

Provincial Exam Review

Chapter #1 – Measuring Systems, Surface Area, and Volume

NO CALCULATOR

11. A baker gets his muffin boxes from the United States. The tallest muffins he bakes are 11 cm. Estimate the height of the smallest box in which the muffins will fit.

- A. 30 inches tall
- B. 10 inches tall
- C. 5 inches tall
- D. 4 inches tall

height = $11\text{cm} \div 2.54\text{cm/in} = 4.33\text{ inches}$
 \therefore the height of the smallest box would be 5 inches

12. Jasdeep and Kelsey converted 177 ounces into kilograms, as shown below.

Jasdeep's Solution	Kelsey's Solution
$177\text{ oz} \times \frac{28.35\text{ g}}{1\text{ oz}} \times \frac{1\text{ kg}}{1000\text{ g}} = 5.017950\text{ kg}$	$177\text{ oz} \times \frac{1\text{ oz}}{28.35\text{ g}} \times \frac{1\text{ kg}}{1000\text{ g}} = 0.0062\text{ kg}$

Which statement below is true?

- A. Only Kelsey is correct because the units cancel.
 - B. Only Jasdeep is correct because the units cancel.
 - C. Only Kelsey is incorrect because the conversion factors are incorrect.
 - D. They are both incorrect for different reasons.
10. A road sign says to turn right in 1000 feet. Approximately how far is this distance in kilometres?

- A. 0.3 km
- B. 0.6 km
- C. 1 km
- D. 1.5 km

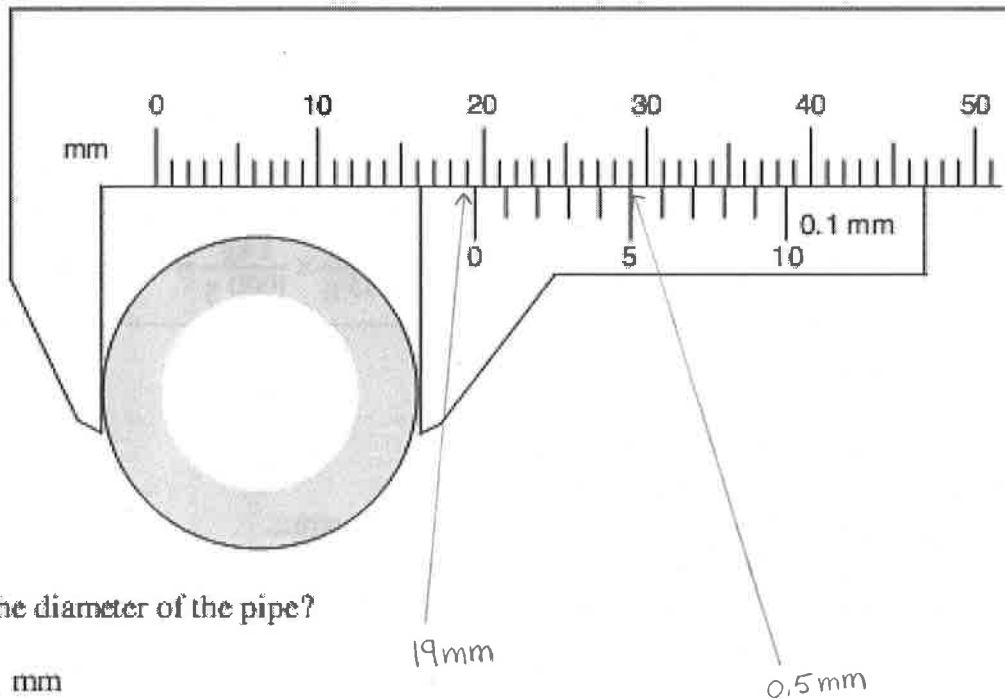
$1000\text{ft} \div 5280\text{ft/mi} = 0.1894\text{ mi}$
 $0.1894\text{ mi} \times 1.609\text{ km/mi} = 0.305\text{ km}$

11. Which of the following calculations converts 4 yards into centimetres?

- A. $4\text{ yd} \times \frac{2.54\text{ cm}}{1\text{ in}} \quad \times$
- B. $4\text{ yd} \times \frac{3\text{ ft}}{1\text{ yd}} \times \frac{2.54\text{ cm}}{1\text{ ft}} \quad \times$
- C. $4\text{ yd} \times \frac{3\text{ ft}}{1\text{ yd}} \times \frac{12\text{ in}}{1\text{ ft}} \times \frac{2.54\text{ cm}}{1\text{ in}} \quad \checkmark$
- D. $4\text{ yd} \times \frac{1\text{ ft}}{3\text{ yd}} \times \frac{1\text{ in}}{12\text{ ft}} \times \frac{1\text{ cm}}{2.54\text{ in}} \quad \times$

Calculator

44. As an estimation strategy, what could be used to best approximate one centimetre?
- A. the length of your foot ×
 - B. the width of your hand ×
 - C. the width of your finger ✓
 - D. the width of a pencil lead ×
45. Sarah needs to replace the exhaust pipe on her dirt bike. She uses a Vernier calliper to find the diameter of the pipe.



What is the diameter of the pipe?

- A. 16.1 mm
 - B. 19.2 mm
 - C. 19.5 mm
 - D. 29.0 mm
46. On a quiz, students were asked to convert 5 lbs 4 oz to a metric weight.

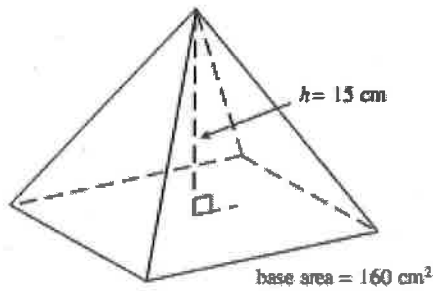
	Stan's Solution	Erin's Solution
Step 1	$4 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} = 0.25 \text{ lb} \quad \checkmark$	$5 \text{ lb} \times \frac{16 \text{ oz}}{1 \text{ lb}} = 80 \text{ oz} \quad \checkmark$
Step 2	$5.25 \text{ lb} \times \frac{0.454 \text{ kg}}{1 \text{ lb}} = 2.3835 \text{ kg} \quad \checkmark$	$84 \text{ oz} \times \frac{28.35 \text{ g}}{1 \text{ oz}} = 2381.4 \text{ g} \quad \checkmark$

How should the teacher mark these two solutions?

- A. Only Erin's solution is correct.
- B. Only Stan's solution is correct.
- C. Both Stan and Erin gave a correct solution.
- D. Neither Stan nor Erin gave a correct solution.

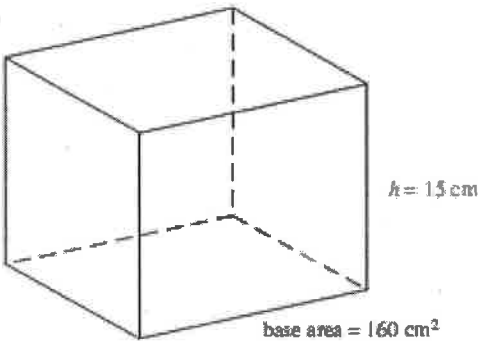
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47. Which of the following shapes has a volume three times larger than the pyramid below?

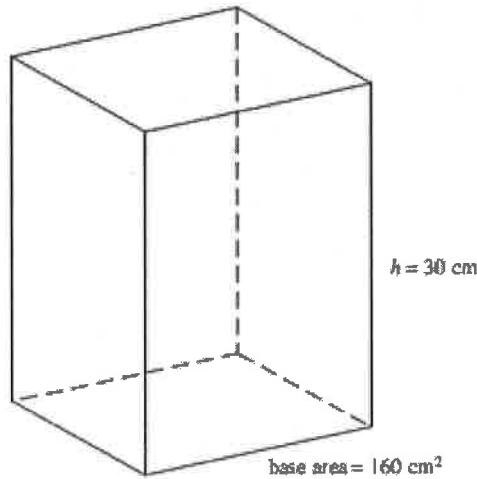


$$V = \frac{1}{3} \text{ area of base} \times h$$

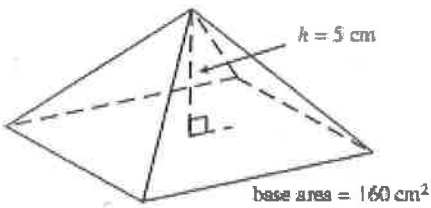
A.



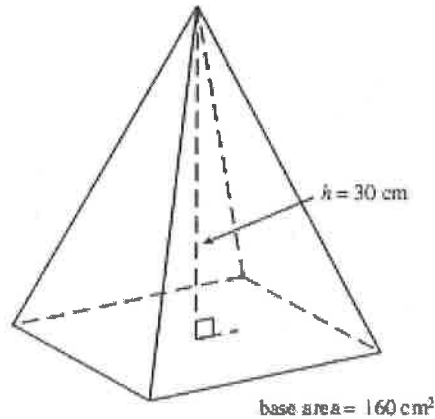
B.



C.



D.



48. A cylinder has a surface area of 402 cm^2 . The height is three times greater than the radius. What is the height of the cylinder?

- A. 8.00 cm
- B. 10.48 cm
- C. 12.00 cm
- D. 16.97 cm

$$S.A. = 2\pi r^2 + 2\pi r h$$

$$\text{but, } h = 3r$$

$$402 = 2\pi r^2 + 2\pi r \cdot (3r)$$

$$402 = 2\pi r^2 + 6\pi r^2$$

$$402 = 8\pi r^2$$

$$\frac{402}{8\pi} = r^2$$

$$16 = r^2 \quad \therefore r = 4 \quad \longrightarrow \quad h = 3r = 3(4) = 12$$

49. A bowling ball measures 264 cm in circumference. What is the volume of the smallest cube that will hold this ball?

- A. approximately 75 000 cm³
- B. approximately 311 000 cm³
- C. approximately 594 000 cm³**
- D. approximately 2 300 000 cm³

$$C = 2\pi r$$

$$264 = 2\pi r$$

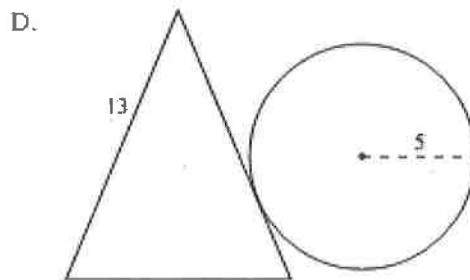
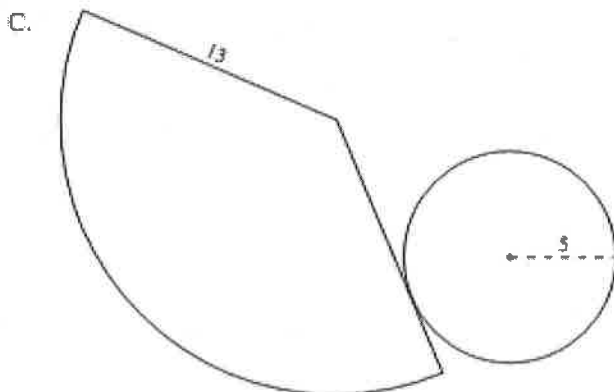
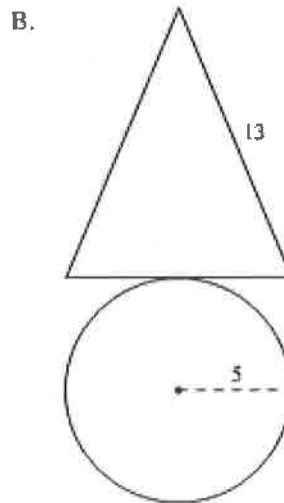
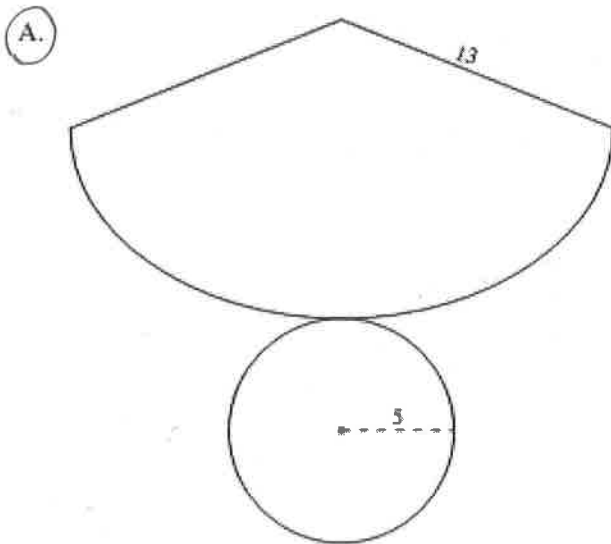
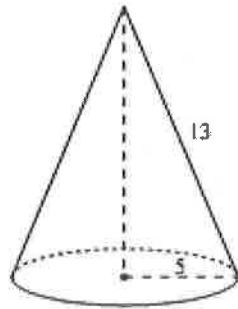
$$\frac{264}{2\pi} = r$$

$$42\text{cm} = r$$

$$\therefore d = 84\text{cm}$$

dimension of smallest cube = (84cm)³
= 592704 cm³

50. Which of the following net diagrams best constructs the cone below?

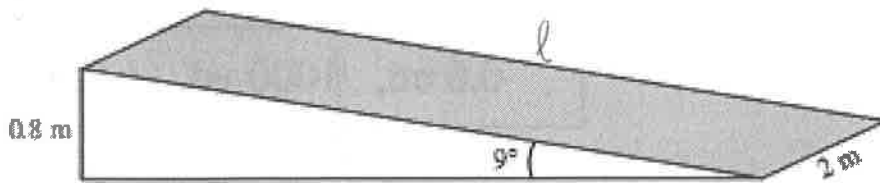


59. Convert 150 pounds into kilograms. Answer to the nearest kilogram.

$$150\text{ lb} \times .454\text{ kg/lb} = 68.1 = 68\text{ kg}$$

Record your answer neatly on the Answer Sheet.

