

Math 10 Final Exam Mock Provincial

Name ☺

Key

PART A NON - CALCULATOR PART

(40 minutes)

1. Which of the following numbers is a perfect cube?

- A. 27
- B. 16
- C. 6
- D. 3

2. Simplify $\sqrt{96}$

- A. $7\sqrt{2}$
- B. $4\sqrt{6}$
- C. $8\sqrt{6}$
- D. $16\sqrt{6}$

3. Write as an entire radical $3\sqrt{5}$

- A. $\sqrt{45}$
- B. $\sqrt{15}$
- C. $\sqrt{75}$
- D. $\sqrt{225}$

4.

Which of the following numbers is best represented by the point on the number line below?



- A. $2\sqrt{7}$
- B. $5\sqrt{3}$
- C. $\sqrt{25}$
- D. $\sqrt{34}$

5. Simplify $2^9 \times 2^3 + 2^2$

- A. 2^{14}
- B. 2^4
- C. 2^2
- D. 2^{10}

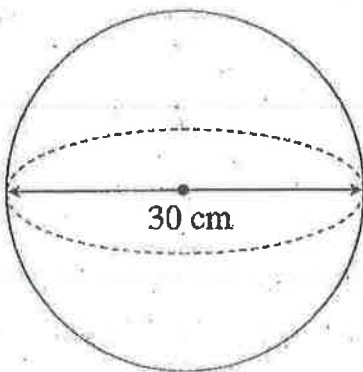
6. Simplify $\left(\frac{2a^2b^3}{3a^{-2}b^4}\right)^{-2}$
- A. $\frac{4a^8b^2}{9}$
- B. $\frac{9b^2}{4a^8}$
- C. $\frac{9a^8b^2}{4}$
- D. $\frac{4a^8b^2}{9}$

$$\left(\frac{3a^{-2}b^4}{2a^2b^3}\right)^2 = \frac{9a^{-4}b^8}{4a^4b^6} = \frac{9b^8}{4a^4a^4b^6} = \frac{9b^{8-6}}{4a^{4+4}} = \frac{9b^2}{4a^8}$$

7. Which of the following measures is approximately two finger widths?
- A. 1 mm
- B. 1 cm
- C. 1 inch
- D. 3 inches

8.

What is the correct formula for calculating the surface area of the sphere below?



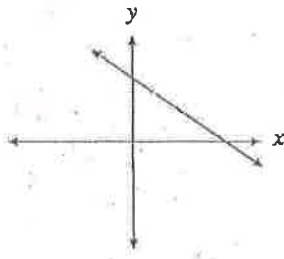
- A. $SA = 4\pi(30)$
- B. $SA = 4\pi(15)^2$
- C. $SA = 4\pi(30)^2$
- D. $SA = \frac{4}{3}\pi(15)^3$

$$SA = 4\pi r^2 = 4\pi(15)^2$$

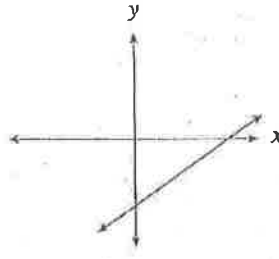
9.

Given $y = mx + b$, where m and b are negative integers, which of the following graphs best represents this relation?

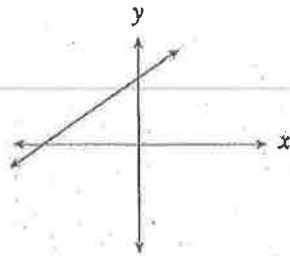
A.



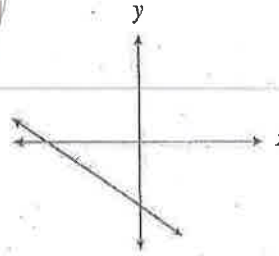
B.



C.

