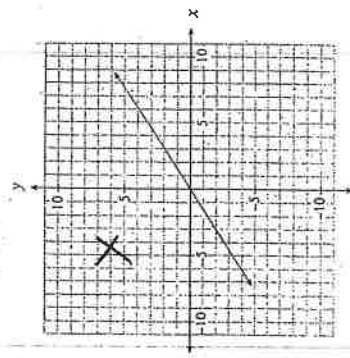
- 13) Which of the following graphs represents a line that passes through $(6, 4)$ and is perpendicular to $y = -\frac{2}{3}x$? slope is $\frac{3}{2}$



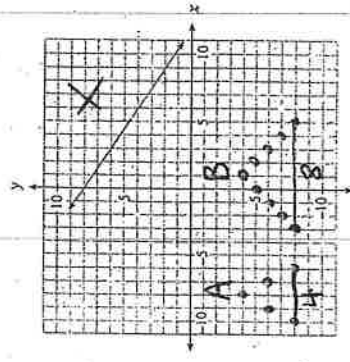
B.



D.



C.



- 14) Two isosceles triangles have the same height. The slopes of the sides of triangle A are double the slopes of the corresponding sides of triangle B. How do the lengths of their bases compare?

- A. The base of A is quadruple that of B.
 B. The base of A is double that of B.
 C. The base of A is half that of B.
 D. The base of A is one quarter that of B.

15) Rewrite $y = \frac{x}{5} - 6$ in general form. (s) $y = \frac{x}{5} - 6$ (s)

A. $\frac{x}{5} - y - 6 = 0$

B. $x + 5y - 6 = 0$

C. $x - 5y - 30 = 0$

D. $5x - 5y - 30 = 0$

I. $y + 3 = 0$ $y = -3$ slope is 0

II. $2x + y = 6$ $y = -2x + 6$ neg slope

III. $(y + 2) = -4(x - 5)$ neg slope

$y + 2 = -4x + 20$
 $y = -4x + 18$

$y = -4x + 18$

- A. II only
- B. III only
- C. I and III only
- D. II and III only

16) Lines A and B are perpendicular and have the same x-intercept. The equation of line A is $(x + 2)y - 4 = 0$. Determine the y-intercept of line B.

A. -8 $x - \text{int} : \text{set } y = 0$ A slope is $-\frac{1}{2}$ B) $y = 2x + b$

B. -2 $x + 2(0) - 4 = 0$ B slope is $\frac{2}{1}$ $0 = 2(4) + b$

C. 4 $x - 4 = 0$ $-8 = b$

D. 8 $x = 4$ (4, 0)

17) Determine the slope-intercept equation of the line that is parallel to $y = \frac{2}{5}x - 3$ and passes through the point (0, 5).

A. $y = -\frac{5}{2}x - 3$

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

C. $y = \frac{2}{5}x + 3$

D. $y = \frac{2}{5}x + 5$

18) Given the equation $Ax + By + C = 0$, which of the following conditions must be true for the graph of the line to have a positive slope and a positive y-intercept?

- A. $A > 0, B > 0, C > 0$
- B. $A > 0, B < 0, C > 0$
- C. $A > 0, B > 0, C < 0$
- D. $A > 0, B < 0, C < 0$

$A > 0, B < 0, C > 0$

$2x - 3y + 6 = 0$

$-3y = -2x - 6$

$\frac{-3y}{-3} = \frac{-2x - 6}{-3}$

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

↑ pos slope ↑ pos y-int

20) Which of the following statements are true for $2x + 3y = 6$?

I.	The y-intercept is -2. X
II.	The line is parallel to $y = 2x$. X
III.	The slope-intercept form of the line is $y = \frac{2}{3}x + 2$. X
IV.	The range is all real numbers. ✓

- A. IV only
- B. I and II only
- C. I and IV only
- D. III and IV only

slope is $-\frac{2}{3}$

y-int is 2

21) Determine the slope-intercept form of the line that passes through the point $(-4, 3)$ and is parallel to the line segment that joins $A(-1, -5)$ and $B(-3, 1)$.