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



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

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

$$l = 5.11 \text{ m}$$

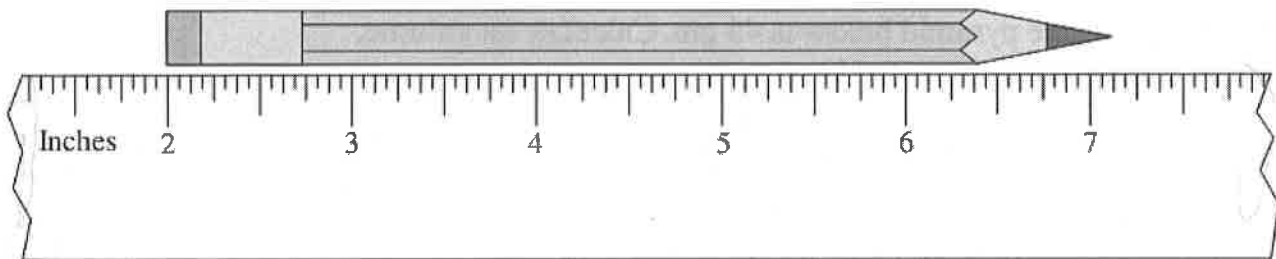
Calculate the area of the plywood. Answer in square metres to one decimal place.

$$\text{AREA} = (5.11 \text{ m})(2 \text{ m}) = 10.22 \text{ m}^2$$

Record your answer neatly on the Answer Sheet.

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

45. Using the ruler below, determine the length of the pencil.



- (A) $5 \frac{1}{8}$ "
- B. 5.2"
- C. $5 \frac{1}{4}$ "
- D. $7 \frac{1}{8}$ "

46. Jung was told to plant trees two steps apart. Which of the following estimates is closest to "two steps apart"?

- (A) 6 ft
- B. 3 m
- C. 60 cm
- D. 30 in

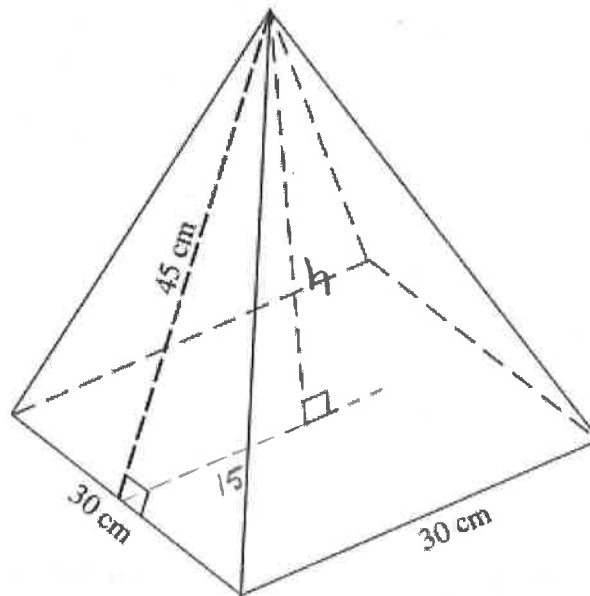
* two steps is approximately equal to a person's height

47. Which distance below is the longest?

0.6 mi,	1000 yd,	1 km,	900 m
$\times 1.6 \text{ km/m}$	$\times .9144 \text{ m/yd}$.9 km
= 0.96 km	= .9144 m		
	= .914 km		

- A. 0.6 mi
- B. 1000 yd
- C. 1 km**
- D. 900 m

49. The slant height of the pyramid below is 45 cm. Calculate its volume.



- A. 10 062 cm³
- B. 12 728 cm³**
- C. 13 500 cm³
- D. 40 500 cm³

$$V = \frac{1}{3} \text{ area of base} \times \text{height}$$

$$V = \frac{1}{3} (30 \times 30) (42.43)$$

$$V = 12729 \text{ cm}^3$$

$$h^2 + 15^2 = 45^2$$

$$h^2 = 45^2 - 15^2$$

$$h^2 = 1800$$

$$h = \sqrt{1800}$$

$$h = 42.43 \text{ cm}$$

4

50. A cylinder with a diameter of 10 cm and a height of 12 cm is half full of water. A sphere with a diameter of 5 cm is dropped into the cylinder. How far will the water level rise once the sphere is completely under the water?

⑤ height of water can be found by using

① $V_{cyl} = \pi r^2 h = \pi (5\text{cm})^2 (12) = 942.48\text{ cm}^3$

$536.69 = \pi (5)^2 h$

A. 0.57 cm

② $\frac{1}{2}$ a cylinder has a volume = 471.24 cm^3

B. 0.83 cm

③ $V_{SPHERE} = \frac{4}{3}\pi (2.5)^3 = 65.45\text{ cm}^3$

C. 5 cm

D. 6 cm

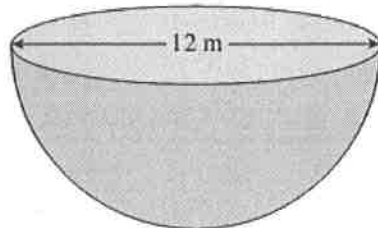
④ If the sphere is completely under the water, the volume = $471.24 + 65.45 = 536.69\text{ cm}^3$

$\frac{536.69}{25\pi} = h$
 $h = 6.83\text{ cm}$

⑥ \therefore water rises from 6 to 6.83 cm

59. Calculate the surface area of the solid hemisphere below. Answer to the nearest square metre.

S.A. sphere = $4\pi r^2$
sphere = $4\pi (6)^2$
= 452.39 m^2

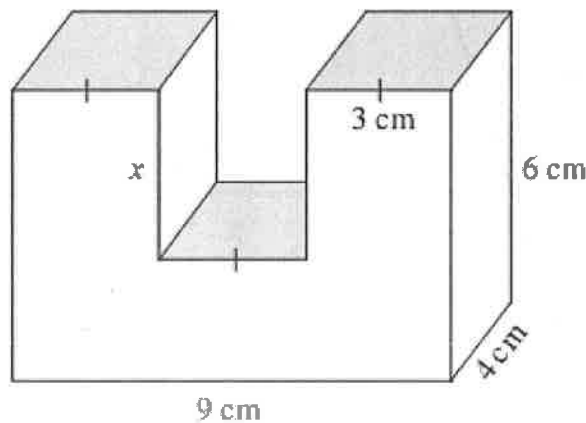


hemisphere S.A.
= $226.19 + \pi r^2$
= $226.19 + 113.10 = \underline{339.29\text{ m}^2}$

$\frac{1}{2}$ sphere = 226.19 m^2

Record your answer neatly on the Answer Sheet.

51. The volume of the object below is 186 cm^3 . Calculate the length of x.



A. 3.1 cm

B. 2.5 cm

C. 1.75 cm

D. 1.25 cm

$V_{rect. prism} = 9 \times 4 \times 6 = 216\text{ cm}^3$

$V_{of missing piece} = 216 - 186 = 30\text{ cm}^3$

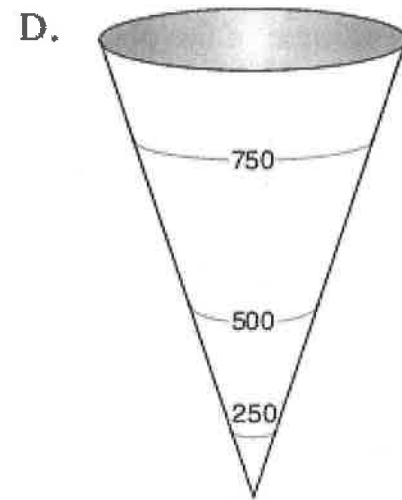
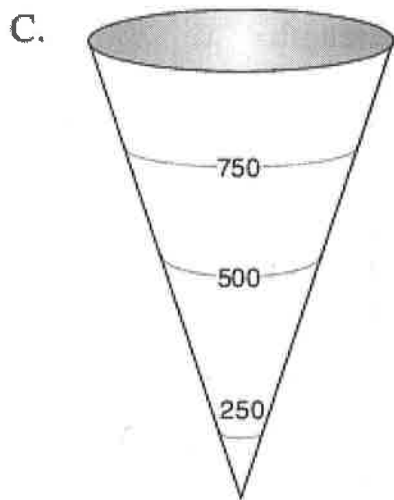
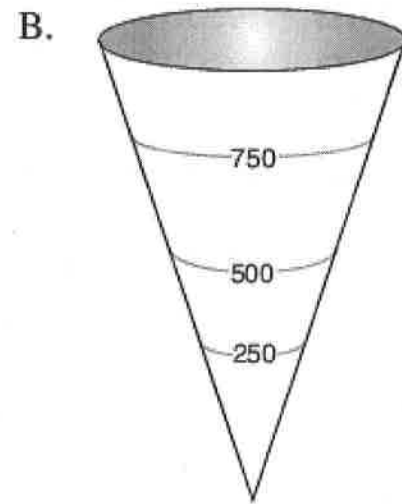
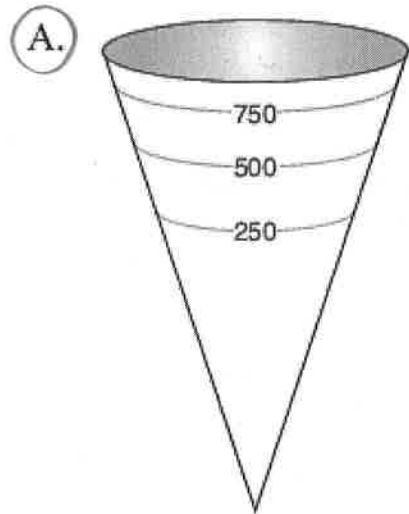
missing piece dimensions are $x \cdot 3\text{ cm} \cdot 4\text{ cm}$

$V = 12x$

$30 = 12x$

$\frac{30}{12} = x$ $x = 2.5\text{ cm}$

48. A cone-shaped water tank has a volume of 1000 litres. Which diagram best represents the 250 L, 500 L and 750 L marks outside of the water tank?



**Match each Real Number on the left with its most Restrictive Category on the right.
Each Restrictive Category may be used once, more than once or not at all.**

Real Number	Restrictive Category
11. π ——— B	A. Rational
12. 0 ——— C	B. Irrational
13. -5 ——— E	C. Whole
14. $\sqrt{2}$ ——— B	D. Natural
15. 1000 ——— D	E. Integer
16. $\frac{3}{4}$ ——— A	
17. $\sqrt{9}$ ——— D	
18. 0.565656... ——— A	
19. 5.121121112... ——— B	
20. $-1.1\overline{582}$ ——— A	

21. To which set(s) of numbers does 8 belong?

I.	Natural
II.	Integer
III.	Rational

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

Shade in Bubble A if the statement is always true.
 Shade in Bubble B if the statement is sometimes true.
 Shade in Bubble C if the statement is never true.