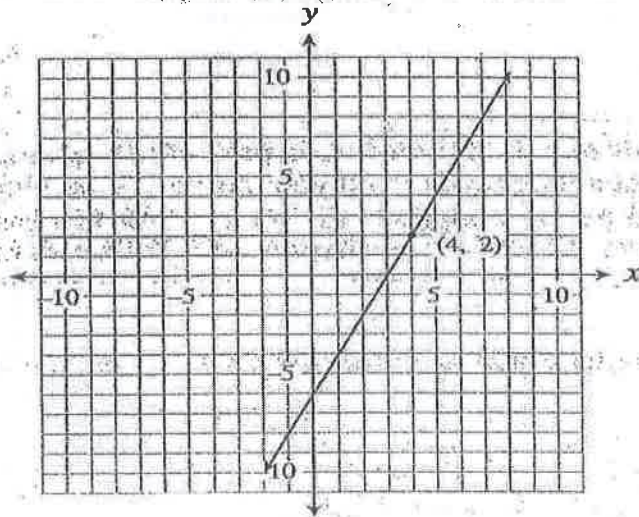


D.



10.

Determine the equation in slope-point form of the following graph.



A. $y - 2 = 2(x - 4)$

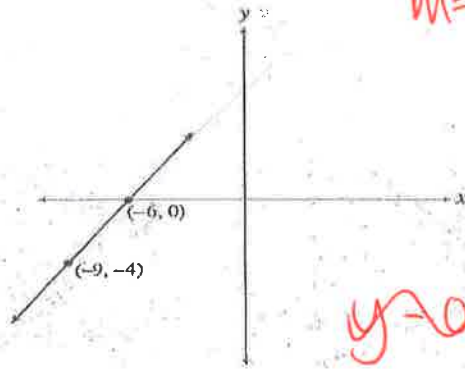
B. $y - 2 = \frac{1}{2}(x - 4)$

C. $y + 2 = 2(x + 4)$

D. $y + 2 = \frac{1}{2}(x + 4)$

11.

Determine the equation in slope-intercept form of the following graph.



$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 + 4}{-6 + 9} = \frac{4}{3}$$

$$(y - 0) = \frac{4}{3}(x + 6)$$

$$y = \frac{4}{3}x + 8$$

$$y - 0 = \frac{4}{3}(x + 6)$$

A. $y = \frac{3}{4}x - 6$

B. $y = \frac{3}{4}x + 6$

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

D. $y = \frac{4}{3}x + 8$

$\frac{4}{3}$

$y = \frac{4}{3}x + 8$
 $\frac{0+4}{-6+9} = \frac{4}{3}$

12.

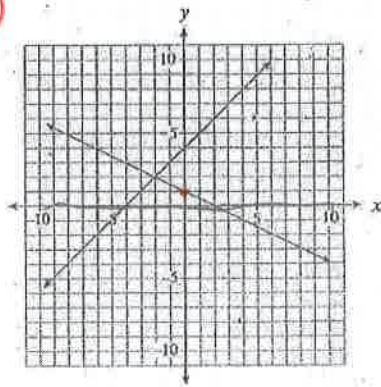
Which graph shows the solution for the system;

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

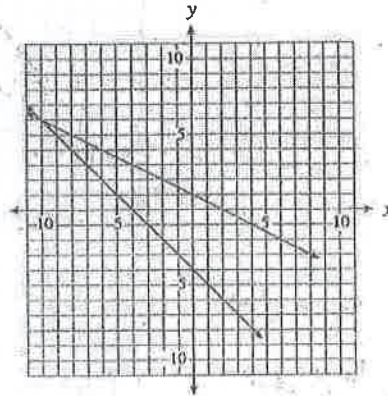
$$0 = x - y + 4$$

$$y = x + 4$$

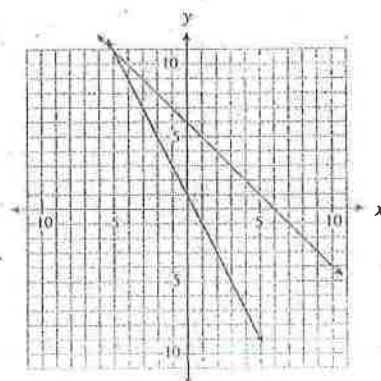
A.



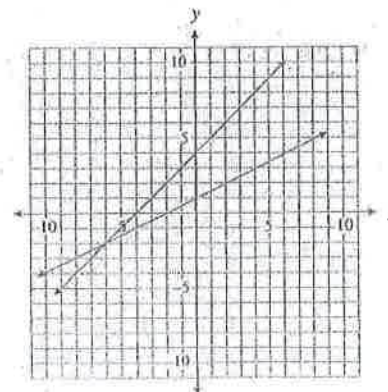
B.



C.