- A. $y = -3x - 9$
- B. $y = -3x + 5$
- C. $y = -3x + 15$
- D. $y = 3x + 15$

slope = $\frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - (-5)}{-3 - (-1)} = \frac{6}{-2} = -3$ same slope

$y = -3x + b$

$3 = -3(-4) + b$

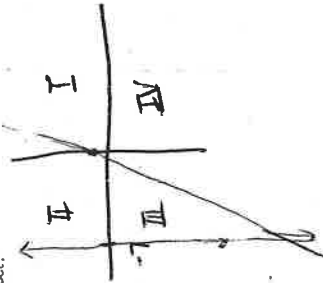
$3 = 12 + b$

$-12 = b$

$-9 = b$

22) In which quadrant do the graphs of $x = -7$ and $y = 2x + 1$ intersect?

- A. Quadrant I
- B. Quadrant II
- C. Quadrant III
- D. Quadrant IV



Numerical Response

23) The slope of AB is $-\frac{2}{3}$. The slope of CD is $\frac{w}{24}$. Given $AB \parallel CD$, determine the value of w . Answer as an integer.

↑ parallel so same slope

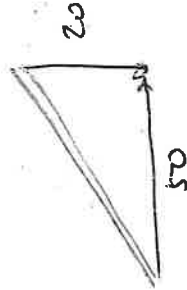
$$-\frac{2}{3} = \frac{w}{24}$$

$$w = -16$$

24) A waterside descends 20 m over a horizontal distance of 50 m. What is the slope of the waterside? Answer, with a positive value, to the nearest tenth.



OR



$$\frac{20}{50} = \frac{2}{5} = 0.4$$

CHAPTER 6

Answer Key

1. D
2. A
3. A
4. C

5. B
6. A
7. C
8. C
9. A
10. D
11. C
12. D
13. A
14. C
15. C
16. A
17. D
18. B
19. D
20. A
21. A
22. C

Numerical Response

23. -16
24. 0.4

Chapter 7

① Solve for y in the following system of equations:

$$\begin{aligned} ① & (x-y=-1) \times 3 \\ ② & 3x+5y=21 \end{aligned}$$

- A. 2
- B. 3
- C. 9
- D. 12

$$\begin{aligned} ① & -3x-3y=-3 \\ ② & (3x+5y=21) \\ \hline & -8y=-24 \end{aligned} \quad y=3$$

② Solve the following system of equations:

$$\begin{aligned} ① & 4x+2y=8 \\ ② & (-3x+y=-1) \times 2 \end{aligned}$$

- A. (-3, 10)
- B. (-1, 6)
- C. (1, 2)
- D. (3, 2)

$$\begin{aligned} ① & 4x+2y=8 \\ ② & (-6x+2y=-2) \\ \hline ① & 10x=10 \\ & x=1 \end{aligned}$$

$$\begin{aligned} 4(1)+2y &= 8 \\ 4+2y &= 8 \\ -4 & \quad -4 \\ 2y &= 4 \\ y &= 2 \end{aligned} \quad (1, 2)$$

③ How many solutions does this system of equations have?

$$\begin{aligned} y &= 3x+7 \\ y &= 3x-4 \end{aligned}$$

- A. no solution
- B. one solution
- C. an infinite number of solutions
- D. cannot be determined without solving

- same slope
- diff y-int
parallel lines
so no solutions

4 Which of the following systems of linear equations has a solution of $(-3, 4)$?

- A. $\begin{cases} 2x - 3y = 6 \\ y = 3x - 13 \end{cases}$
 $\begin{aligned} 2(-3) - 3(4) &= 6 \\ -6 - 12 &= 6 \\ -18 &= 6 \end{aligned}$ X
- B. $\begin{cases} 2x - 3y = 6 \\ y = 3x + 13 \end{cases}$
 $\begin{aligned} 2(-3) - 3(4) &= 6 \\ -6 - 12 &= 6 \\ -18 &= 6 \end{aligned}$ X
- C. $\begin{cases} 2x + 3y = 6 \\ y = 3x - 13 \end{cases}$
 $\begin{aligned} 2(-3) + 3(4) &= 6 \\ -6 + 12 &= 6 \\ 6 &= 6 \end{aligned}$ ✓
 $\begin{aligned} 4 &= 3(-3) - 13 \\ 4 &= -9 - 13 \\ 4 &= -22 \end{aligned}$ X
- D. $\begin{cases} 2x + 3y = 6 \\ y = 3x + 13 \end{cases}$
 $\begin{aligned} 2(-3) + 3(4) &= 6 \\ -6 + 12 &= 6 \\ 6 &= 6 \end{aligned}$ ✓
 $\begin{aligned} 4 &= 3(-3) + 13 \\ 4 &= -9 + 13 \\ 4 &= 4 \end{aligned}$ ✓