Questions

22. An integer is a whole number. **SOMETIMES**
 23. A whole number is an integer. **ALWAYS**
 24. An irrational number is an integer. **NEVER**
 25. A repeating decimal is an irrational number. **NEVER**
 26. A real number is an irrational number. **SOMETIMES**
 27. A non-repeating non-terminating decimal is an irrational number. **ALWAYS**
 28. An irrational number is a real number. **ALWAYS**

38. Simplify: $x^{\frac{3}{4}} \cdot x^{\frac{1}{4}} + x$

A. $x^{\frac{9}{4}}$

B. x^2

C. $x^{\frac{5}{4}}$

D. $2x$

$$\begin{aligned}
 & x^{\frac{3}{4}} \cdot x^{\frac{1}{4}} + x \\
 &= x^{\frac{3}{4} + \frac{1}{4}} + x \\
 &= x^{\frac{4}{4}} + x = x + x = 2x
 \end{aligned}$$

37. What is the equivalent expression for $\frac{1}{\sqrt[5]{x^2}}$?

A. $x^{-\frac{2}{5}}$

B. $-x^{\frac{2}{5}}$

C. $x^{-\frac{5}{2}}$

D. $\left(\frac{1}{x^2}\right)^5$

$$= \frac{1}{x^{\frac{2}{5}}}$$

because $\sqrt[m]{x^n} = x^{\frac{n}{m}}$

$$= x^{-\frac{2}{5}}$$

because $x^{-m} = \frac{1}{x^m}$

Match each Expression on the left with the Equivalent Expression on the right.
Each Equivalent Expression may be used once, more than once or not at all.

Expression	Equivalent Expression
39. $\left(\frac{b}{a}\right)^{\frac{3}{2}} = 2\sqrt{\left(\frac{b}{a}\right)^3} = \sqrt{\frac{b^3}{a^3}}$ C	A. $\sqrt[3]{\frac{b^2}{a^2}}$
40. $\left(\frac{a}{b}\right)^{-\frac{2}{3}} = \left(\frac{b}{a}\right)^{\frac{2}{3}} = \sqrt[3]{\left(\frac{b}{a}\right)^2}$ A	B. $-\left(\frac{b}{a}\right)^{\frac{3}{2}}$
41. $\left(\frac{a}{b}\right)^{-\frac{3}{2}} = \left(\frac{b}{a}\right)^{\frac{3}{2}} = \sqrt{\left(\frac{b}{a}\right)^3}$ C	C. $\sqrt{\frac{b^3}{a^3}}$ D. $-\left(\frac{a}{b}\right)^{\frac{2}{3}}$ E. $\sqrt[3]{\frac{a^2}{b^2}}$ F. $-\left(\frac{a}{b}\right)^{\frac{3}{2}}$

Provincial Exam Review

Chapter #3 – Polynomials

L.O. B4. Demonstrate an understanding of the multiplication of polynomial expressions (limited to monomials, binomials and trinomials), concretely, pictorially, and symbolically.

L.O. B5. Demonstrate an understanding of common factors and trinomial factoring, concretely, pictorially, and symbolically.

34. Expand and simplify $(x-5)(x-5)$. How many terms are in the simplified product?

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

$$= x^2 - 5x - 5x + 25$$

$$= x^2 - 10x + 25$$

Match each Product on the left with one of its Factors on the right.
Each Factor may be used once, more than once or not at all.

Product	Factor
58. $4x^2 - 1 = (2x-1)(2x+1)$ E	A. $x-2$
59. $x^2 - 4x + 4 = (x-2)(x-2)$ A	B. $x+2$
60. $4x^2 - 4x + 1 = (2x-1)(2x-1)$ E	C. $x-4$
	D. $x+4$
	E. $2x-1$

66. If the product of $(2x+1)(x^2+kx-4) = 2x^3 - 5x^2 - 11x - 4$, what is the value of k ?

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

	x^2	$+kx$	-4
$2x$			$-8x$
$+1$		kx	

$$-8x + kx = -11x$$

$$\therefore k = -3$$

61. What are the possible integral values of k so that $2x^2 + kx - 1$ can be factored?

- A. -1, 2
- B. -2, 2
- C. -2, 1
- D. -1, 1

this factors as $(2x+1)(x-1) = 2x^2 + x - 2x - 1 = 2x^2 - x - 1 \quad k = -1$

or $(x+1)(2x-1) = 2x^2 + 2x - x - 1 = 2x^2 + x - 1 \quad k = 1$

62. When completely simplified, how many terms does the product of $(2x + 5)(2x - 5)$ have?

- A. 1
- B. 2**
- C. 3
- D. 4

$$= 4x^2 - 10x + 10x - 25$$

$$= 4x^2 - 25$$

Match each Expression on the left with the correct Expanded Form on the right.
Each Expanded Form may be used once, more than once or not at all.

Expression	Expanded Form
63. $(x+4)(x-4) = x^2 - 4x + 4x - 16$ F	A. $x^2 + 8x + 16$
64. $(x-4)^3$ last term is $(-4)^3 = -64$ D	B. $x^3 + 12x^2 + 48x + 64$
65. $(x+6)(x^2 - 2x + 4)$ E last term is $+24$	C. $x^3 - 64$
	D. $x^3 - 12x^2 + 48x - 64$
	E. $x^3 + 4x^2 - 8x + 24$
	F. $x^2 - 16$
	G. $x^2 - 8x + 16$

69. If the area of a triangle is $x^3 + x^2 - 4x - 4$ and the height is $2x + 2$, find the base in terms of x .

- A. $x^2 - 4$** ① $A = \frac{1}{2}bh$
 $2A = b \times h$
- B. $2x^2 - 8$ $2(x^3 + x^2 - 4x - 4) = b \times h$
- C. $\frac{x^2 - 4}{2}$ $2x^3 + 2x^2 - 8x - 8 = b \times h$
- D. $x^2 - 2$ $2x^3 + 2x^2 - 8x - 8 \div h = b$

② use long division $\frac{x^3 - 4}{2x + 2}$

$$\begin{array}{r}
 2x+2 \overline{) 2x^3 + 2x^2 - 8x - 8} \\
 \underline{2x^3 + 2x^2} \\
 - 8x - 8 \\
 \underline{ - 8x - 8} \\
 0
 \end{array}$$

32. Expand and simplify: $3x(2x-3)^2 - (x+4)$

- A. $12x^3 - 26x - 4$
- B. $144x^4 - 81x^2 - x - 4$
- C. $12x^3 - 36x^2 + 27x - 4$**
- D. $36x^4 + 81x^2 - x + 4$

$$\begin{aligned}
 &= 3x(2x-3)(2x-3) - (x+4) \\
 &= 3x(4x^2 - 6x - 6x + 9) - x - 4 \\
 &= 3x(4x^2 - 12x + 9) - x - 4 \\
 &= 12x^3 - 36x^2 + 27x - x - 4 \\
 &= 12x^3 - 36x^2 + 26x - 4
 \end{aligned}$$

37. Determine a factor of $45a^2 - 125b^2$.

- A. $3a + 5b$**
- B. $9a - 5b$
- C. $3a - 25b$
- D. $9a + 25b$

$$= 5(9a^2 - 25b^2)$$

$$= 5(3a - 5b)(3a + 5b)$$

35. Determine a factor of $2a^2 - 6a + 4$. $= 2(a^2 - 3a + 2)$

- (A) 2
- B. $a - 4$
- C. $a + 1$
- D. $2a + 1$

$= 2(a - 2)(a - 1)$

31. Which factor is common to both of the following polynomials?

$8x^2 - 2x - 1$	$= (2x + 1)(2x - 1)$
$4x^2 - 1$	

- (A) $2x - 1$
- B. $2x + 1$
- C. $4x - 1$
- D. $4x + 1$

using AC method: $8x^2 - 2x - 1 \xrightarrow{\text{becomes}} x^2 - 2x - 8$

factor $(x - 4)(x + 2)$

divide constants by A $(x - \frac{4}{8})(x + \frac{2}{8})$

reduce $(x - \frac{1}{2})(x + \frac{1}{4})$

mult. terms by denominator $= (2x - 1)(4x + 1)$

36. Determine a factor of $28x^2 + 5xy - 12y^2$.

using AC method

A. $7x - 6y$ $x^2 + 5xy - 336y^2$

B. $7x + 6y$ $(x + 21)(x - 16)$

C. $4x - 3y$ $(x + \frac{21}{28})(x - \frac{16}{28})$

(D) $4x + 3y$ $(x + \frac{3}{4})(x - \frac{4}{7}) \longrightarrow = (4x + 3)(7x - 4)$

32. Which of the following expressions is a common factor of $12x^2 + 7x - 10$ and $9x^2 - 4$?

A. $3x + 2$

(B) $3x - 2$

C. $4x + 5$

D. $4x - 5$

$x^2 + 7x - 120$

$(x + 15)(x - 8)$

$(x + \frac{15}{12})(x - \frac{8}{12}) \longrightarrow (x + \frac{5}{4})(x - \frac{2}{3})$

$= (4x + 5)(3x - 2)$

$9x^2 - 4 = (3x + 2)(3x - 2)$

#36. factors of -336	sum
-12, 28	16
-14, 24	10
-16, 21	5

33. Determine the value of k :

$121x^2 - k = (11x + 8)(11x - 8)$

Record your answer neatly on the Answer Sheet.

$(11x + 8)(11x - 8) = 121x^2 - 88x + 88x - 64$

$= 121x^2 - 64$

$k = 64$

37. Which of the following is a factor of $4x^2 - 7x - 2$?

- A. $x+3$
- B. $2x+1$
- C. $4x+1$
- D. $4x-1$

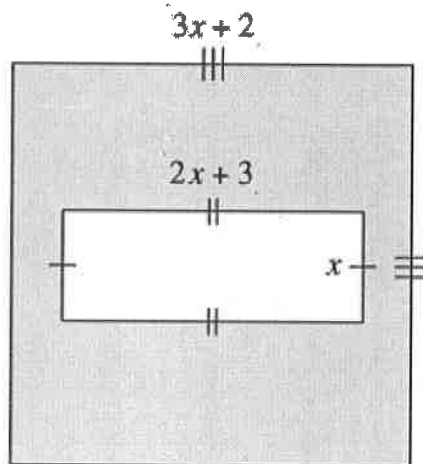
USING
AC METHOD

$$x^2 - 7x - 8$$

$$(x-8)(x+1)$$

$$(x - \frac{8}{4})(x + \frac{1}{4}) \longrightarrow = (x-2)(4x+1)$$

Use the following diagram to answer question 32.



32. Determine the area of the shaded region.

- A. $7x^2 - 3x + 4$
- B. $7x^2 + 3x + 4$
- C. $7x^2 + 9x + 4$
- D. $7x^2 + 15x + 4$

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

$$= 9x^2 + 6x + 6x + 4 - (2x^2 + 3x)$$

$$= 9x^2 + 12x + 4 - 2x^2 - 3x$$

$$= 7x^2 + 9x + 4$$

34. Expand: $(x+5)(x-4)(2x+9)$

- A. $2x^3 - 180$
- B. $2x^3 + 9x^2 - 41x - 180$
- C. $2x^3 + 11x^2 - 31x - 180$
- D. $2x^3 + 11x^2 + 49x - 180$