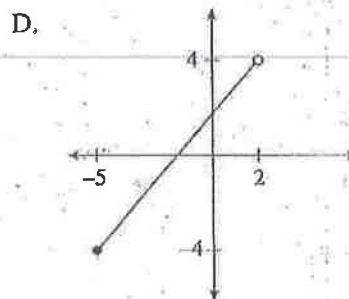
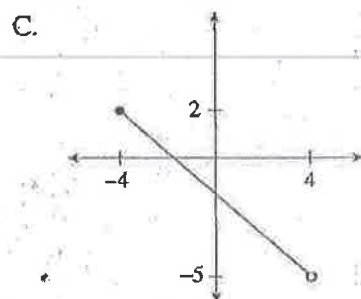
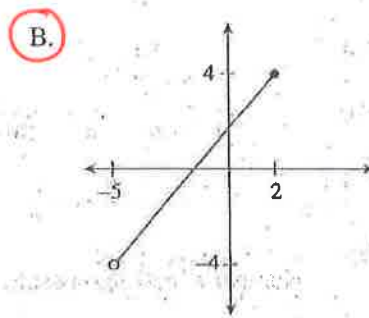
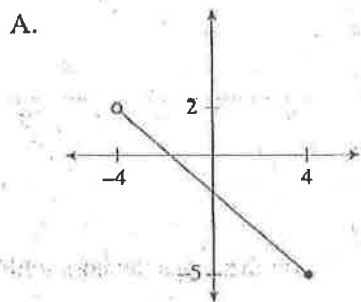


D.



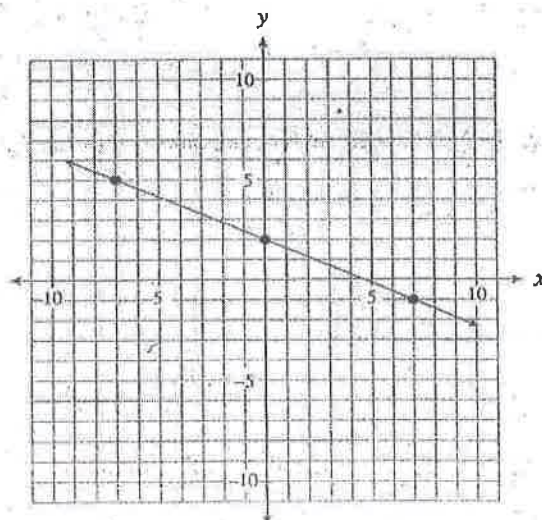
PART B CALCULATORS PERMITTED

13. Which graph has a domain $-5 < x \leq 2$



14.

What is the slope of the line below?



A. $\frac{7}{3}$

B. $\frac{3}{7}$

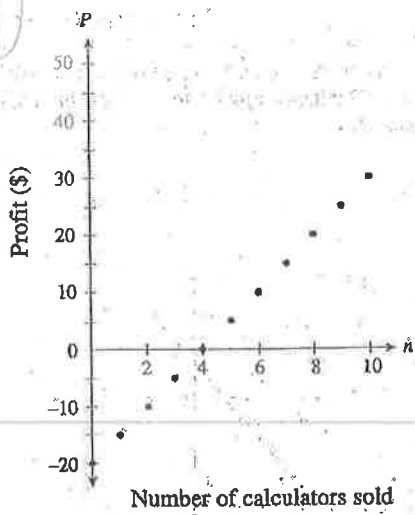
C. $-\frac{3}{7}$

D. $-\frac{7}{3}$

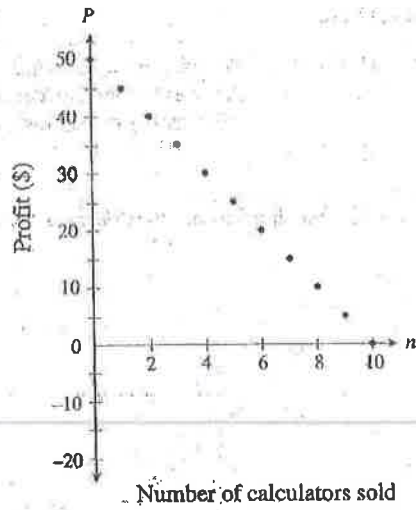
15.

Brad bought 10 calculators for \$20. He plans to resell them for \$5 each. Determine a graph of his profit as he sells the calculators.