5 Two planes have a cruising speed of 570 km/h without wind. The first plane flies for 12 hours against a constant headwind. The second plane flies for 10 hours in the opposite direction with the same wind (a tailwind). The second plane flies 370 km less than the first plane.

Determine two equations that could be used to solve for the wind speed, w , and the distance travelled by the first plane, d .

- A. $(570 - w)(12) = d$ ✓
 $(570 + w)(10) = d - 370$
- B. $(570 - w)(12) = d$ X
 $(570 + w)(10) = d + 370$ X
- C. $(570 + w)(12) = d$ X
 $(570 - w)(10) = d - 370$
- D. $(570 + w)(12) = d$ X
 $(570 - w)(10) = d + 370$ X

	headwind	tailwind
dist	d	$d - 370$
speed	$570 - w$	$570 + w$
time	12	10
d = st	$d = (570 - w)(12)$	$d - 370 = (570 + w)(10)$

6

Joey bought 8 books. Some books cost \$12 each the rest cost \$18 each. He spent a total of \$108. Which of the following systems of linear equations could represent the given situation?

- A. $\begin{cases} x + y = 8 \\ 12x + 18y = 108 \end{cases}$ ✓
- B. $\begin{cases} x + y = 108 \\ 12x + 18y = 8 \end{cases}$ X
- C. $\begin{cases} x + 12y = 8 \\ x + 18y = 108 \end{cases}$ X
- D. $\begin{cases} 12x + y = 8 \\ x + 18y = 108 \end{cases}$ X

Let x = Number of \$12 books
 Let y = number of \$18 books

① $x + y = 8$
 ② $12x + 18y = 108$

7 Kim invested a total of \$1500 between two bonds. One bond earned 8% per annum and the other bond earned 10% per annum. In one year, Kim earned \$132 on her investments. How much did she invest in the bond that earned 10%?

Let x = \$ invested in 8% bond
 Let y = \$ invested in 10% bond

① $x + y = 1500 \Rightarrow x = 1500 - y$
 ② $0.08x + 0.10y = 132$
 $0.08(1500 - y) + 0.10y = 132$
 $120 - 0.08y + 0.10y = 132$
 $120 + 0.02y = 132$
 $-120 \quad -120$
 $0.02y = 12 \quad y = 600$
 $\frac{0.02y}{0.02} = \frac{12}{0.02}$

Numerical Response

8 Solve for x:

① $3x + 4y = -16$
 ② $x = 4y$

② $x = 4y$
 $x = 4(-1)$

① $3(4y) + 4y = -16$

$12y + 4y = -16$ $y = -1$
 $16y = -16$

$x = -4$
 $(-4, -1)$
 $x = -4$

9

A package of 12 hex bolts and 10 anchor bolts weighs 7 pounds. A second package of 5 hex bolts and 15 anchor bolts weighs 4 pounds. How much does a single hex bolt weigh? Answer in pounds to one decimal place.

Let x = weight of one hex bolt

Let y = weight of one anchor bolt

① $(12x + 10y = 7) \times 3$

② $(5x + 15y = 4) \times 2$

① $36x + 30y = 21$

② $(10x + 30y = 8)$

$26x = 13$

$x = \frac{13}{26} = 0.5 \text{ pounds}$

CHAPTER 7

Answer Key

1. B

2. C

3. A

4. D

5. A

6. A

7. A

Numerical Response

8. -4

9. 0.5 pounds