$$= (x^2 - 4x + 5x - 20)(2x+9)$$

$$= (x^2 + x - 20)(2x+9)$$

$$= 2x^3 + 2x^2 - 40x + 9x^2 + 9x - 180$$

$$= 2x^3 + 11x^2 - 31x - 180$$

35. Simplify: $(4x+1)(2x+3) - (3x-7)(2x-5)$

$= (8x^2+12x+2x+3) - (6x^2-14x-15x+35)$

A. $2x^2 - 15x + 38$

$= 8x^2+14x+3 - (6x^2-29x+35)$

B. $2x^2 - 15x - 32$

$= 8x^2+14x+3 - 6x^2+29x-35$

C. $2x^2 + 43x + 38$

$= 2x^2 + 43x - 32$

D. $2x^2 + 43x - 32$

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

$= (x-4)(x-4)(x-4)$

A. $x^3 - 12x^2 + 48x - 64$

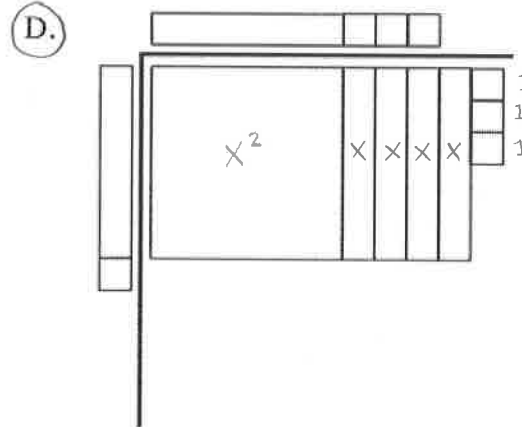
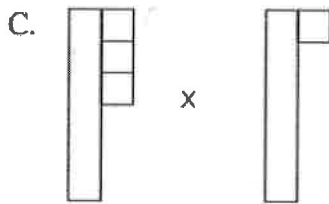
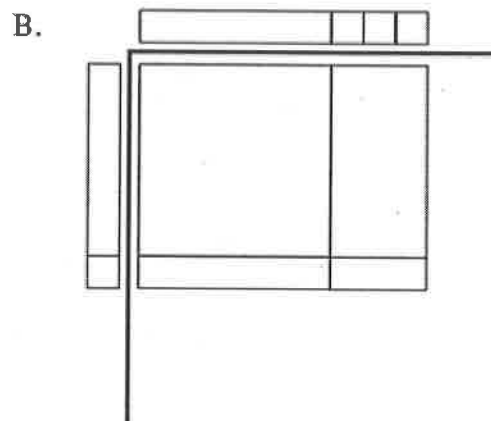
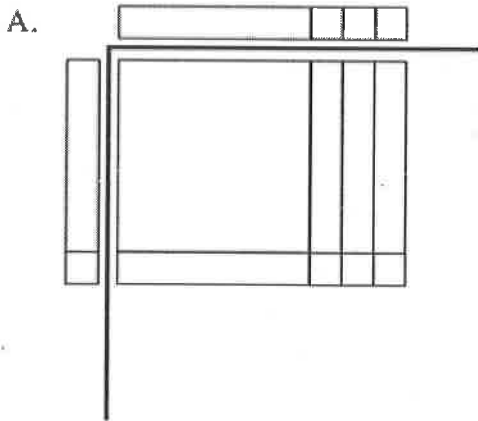
last term will be $-4^3 = -64 \therefore A$

B. $x^3 + 12x^2 + 48x + 64$

C. $x^3 - 4x^2 + 16x + 64$

D. $x^3 - 64$

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



$(x+3)(x+1) = x^2 + 3x + x + 3$
 $= x^2 + 4x + 3$

40. 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 ?

this means both b and c are negative

A. $g < 0$ and $k > 0$

$\therefore k = b \times c$ is positive $\longrightarrow k$ is positive, > 0

B. $g < 0$ and $k < 0$

$g = b + c$ is negative $\longrightarrow g$ is negative, < 0

C. $g > 0$ and $k > 0$

D. $g > 0$ and $k < 0$

42. Which of the following expressions have a factor of $x + 2$?

using AC method

$$2x^2 - x - 10$$

$$x^2 - x - 20$$

$$(x-5)(x+4)$$

$$(x-\frac{5}{2})(x+\frac{4}{2})$$

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

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

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

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

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

$$= 16x^2 - 24x + 9$$

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

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

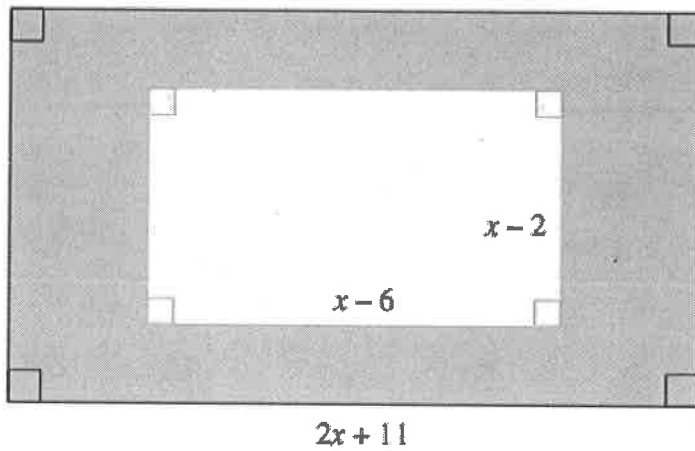
Steps	
I.	$x(x^2 + 2x - 4) - 3(x^2 + 2x - 4)$
II.	$x^3 + 2x^2 - 4x - 3x^2 + 6x - 12$
III.	$x^3 - x^2 + 2x - 12$

✓
 ✗ should be $-6x + 12$

In which step is Pam's first error?

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

40. Determine an expression to represent the shaded area below.



$$\begin{aligned} & (2x+11)(x+5) - (x-6)(x-2) \\ & 2x^2+10x+11x+55 - (x^2-2x-6x+12) \\ & 2x^2+21x+55 - (x^2-8x+12) \\ & 2x^2+21x+55 - x^2+8x-12 \\ & = x^2+29x+43 \end{aligned}$$

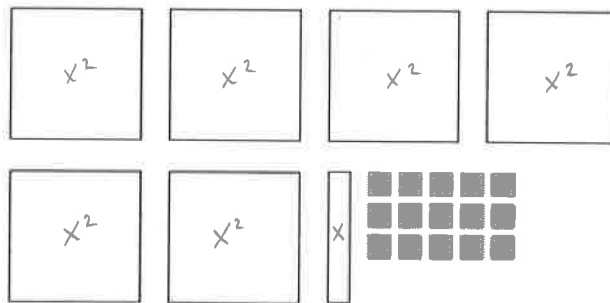
- A. x^2+43
- B. $x^2+13x+67$
- C. $x^2+29x+43$
- D. $3x^2+13x+67$

41. Determine the greatest common factor of $12x^5y$, $4x^3y^2$ and $6x^2y^4$.

- A. $2xy$
- B. $2x^2y$
- C. $4x^3y^2$
- D. $12x^5y^4$

G.C.F. of: 12, 4, and 6 = 2
 x^5, x^3 and $x^2 = x^2$
 y, y^2 and $y^4 = y$

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



Factor this using AC method

$$x^2 + x - 90$$

$$(x+10)(x-9)$$

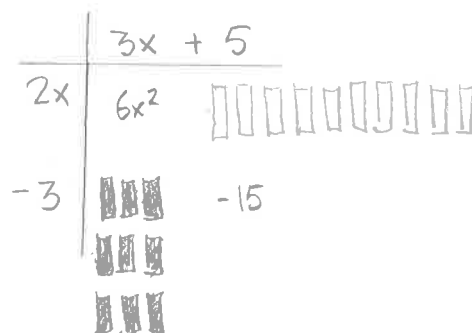
$$(x+\frac{10}{6})(x-\frac{9}{6})$$

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

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

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



factors of -90	sum
15, -6	+9
10, -9	+1

08. The slope of the graph of $y = -x - 5$ is -5 .

- A. True
- B. False

slope

The slope is -1

Use the following equation to answer questions 109 to 113.

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

Match each graphing Characteristic of the equation on the left with the correct Value(s) on the right. Each Value may be used once, more than once or not at all.

Characteristic	Value(s)
109. y-intercept _____ B	A. 2
110. x-intercept _____ A	B. 4
111. slope _____ D	C. $-2x$
112. domain _____ E	D. -2
113. range _____ E	E. all real numbers
	F. $-2 \leq x \leq 2$
	G. $0 \leq y \leq 8$
	H. -4

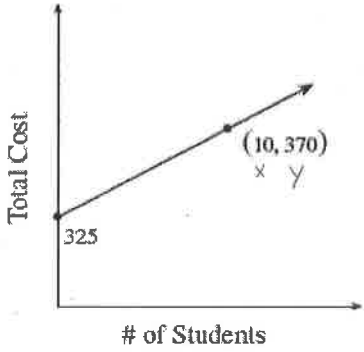
$$2x + y - 4 = 0 \xrightarrow[\text{form}]{\text{slope-int}} y = -2x + 4$$

↑ slope
↑ y-int.

x-int occurs when $y=0$

$$\begin{aligned} \therefore 2x + 0 - 4 &= 0 \\ 2x - 4 &= 0 \\ 2x &= 4 \\ x &= \frac{4}{2} = 2 \end{aligned}$$

20. A class is going on a field trip. The cost of the bus rental is \$325 and the cost of admission is \$5 per student. Which of the following statements are true?

I.	$y = 10x + 375$ where x is the number of students and y is the total cost of the field trip
II.	The total cost for 20 students is \$425. TRUE
III.	This represents a partial variation. TRUE
IV.	The graph of the function is: 

FALSE $\longrightarrow y = 5x + 325$

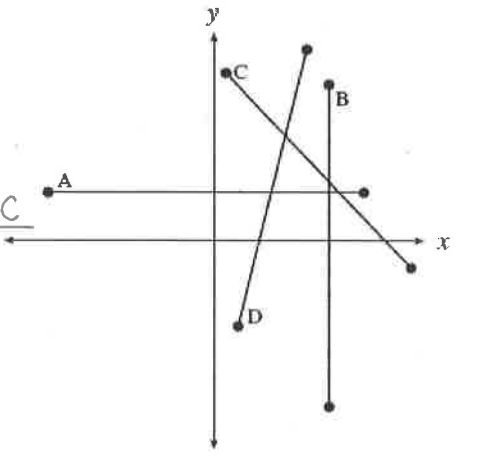
if $x = 20$ then $y = 5(20) + 325 = 425$

FALSE

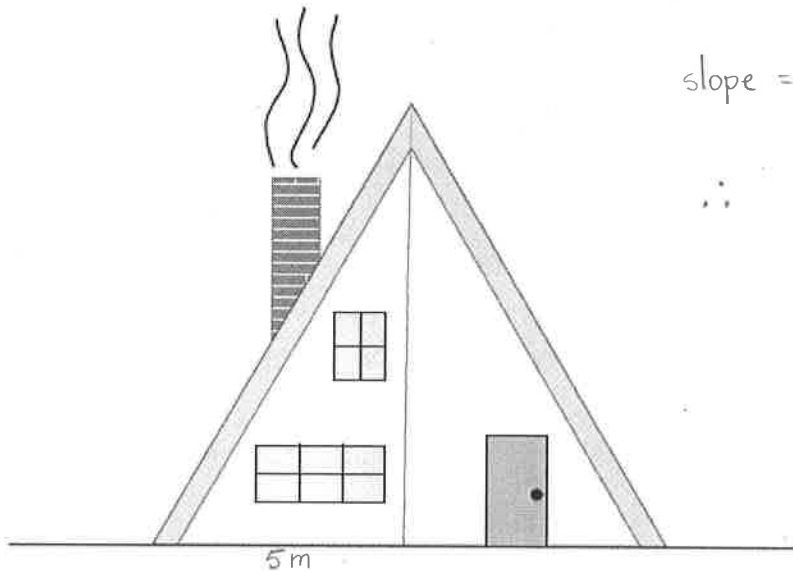
if $x = 10$ then $y = 5(10) + 325 = 375$

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

Match each Line Description on the left with a line on the Graph on the right.
 Each line on the Graph may be used once, more than once or not at all.

Line Description	Graph
159. A line segment with slope of 0. <u>A</u>	
160. A line segment with undefined slope. <u>B</u>	
161. A line segment with positive slope. <u>D</u>	
162. A line segment with $m < 0$, where m is slope. <u>C</u>	
163. A line segment perpendicular to A. <u>B</u>	
164. A line segment parallel to the x-axis. <u>A</u>	

66. The slope of the roof of an A-frame cottage is $\frac{3}{4}$.



$$\text{slope} = \frac{\text{RISE}}{\text{RUN}} = \frac{\text{height}}{5\text{m}}$$

$$\therefore \frac{3}{4} = \frac{h}{5} \longrightarrow \frac{5 \times 3}{4} = h$$

$$h = \frac{15}{4} = \boxed{3.75\text{m}}$$

How high, in metres, is the peak of the cottage, given that the total width of the cottage is 10 m?
Answer to two decimal places.

65. If the slope of a ski hill is $\frac{1}{3}$ and the coordinates of the bottom of the hill are $(2, 5)$, what is the value of y if the coordinates at the top of the hill are $(8, y)$?