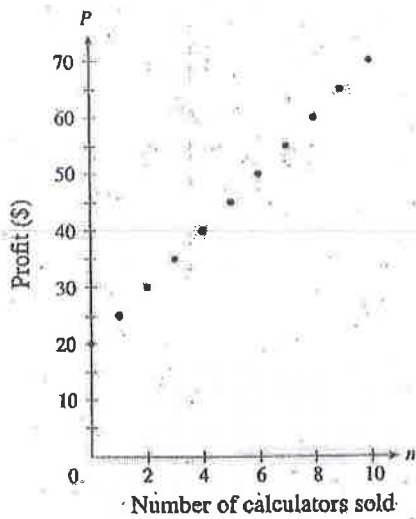
A.



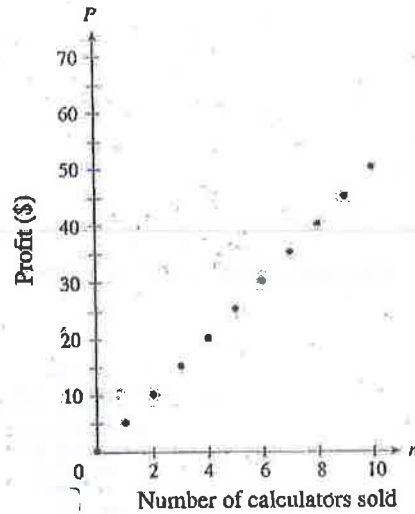
B.



C.



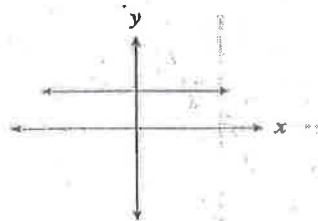
D.



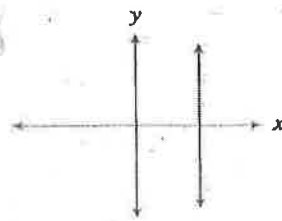
16.

Which of the following graphs has an undefined slope?

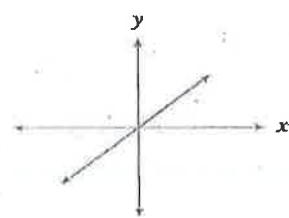
A.



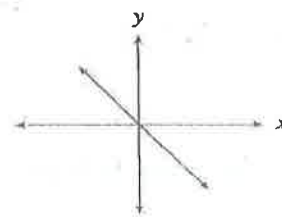
B.



C.



D.



17.

The slope of a line segment is $\frac{1}{4}$. The segment has endpoints at $P(-12, 6)$ and $Q(8, w)$. Determine the value of w .

- A. 1
- B. 5
- C. 11
- D. 86

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

$$\frac{1}{4} = \frac{w - 6}{8 - (-12)}$$

$$\frac{1}{4} = \frac{w - 6}{20}$$

$$20 = 4(w - 6)$$

$$20 = w - 6$$

$$5 = w - 6$$

$$11 = w$$

18.

Two lines with slopes of $\frac{2}{3}$ and $-\frac{12}{k}$ are perpendicular. Determine the value of k .

- A. 18
- B. 8
- C. -8
- D. -18

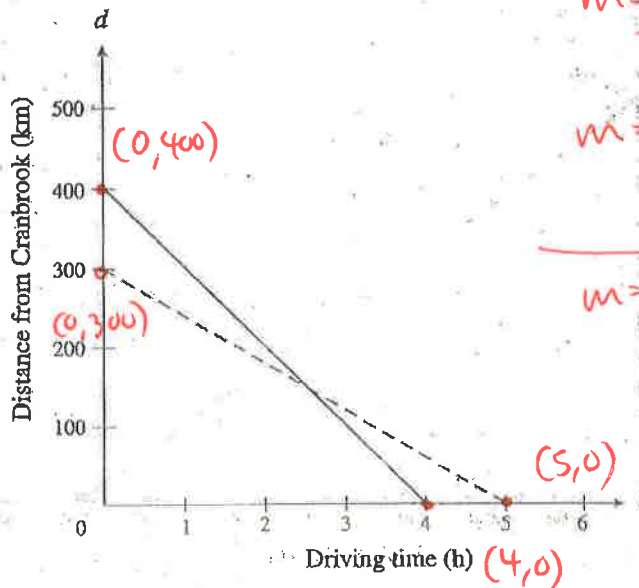
$$\frac{2}{3} = \frac{k}{12}$$

$$\frac{24}{3} = k$$

$$k = 8$$

19.