- A. 3
- B. 7
- C. 11
- D. 23

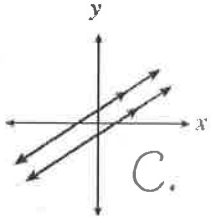
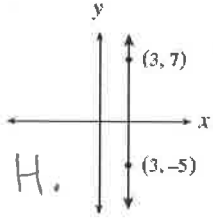
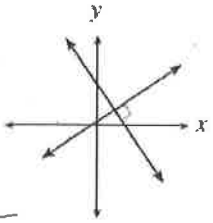
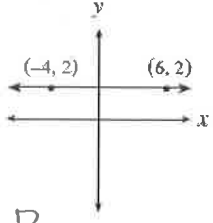
use $m = \frac{y_2 - y_1}{x_2 - x_1}$

$x_2 \ y_2$

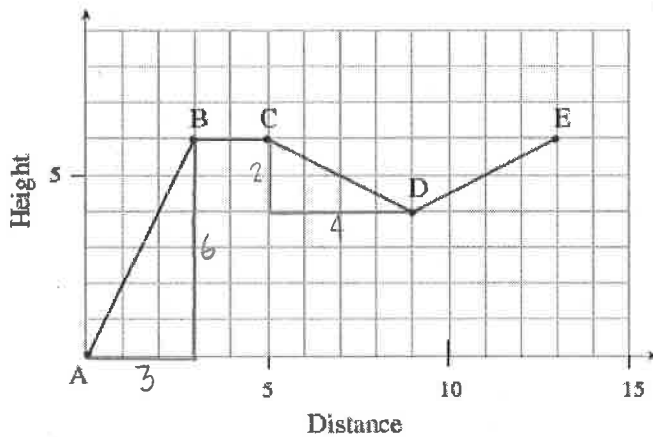
in this case, $\frac{1}{3} = \frac{y-5}{8-2} \longrightarrow \frac{1}{3} = \frac{y-5}{6} \longrightarrow \frac{6}{3} = y-5 \longrightarrow 2 = y-5$

$$\boxed{y=7}$$

Match each Graph on the left with the correct Characteristic on the right.
Each Characteristic may be used once, more than once or not at all.

Graph	Characteristic
<p>173. </p>	<ul style="list-style-type: none"> A. slopes of 1 B. slopes of 0 C. equal slopes D. slopes of -1 E. negative slopes only F. negative reciprocal slopes G. positive reciprocal slopes H. undefined slopes
<p>175. </p>	
<p>174. </p>	
<p>176. </p>	

77. The following is a side view of part of the Appleton Roller Coaster.



$$\text{SLOPE}_{AB} = \frac{6}{3} = 2$$

$$\text{SLOPE}_{CD} = \frac{-2}{4} = -\frac{1}{2}$$

Which of the following statements are true?

I.	The slope of AB is 2.	TRUE
II.	The slope of BC is 0.	TRUE
III.	Line AB is perpendicular to CD.	TRUE
IV.	The slope of CB is undefined.	FALSE

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

Shade in Bubble A if the statement is always true.
 Shade in Bubble B if the statement is sometimes true.
 Shade in Bubble C if the statement is never true.

Statements

178. The product of the slopes of perpendicular lines is 1. NEVER
179. The product of the slopes of parallel lines is -1 . NEVER
180. The product of the slopes of parallel lines is 1. SOMETIMES
181. The slope of a line where the x -intercept and the y -intercept have opposite non-zero values is 1. ALWAYS
182. The slope of a line where the x -intercept and the y -intercept have the same non-zero values is 1. NEVER

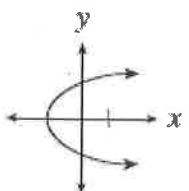
+60

19. UNEEDA Car Rental Company charges a flat rate of \$60 for a car rental plus \$0.15 for each kilometre driven. Which of the following is a function which will determine the overall charge if n kilometres have been driven? $\rightarrow 0.15n$

- A. $C(n) = 0.15 + 60n$
- B. $C(n) = 60 + 0.15(n+1)$
- C. $C(n) = 60 + 0.15(n-1)$
- D.** $C(n) = 60 + 0.15n$

$C(n) = 0.15n + 60$

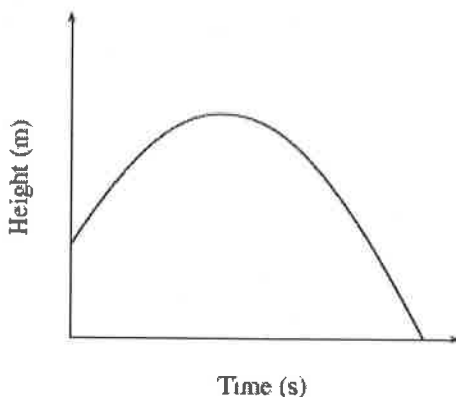
26. Which of the following represent(s) a function?

I.	$(0, 0), (2, 4), (3, 9), (4, 16), (5, 25)$	✓
II.	Square the number and add 3 to the result.	✓
III.	$y = -3x^2 + 2$	✓
IV.		

NO, because an input of x produces more than one output (y)
OR/ it does not pass the vertical line test

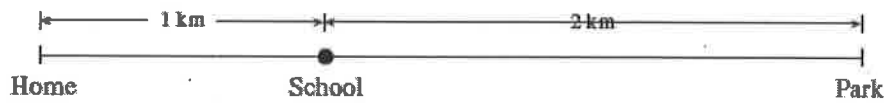
- A. I only
- B. II and III only
- C.** I, II and III only
- D. I, II, III and IV

90. A football is thrown into the air. The graph below could describe the height of a football above the ground over time.



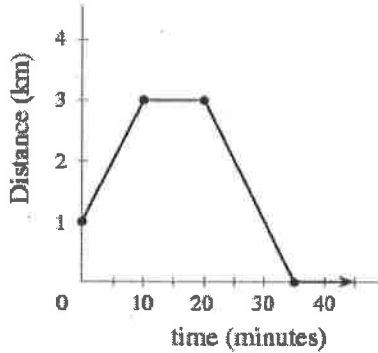
- A.** True — because it initially starts above the ground
- B. False

91. Sue leaves school and runs to the park. After doing some stretches, she runs home.

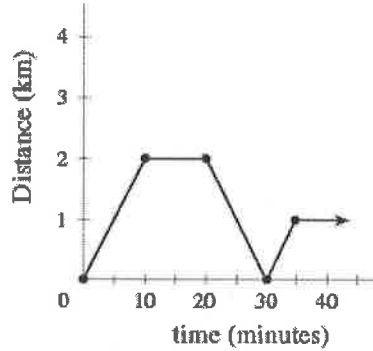


Choose the graph that best describes Sue's distance from home, starting when she leaves school.

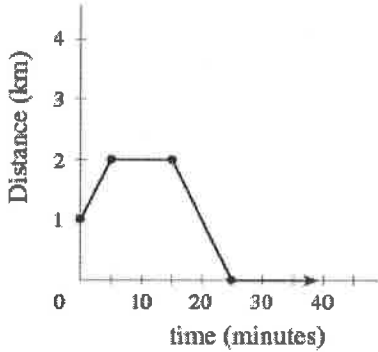
A.



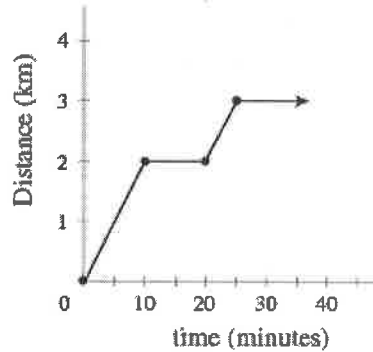
B.



C.



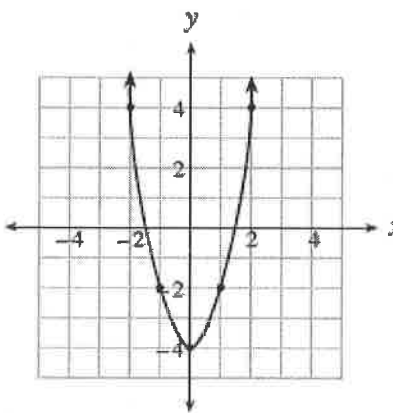
D.



Initially, Sue is 1 km from home, so, the graph should start at $(0, 1)$ \longrightarrow A or C.

She is 3 km from home when she gets to the park \longrightarrow A

97. Which of the following can be used to describe one and the same function?

I.	<table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>-5</td> <td>46</td> </tr> <tr> <td>-3</td> <td>14</td> </tr> <tr> <td>0</td> <td>-4</td> </tr> <tr> <td>3</td> <td>14</td> </tr> <tr> <td>5</td> <td>46</td> </tr> </tbody> </table> <p style="margin-left: 20px;"><i>same as III</i></p>	x	y	-5	46	-3	14	0	-4	3	14	5	46
x	y												
-5	46												
-3	14												
0	-4												
3	14												
5	46												
II.	$g(x) = 2x^2 + 4$												
III.	Four less than twice the squared number.												
IV.													

$$y = 2x^2 - 4$$

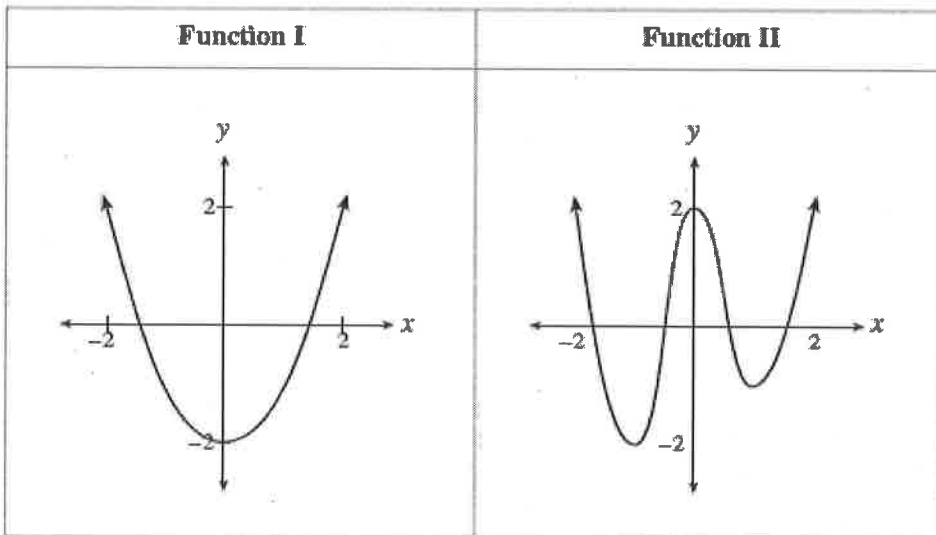
$$y = 2x^2 - 4$$

x	y
-2	4
-1	-2
0	-4
1	-2
2	4

this is also
 $y = 2x^2 - 4$

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

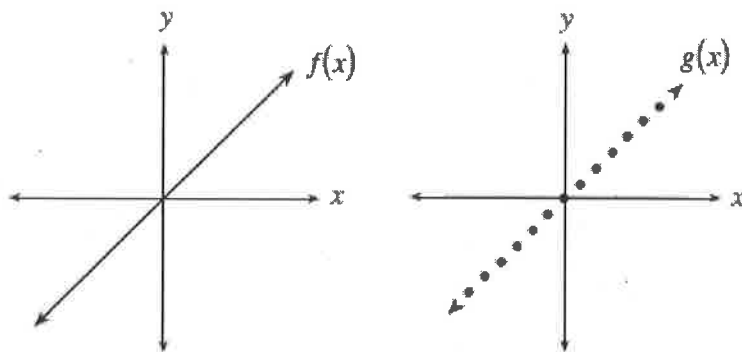
Use the following graphs of the functions to answer question 107.



07. Which of the following statements is correct?

- A. The range of both functions is $-2 \leq x \leq 2$. NO — RANGE DESCRIBES y NOT x
- B. The domain of both functions is $-2 \leq x \leq 2$. NO
- C. The range of both functions is all real numbers. NO
- D. The domain of both functions is all real numbers.

01. Consider the following functions:



The domain and range for $f(x)$ and $g(x)$ are the same.

- A. True
- B. False

Match each Graph on the left with the correct Range on the right.
Each Range may be used once, more than once or not at all.

Graph	Range	
102. E.		A. $y = 3$
103. B.		B. $y = -3$
104. G.		C. $y \leq 3$
105. D.		D. $y \geq -3$
106. H.		E. $y \leq -3$
	F. $3 \leq y \leq -3$	
	G. $-3 \leq y \leq 3$	
	H. all real numbers	

67. Which of the following equations represents a line that has a slope of $\frac{3}{4}$ and passes through the point $(0, -5)$?

← y-intercept occurs @ $x=0$

- A. $y = -\frac{4}{3}x - 5$
- B. $y = \frac{3}{4}x$
- C. $y = \frac{3}{4}x - 5$
- D. $y = \frac{3}{4}x + 5$

Match each Description on the left with the correct Equation on the right. Each Equation may be used once, more than once or not at all.

Description	Equation
D. 168. Line that has a slope of -1 and passes through $(3, 4)$	A. $y = x + 7$
B. 169. Line that passes through $(6, 5)$ and $(-9, -5)$ <small>$x_1 \ y_1 \quad x_2 \ y_2$</small>	B. $y = \frac{2}{3}x + 1$
F. 170. Line that passes through $(4, 3)$ and is parallel to the line $y = -2x + 4$	C. $y = -2x + 4$
b. 171. Line that is perpendicular to the line $y = -\frac{3}{2}x + 1$	D. $y = -x + 7$
	E. $y = \frac{4}{3}x + 4$
	F. $y = -2x + 11$
	G. $y = -x + 1$
	H. $y = -2x + 1$

168.

$$y - 4 = -1(x - 3)$$

$$y - 4 = -x + 3$$

$$y = -x + 3 + 4$$

$$y = -x + 7$$

169. $m = \frac{-5 - 5}{-9 - 6} = \frac{-10}{-15} = \frac{2}{3}$

170. $y - 3 = -2(x - 4)$
 $y - 3 = -2x + 8$
 $y = -2x + 8 + 3$
 $y = -2x + 11$

83. A line segment joins A $(6, 2)$ and B $(14, 12)$. What are the slope and y-intercept of the line perpendicular to AB and passing through the midpoint of AB?

	slope	y-intercept
A.	$-\frac{4}{5}$	-1
<input checked="" type="radio"/> B.	$-\frac{4}{5}$	15
C.	$\frac{5}{4}$	5
D.	$\frac{5}{4}$	9

$$m = \frac{12 - 2}{14 - 6} = \frac{10}{8} = \frac{5}{4}$$

midpoint AB $(\frac{6+14}{2}, \frac{2+12}{2})$

$$(\frac{20}{2}, \frac{14}{2}) \rightarrow (10, 7)$$

so, we are looking for the eqn. of a line with a slope $-\frac{4}{5}$ passing thru $(10, 7)$

$$y - 7 = -\frac{4}{5}(x - 10)$$

$$y - 7 = -\frac{4}{5}x + \frac{40}{5}$$

$$y - 7 = -\frac{4}{5}x + 8$$

$$y = -\frac{4}{5}x + 8 + 7$$

$$y = -\frac{4}{5}x + 15$$

72. The equation of a line is $2x - ay + c = 0$. The slope is $-\frac{2}{3}$ and the y-intercept is 6. What are the values of a and c ?

- (A) $a = -3, c = -18$
- B. $a = -3, c = -2$
- C. $a = -3, c = 2$
- D. $a = 3, c = -18$

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

$$3y = -2x + 18$$

$$2x + 3y - 18 = 0$$

121. Consider the following information:

- y varies partially as x
- when $x = 2, y = 1$
- when $x = 0, y = -7$

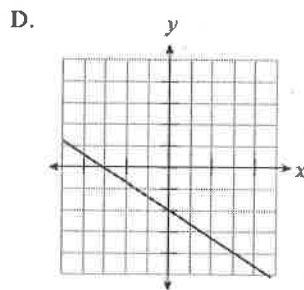
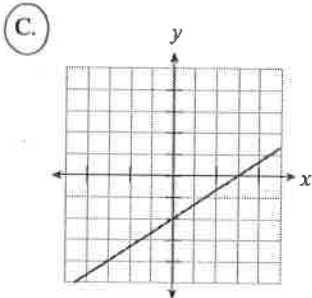
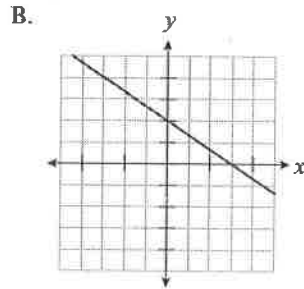
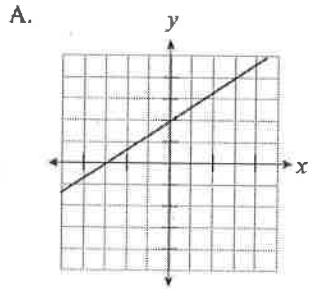
$$\begin{matrix} (2, 1) & (0, -7) & \leftarrow y\text{-intercept} = -7 \\ x_1, y_1 & x_2, y_2 \end{matrix}$$

$$m = \frac{-7 - 1}{0 - 2} = \frac{-8}{-2} = 4$$

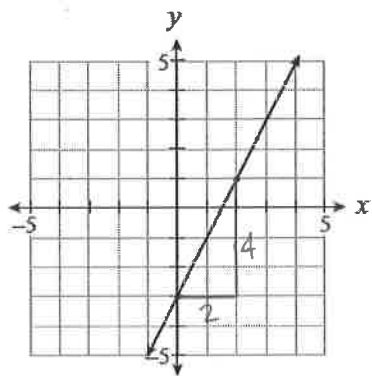
$$\therefore \boxed{y = 4x - 7}$$

What is the value of the constant of variation (constant of proportionality)?

Which of the choices below shows the correct graph of the equation $y = \frac{2}{3}x - 2$?



What is the equation of the line below?



$y\text{-int} = -3$
 $\text{slope} = \frac{4}{2} = 2$

- (A) $y = 2x - 3$
- B. $y = 2x + 3$
- C. $y = \frac{1}{2}x - 3$
- D. $y = -3x + 2$

Which of the following ordered pairs are found on the line represented by the equation $x + 3y = 6$?

I.	(3, 1)
II.	(-6, 4)
III.	(0, 2)

$3 + 3(1) = 6$ yes

$-6 + 3(4) = 6$ yes

$0 + 3(2) = 6$ yes

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

Determine the slope of the following relation : $3x - 2y + 4 = 0$

OR USE SLOPE = $-\frac{A}{B}$

(A) $\frac{3}{2}$

B. $-\frac{3}{2}$

C. 2

D. 3

$-2y = -3x - 4$

$y = \frac{-3x - 4}{-2}$

$y = \frac{-3x}{-2} - \frac{4}{-2}$

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

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

$= \frac{3}{2}$

Which of the following equations represents the steepest line?

USE SLOPE = $-\frac{A}{B}$

A. $3x + 4y = -17$

$\rightarrow m = -\frac{3}{4}$

B. $3x + 5y = 18$

$\rightarrow m = -\frac{3}{5}$

C. $4x + 3y = 10$

$\rightarrow m = -\frac{4}{3}$

(D) $5x + 3y = 10$

$\rightarrow m = -\frac{5}{3}$

Determine the y-intercept of the line whose equation is $5x - 4y - 10 = 0$.

Record your answer neatly on the Answer Sheet.

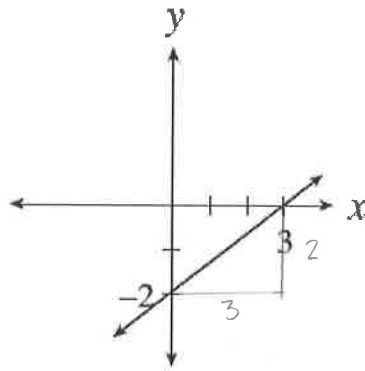
$$-4y = -5x + 10$$

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

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

$$y = \frac{5}{4}x - \frac{5}{2}$$

$y\text{-int.} = -\frac{5}{2}$



slope = $\frac{2}{3}$

y-int. = -2

Which of the following equations is represented by the line shown above?

(A) $2x - 3y - 6 = 0$

B. $2x - 3y - 2 = 0$

C. $2x - 3y + 9 = 0$

D. $3x - 2y - 4 = 0$

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

$$3y = 2x - 6$$

$$0 = 2x - 3y - 6$$

What is the equation of the line that passes through the point $(6, -3)$ and is parallel to the line $y = \frac{2}{3}x + 4$?

A. $y = \frac{2}{3}x - 7$

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

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

D. $y = \frac{3}{2}x - 12$

This is the only line with the same slope!!

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

$$y + 3 = \frac{2}{3}x - \frac{12}{3}$$

$$y + 3 = \frac{2}{3}x - 4$$

$$y = \frac{2}{3}x - 4 - 3$$

$$y = \frac{2}{3}x - 7$$

The line ℓ_1 passes through the point $(-4, -4)$ and has an x -intercept of 4. \leftarrow means it passes thru $(4, 0)$
Which of the following statements are true?

I.	ℓ_1 has a y -intercept of -2	✓
II.	ℓ_1 passes through the point $(8, 2)$	✓
III.	ℓ_1 is perpendicular to $y = -2x - 2$	✓

Determine the eqn. of the line

$$m = \frac{0 - (-4)}{4 - (-4)} = \frac{4}{8} = \frac{1}{2}$$

$$y - 0 = \frac{1}{2}(x - 4)$$

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

if $x = 8$

$$y = \frac{1}{2}(8) - 2$$

$$= 4 - 2$$

$$= 2$$

A. I and II only

C. I and III only

B. II and III only

D. I, II and III

Which of the following statements are true about the graph of the function $5y + 40 = 0$?

I.	The slope is zero.	✓
II.	The y -intercept is -8 .	✓
III.	The domain is the set of all real numbers.	✓
IV.	The range is the set of all real numbers.	✗

$$5y = -40$$

$$y = -\frac{40}{5}$$

$$y = -8$$

this is a horizontal line

A. I and III only

B. I and IV only

C. II and III only

D. I, II and III only

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

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

$$Ax + By = -C$$

$$By = -Ax - C$$

$$y = \frac{-Ax - C}{B}$$

$$y = \frac{-A}{B}x - \frac{C}{B}$$

$$\therefore B < 0$$

$$C < 0$$

Which of the following ordered pairs can be found on the graph of the line $4x + 3y = 36$?

✓	I.	$(-9, 24)$	$4(-9) + 3(24) = -36 + 72 = 36$
×	II.	$(-3, 8)$	$4(-3) + 3(8) = -12 + 24 = 12$
✓	III.	$(0, 12)$	$4(0) + 3(12) = 36$
×	IV.	$(12, 4)$	$4(12) + 3(4) = 48 + 12 = 60$

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

For the grad banquet, there is a fixed cost of \$250 for the room rental plus a cost per person. If it costs \$3276 for 89 people, what is the cost for 110 people?

- A. \$4299
- B. \$4049
- C. \$3990**
- D. \$3740

$$C = np + 250$$

$$3276 = 89p + 250$$

$$3276 - 250 = 89p$$

$$3026 = 89p$$

$$\frac{3026}{89} = p$$

$$p = 34$$

COST FOR 110 PEOPLE

$$C = 110(34) + 250$$

$$C = 3990$$

Determine the slope of the line joining $P(-5, 9)$ and $Q(3, -7)$.

- A. -2**

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

C. $\frac{1}{2}$

- D. 2

$$x_1 \quad y_1 \quad x_2 \quad y_2$$

$$m = \frac{-7 - 9}{3 - (-5)} = \frac{-16}{8} = -2$$

A line passes through the points $(-8, 24)$ and $(4a, 9)$. The slope of the line is $-\frac{1}{2}$.

Determine the value of a . $x_1 \ y_1 \quad x_2 \ y_2$

A. $-\frac{29}{2}$

B. $-\frac{1}{8}$

C. $\frac{11}{2}$

D. $\frac{19}{2}$

$$-\frac{1}{2} = \frac{9-24}{4a-(-8)}$$

$$\frac{-1}{2} = \frac{-15}{4a+8}$$

$$-1(4a+8) = 2(-15)$$

$$-4a-8 = -30$$

$$-4a = -30+8$$

$$-4a = -22$$

$$a = \frac{-22}{-4}$$

$$a = \frac{11}{2}$$

Which equation represents a line with a y-intercept of -5 and a slope of $\frac{2}{3}$?

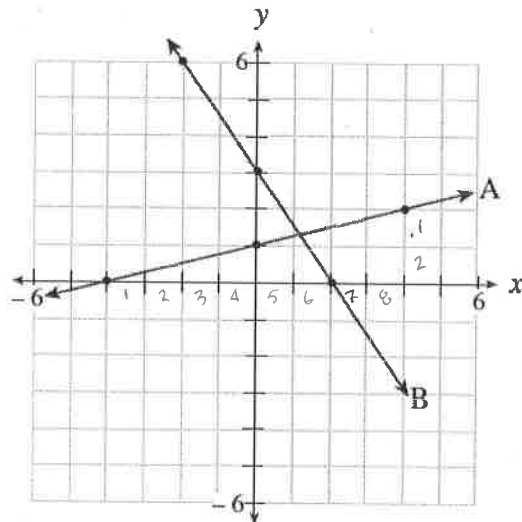
A. $y = \frac{2}{3}x - 5$

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

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

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

Which equation represents a line with the same slope as line A and the same y-intercept as line B?



$$\text{SLOPE}_A = \frac{2}{8} = \frac{1}{4}$$

$$\text{SLOPE} = \frac{-A}{B} = \frac{-4}{-1}$$

$$m = \frac{-1}{-4} = \frac{1}{4}$$

A. $4x - y + 3 = 0$

B. $3x + 2y - 2 = 0$

C. $x - 4y + 12 = 0$

D. $x + 4y - 12 = 0$

Which equation represents a line that is perpendicular to $2x + 3y - 18 = 0$?