Two friends are meeting in Cranbrook but leaving from different towns. The graph below displays their distances from Cranbrook over time.



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

$$m = \frac{400 - 0}{0 - 4} = \frac{400}{-4} = -100$$

$$m = \frac{300 - 0}{0 - 5} = \frac{-300}{5} = -60$$

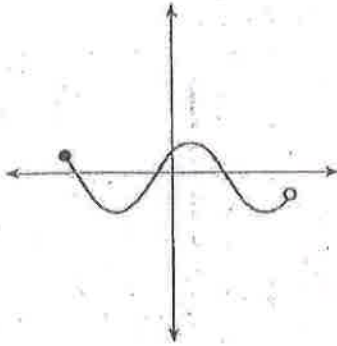
What is the difference in their speeds?

- A. 1 km/h
- B. 40 km/h
- C. 80 km/h
- D. 100 km/h

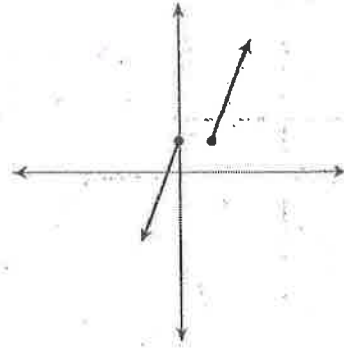
20.

Which of the following situations does **not** represent a function?

A.



B.

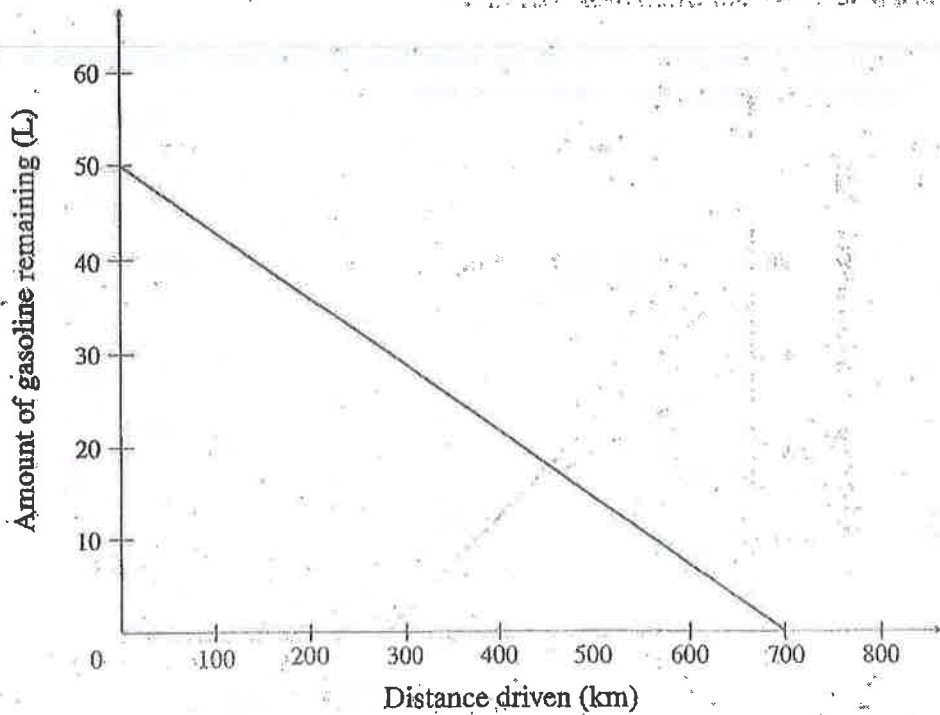


C. $\{(0, 5), (-3, 4), (7, 1), (2, 8), (7, 3)\}$

D. $y = -\frac{2}{3}x + \frac{4}{5}$

21.

What is the range of the graph below?



- A. 0 to 50
- B. 0 to 60
- C. 0 to 700
- D. all real numbers

22.