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

$$\text{SLOPE} = -\frac{2}{3}$$

B. $y = \frac{3}{2}x + 4$

$$\perp \text{ SLOPE} = \frac{3}{2}$$

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

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

Determine an equation of the line passing through the point $(-4, 3)$ and parallel to the line segment joining $A(5, -2)$ and $B(3, 4)$.

A. $y = 3x + 15$

B. $y = 3x - 9$

C. $y = -3x + 15$

D. $y = -3x - 9$

$$m = \frac{4 - (-2)}{3 - 5} = \frac{4 + 2}{-2} = \frac{6}{-2} = -3$$

USE POINT-SLOPE FORM TO DETERMINE EQN.

$$y - 3 = -3(x - (-4))$$

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

$$y - 3 = -3x - 12$$

$$y = -3x - 12 + 3$$

$$y = -3x - 9$$

CHAPTER 7 PROVINCIAL EXAM REVIEW - LINEAR SYSTEMS

USING ELIMINATION (ADDITION METHOD)

Solve for y in the following system of equations:

$$\begin{array}{r} x - y = -1 \xrightarrow{\times 3} -3x + 3y = +3 \\ 3x + 5y = 21 \xrightarrow{\oplus} 3x + 5y = 21 \\ \hline 0 + 8y = 24 \\ y = 3 \end{array}$$

USING SUBSTITUTION

A.	2	$x = y - 1$	$8y - 3 = 21$
B.	3	$3x + 5y = 21$	$8y = 24$
C.	9		$y = 3$
D.	12	$3(y - 1) + 5y = 21$	$y = 3$
		$3y - 3 + 5y = 21$	$\therefore x = 3 - 1 = 2$

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

A. $\begin{cases} 2x - 3y = 6 \\ y = 3x - 13 \end{cases} \rightarrow 2(-3) - 3(4) = -6 - 12 = -18$ this does not = 6
 \therefore NOT A OR B

B. $\begin{cases} 2x - 3y = 6 \\ y = 3x + 13 \end{cases}$

C. $\begin{cases} 2x + 3y = 6 \\ y = 3x - 13 \end{cases} \rightarrow 2(-3) + 3(4) = -6 + 12 = 6 \quad \checkmark$

D. $\begin{cases} 2x + 3y = 6 \\ y = 3x + 13 \end{cases} \rightarrow 3(-3) + 13 = -9 + 13 = 4 = y$
 \uparrow
 x

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 .

USE DISTANCE (d) = RATE (r) \times TIME (t)

(A) $(570 - w)(12) = d$
 $(570 + w)(10) = d - 370$

B. $(570 - w)(12) = d$
 $(570 + w)(10) = d + 370$

C. $(570 + w)(12) = d$
 $(570 - w)(10) = d - 370$

D. $(570 + w)(12) = d$
 $(570 - w)(10) = d + 370$

... in this case, the distance travelled by the first plane is $d = (570 - w)(12)$ where w is the windspeed

$$d - 370 = (570 + w)(10)$$

Solve for x :

$$3x + 4y = -16 \quad \textcircled{1}$$

$$x = 4y \quad \textcircled{2}$$

Record your answer neatly on the Answer Sheet.

substitute for x in equation $\textcircled{1}$

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

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

$$16y = -16$$

$$y = -1$$

$$\therefore x = 4(-1)$$

$$x = -4$$

Solve the following system of equations:

USING ADDITION METHOD (ELIMINATION)

$$\begin{array}{r} 4x + 2y = 8 \\ -3x + y = -1 \end{array} \xrightarrow{x \cdot 2} \begin{array}{r} 4x + 2y = 8 \\ \oplus 6x - 2y = 2 \end{array}$$

$$10x = 10$$
$$x = 1$$

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

CHECK FOR Y

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

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.

Record your answer neatly on the Answer Sheet.

$$h = \frac{1}{2} = 0.5 \text{ lbs}$$

$$\begin{array}{r} 12h + 10a = 7 \xrightarrow{\times 3} 36h + 30a = 21 \\ 5h + 15a = 4 \xrightarrow{\times 2} -10h - 30a = -8 \end{array}$$

$$26h = 13$$
$$h = \frac{13}{26} = \frac{1}{2}$$

How many solutions does this system of equations have?

$$y = 3x + 7$$

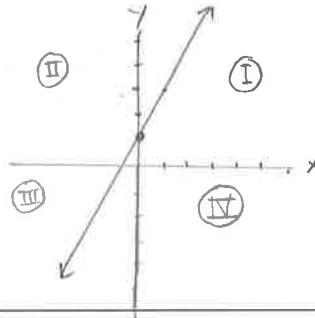
$$y = 3x - 4$$

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

The lines have the same slope but different y-intercepts. These lines are parallel.

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



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. $x + y = 8$
 $12x + 18y = 108$
- B. $x + y = 108$
 $12x + 18y = 8$
- C. $x + 12y = 8$
 $x + 18y = 108$
- D. $12x + y = 8$
 $x + 18y = 108$

$$12S + 18R = 108$$

$$S + R = 8$$

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%?

- A. \$600
- B. \$750
- C. \$900
- D. \$1000

Let x represent the amount spent on the first bond.
 y represent the amount spent on the second bond.

If Kim invested a total of \$1500 between two bonds,

then $x + y = 1500$ ① \longrightarrow $x = 1500 - y$ ②

and $0.08x + 0.1y = 132$ ②

substitute for x into ②

$$0.08(1500 - y) + 0.1y = 132$$

$$120 - .08y + 0.1y = 132$$

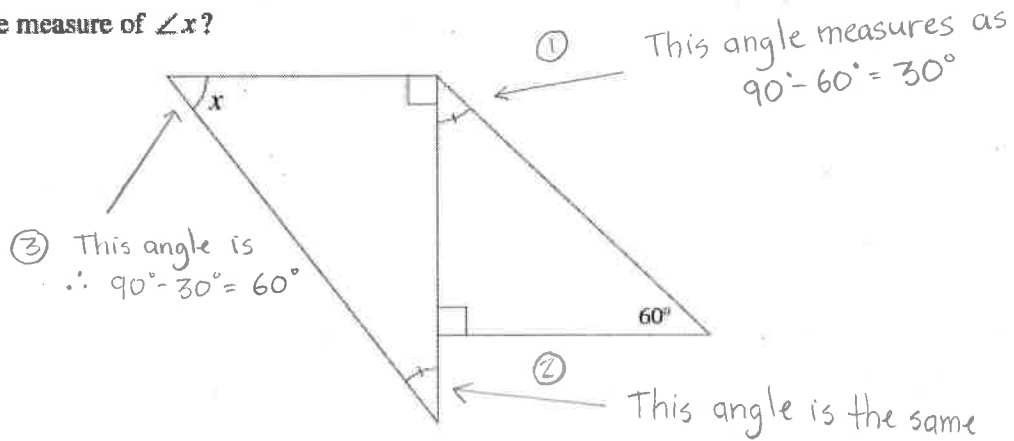
$$.02y = 132 - 120$$

$$.02y = 12 \longrightarrow y = \frac{12}{.02} = 600$$

Foundations and Pre-Calculus Math 10

Unit 8 Provincial Review Questions

28. What is the measure of $\angle x$?



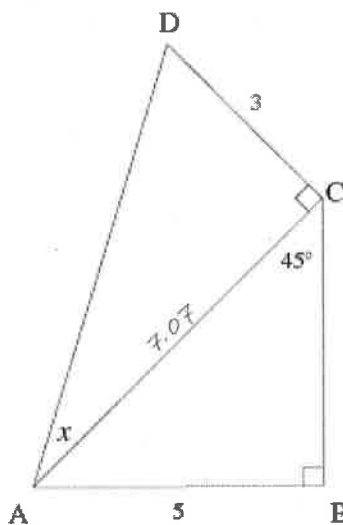
- A. 30°
- B. 45°
- C. 60°**
- D. 90°

129. What is the measure of $\angle x$ to the nearest degree?

① $\sin 45 = \frac{5}{\overline{CA}}$

$\overline{CA} = \frac{5}{\sin 45^\circ}$

$\overline{CA} = 7.07$



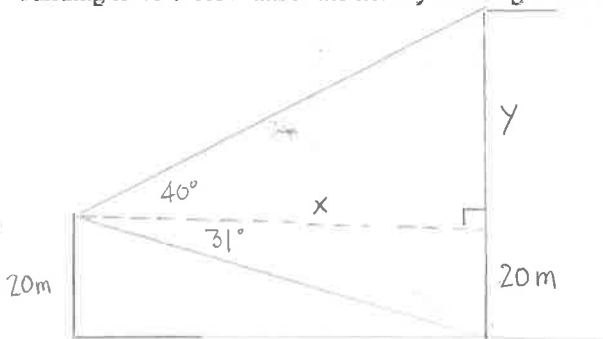
② $\tan x = \frac{3}{7.07}$

$x = \tan^{-1}\left(\frac{3}{7.07}\right)$

$x = 22.99^\circ$

$x = 23^\circ$

130. A window on the fourth floor of a building is 20 m above the ground. From the window, the angle of depression to the base of a nearby building is 31° and the angle of elevation to the top of the building is 40° . How tall is the nearby building to the nearest metre?



① $\tan 31^\circ = \frac{20}{x}$

$x \tan 31^\circ = 20$

$x = \frac{20}{\tan 31^\circ}$

$x = 33.29 \text{ m}$

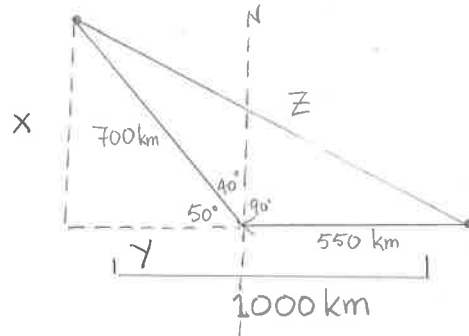
② $\tan 40^\circ = \frac{y}{33.29}$

$33.29 \tan 40^\circ = y$

$y = 27.9 \text{ m}$

③ height of building is

$27.9 + 20 = 47.9 = \boxed{48 \text{ m}}$



$$\sin 50 = \frac{x}{700}$$

$$\cos 50 = \frac{y}{700}$$

$$700 \sin 50 = x$$

$$700 \cos 50 = y$$

$$x = 536.23$$

$$y = 449.95$$

$$x \approx 536 \text{ km}$$

$$y \approx 450$$

$$450 + 550 = 1000 \text{ km}$$

43. A ship travels due west for 550 km then travels N40°W (bearing 320°) for 700 km. How far is the ship from its starting point?

USE PYTHAGOREAN THM.

$$\sqrt{536^2 + 1000^2} = z$$

$$z = 1134.6 \text{ km}$$

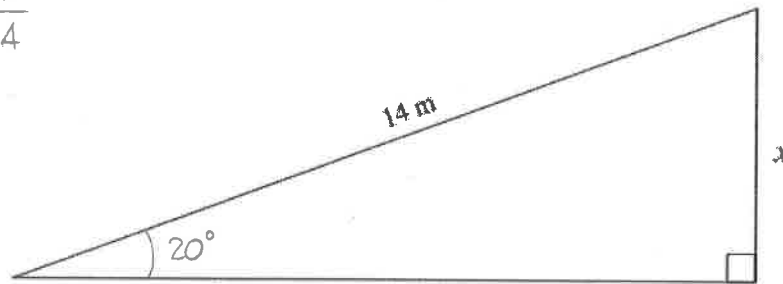
- A. 450 km
 B. 890 km
 C. 1135 km
 D. 1250 km

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

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

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

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

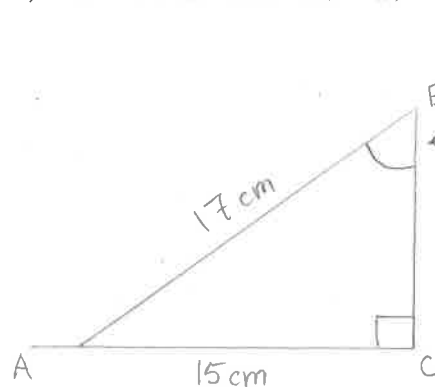


Note: This diagram is drawn to scale.

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

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

- A. 28°
 B. 41°
 C. 49°
 D. 62°

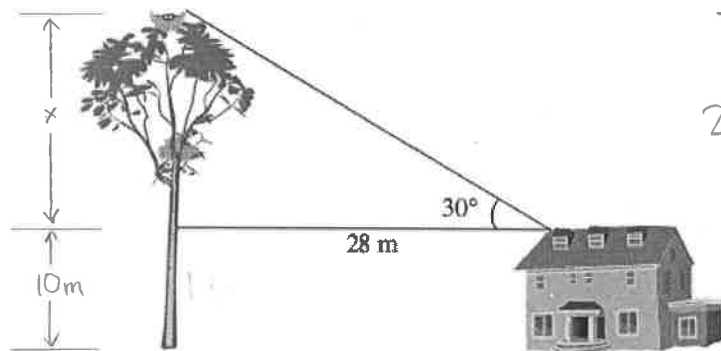


$$\sin B = \frac{15}{17}$$

$$\angle B = \sin^{-1}\left(\frac{15}{17}\right)$$

$$\angle B = 41.4^\circ$$

53. 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° .



$$\tan 30^\circ = \frac{x}{28}$$

$$28 \tan 30 = x$$

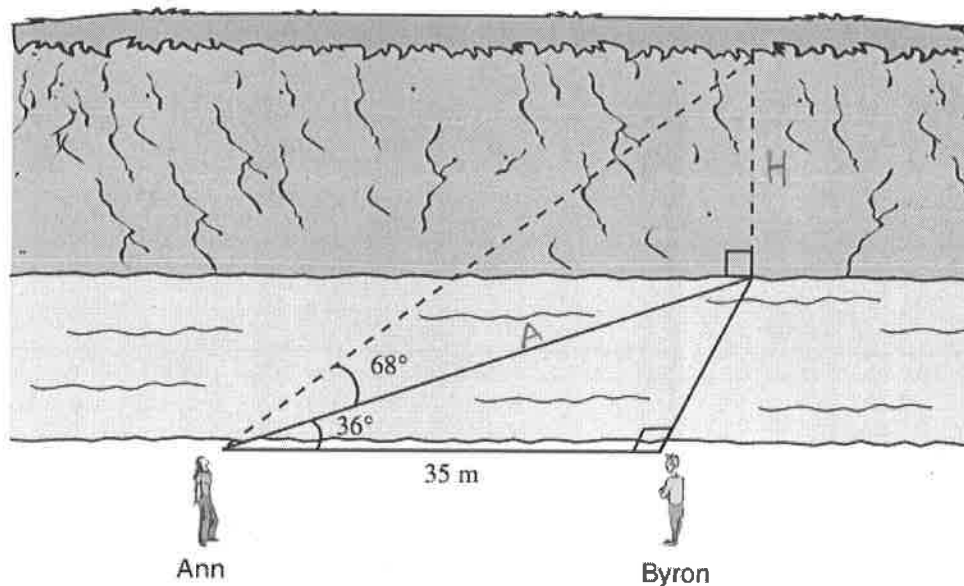
$$x = 16.17 \text{ m}$$

$$\therefore \text{height of nest is} = 16.17 + 10$$

$$= 26.17 \text{ m}$$

What is the height of the eagle's nest?

- A. 16 m
 B. 24 m
 C. 26 m
 D. 48 m
54. 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

$$\cos 36^\circ = \frac{35}{A}$$

$$A \cos 36^\circ = 35$$

$$A = \frac{35}{\cos 36^\circ}$$

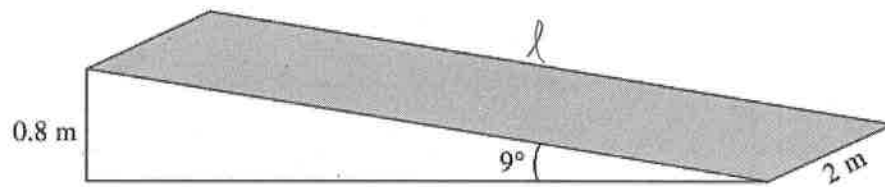
$$A = 43.3 \text{ m}$$

$$\tan 68^\circ = \frac{H}{43.3}$$

$$43.3 \tan 68^\circ = H$$

$$H = 107.2 \text{ m}$$

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



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

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

$$l = 5.11 \text{ m}$$

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

$$\text{AREA} = (5.11 \text{ m})(2 \text{ m}) = 10.22 \text{ m}^2$$

Record your answer neatly on the Answer Sheet.

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

52. 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



$$\tan 15^\circ = \frac{64 \text{ m}}{s}$$

$$s = \frac{64 \text{ m}}{\tan 15^\circ} = 238.8 \text{ m}$$

53. 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. $\tan^{-1}\left(\frac{7}{100}\right)$

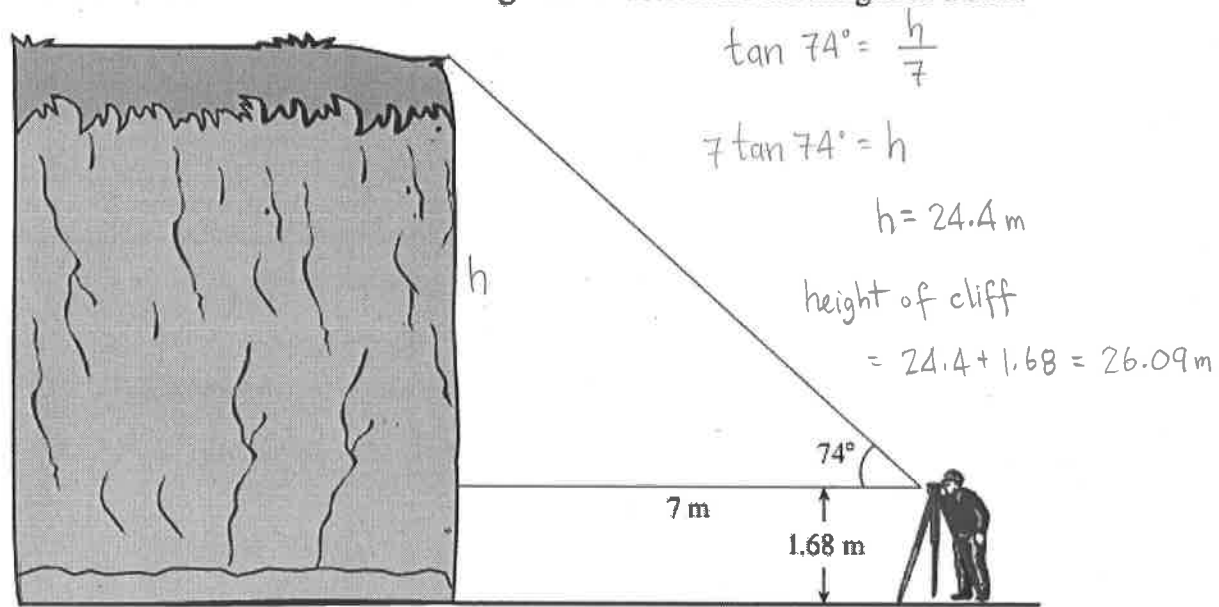
D. $\sin^{-1}\left(\frac{7}{100}\right)$



$$\tan A = \frac{7}{100}$$

$$A = \tan^{-1}\left(\frac{7}{100}\right)$$

54. 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
60. Calculate the length of side x on the diagram below. Answer to the nearest centimetre.

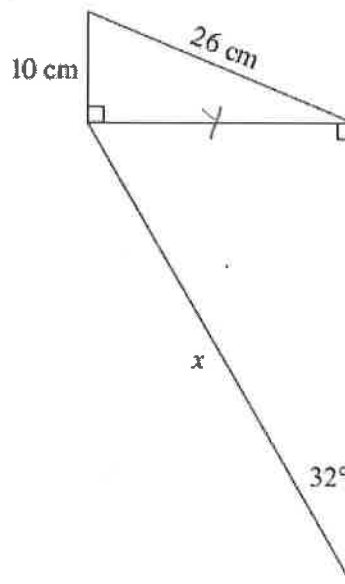
$$10^2 + y^2 = 26^2$$

$$y^2 = 26^2 - 10^2$$

$$y = \sqrt{26^2 - 10^2}$$

$$y = \sqrt{576}$$

$$y = 24 \text{ cm}$$



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

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

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

$$x = 45.3 \text{ cm}$$

$x = 45 \text{ cm}$

Record your answer neatly on the Answer Sheet.

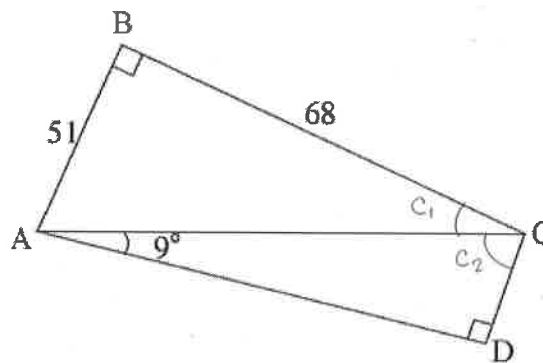
55. Determine the measure of $\angle BCD$. Answer to the nearest degree.

$$C_2 = 90^\circ - 9^\circ = 81^\circ$$

$$\tan C_1 = \frac{51}{68}$$

$$C_1 = \tan^{-1}\left(\frac{51}{68}\right)$$

$$C_1 = 36.9^\circ \approx 37^\circ$$



$$\angle BCD = 81^\circ + 37^\circ$$

$$= 118^\circ$$

Record your answer neatly on the Answer Sheet.

50. Solve for x :

$$\tan 19^\circ = \frac{y}{17}$$

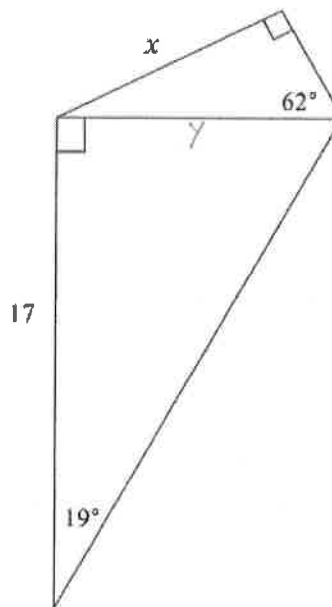
$$17 \tan 19^\circ = y$$

$$y = 5.85$$

$$\sin 62^\circ = \frac{x}{5.85}$$

$$5.85 \sin 62^\circ = x$$

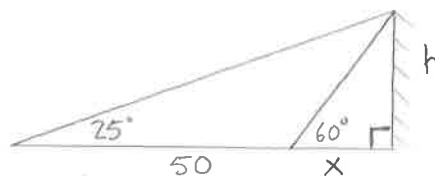
$$x = 5.17$$



- A. 2.75
- B. 4.89
- C. 5.17
- D. 6.63

51. From where she parked her car, Jade observed that the angle of elevation to the top of a building was 25° . When she walked 50 m closer to the building, the angle of elevation became 60° . Determine the distance from the base of the building to her car.

- A. 18.42 m
- B. 36.84 m
- C. 68.42 m
- D. 75.49 m



WE KNOW THE FOLLOWING

$$\textcircled{1} \tan 25^\circ = \frac{h}{50+x}$$

$$(50+x) \tan 25^\circ = h$$

$$\textcircled{2} \tan 60^\circ = \frac{h}{x}$$

$$x \tan 60^\circ = h$$

$$\textcircled{3} (50+x) \tan 25^\circ = x \tan 60^\circ$$

$$50 \tan 25^\circ + x \tan 25^\circ = x \tan 60^\circ$$

$$50 \tan 25^\circ = x \tan 60^\circ - x \tan 25^\circ$$

$$50 \tan 25^\circ = x (\tan 60^\circ - \tan 25^\circ)$$

$$\frac{50 \tan 25^\circ}{\tan 60^\circ - \tan 25^\circ} = x$$

$$x = 18.42$$

$$\textcircled{4} 50 + x = 50 + 18.42 = 68.42 \text{ m}$$