The Acting Club put on a play and collected \$700 from ticket sales. The relation is graphed where:

- x represents the number of adult tickets sold at \$7 each
- y represents the number of student tickets sold at \$5 each

Which of the following statements explains what the y-intercept represents?

- A. 100 adult tickets sold and 0 student tickets sold
- B. 140 adult tickets sold and 0 student tickets sold
- C. 100 student tickets sold and 0 adult tickets sold
- D. 140 student tickets sold and 0 adult tickets sold

$x=0 \therefore 0$ adult tickets sold

$700 \div \$5 = 140$

Cost of student.

23.

Given the equation $Ax + By + C = 0$, where $A > 0$, $B < 0$ and $C < 0$, which of the following statements must be true?

- A. The slope must be negative.
- B. The x-intercept must be negative.
- C. The y-intercept must be negative.
- D. Both the x-intercept and y-intercept are positive.

$Ax + By + C = 0$

$By = -Ax - C$

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

$m = -\frac{A}{B}$ $y \text{ int} = -\frac{C}{B}$

24.

Express $y = \frac{7}{5}x - 2$ in general form.

- A. $7x - 5y - 10 = 0$
- B. $7x + 5y - 10 = 0$
- C. $7x - 5y - 2 = 0$
- D. $7x + 5y - 2 = 0$

$5y = 7x - 10$

$7x - 5y - 10 = 0$

25.

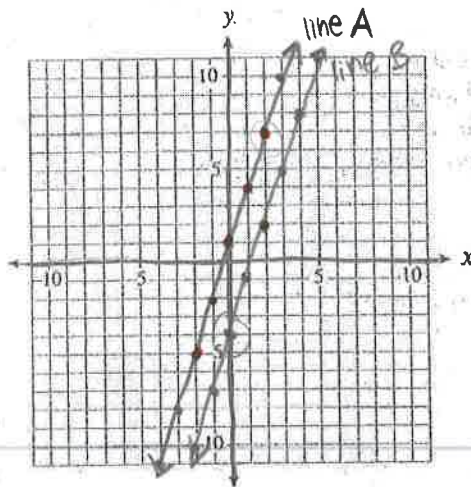
Which of the following functions is parallel to the line $2x + 3y = 6$?

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

$3y = -2x + 6$

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

The grid below may be used for rough work to answer question 26.



26. Determine the y-intercept of line B, given:

- Line B is parallel to Line A.
- The equation of line A is $3x - y + 1 = 0$. $y = 3x + 1$
- Line A passes through point $(2, q)$. $(2, 7)$
- Line B passes through point $(2, q - 5)$. $(2, 7 - 5) \Rightarrow (2, 2)$

- A. The y-intercept is -4 .
- B. The y-intercept is 2 .
- C. The y-intercept is 6 .
- D. The y-intercept is 8 .

27.

Mitch is starting a dog-grooming business. He has an initial expense of \$150 for equipment. He will charge \$30 per dog groomed. Which equation represents his profit, P , given that n represents the number of dogs groomed?

- A. $P = -150n + 30$
- B. $P = 150n - 30$
- C. $P = 30n - 150$
- D. $P = 30n + 150$

28.

The U-Renta car company charges an initial amount plus a per-kilometre rate. A rental car would cost \$58 if driven 30 km or would cost \$64 if driven 40 km. Which equation represents the cost, C , as a function of the number of kilometres travelled, n ?

- A. $C = 6n + 40$
- B. $C = \frac{5}{3}n + 40$
- C. $C = 0.6n + 46$
- D. $C = 0.6n + 40$

$$\begin{aligned} 58 &= 0.6(30) + 40 \\ 58 &= 18 + 40 \\ 58 &= 58 \checkmark \end{aligned}$$

$$\begin{aligned} 64 &= 0.6(40) + 40 \\ 64 &= 24 + 40 \\ 64 &= 64 \checkmark \end{aligned}$$

29.

Given the function $f(x) = -\frac{3}{4}x - 3$, determine the value of x when $f(x) = 6$.

- A. -12
- B. -9
- C. $-\frac{15}{2}$
- D. 12

$$\begin{aligned} f(6) &= -\frac{3}{4}(6) - 3 \\ f(6) &= -\frac{9}{2} - 3 \\ f(6) &= -\frac{15}{2} \end{aligned}$$

30.

Solve the system:

- A. (0, -4)
- B. (7, 3.5)
- C. no solution
- D. infinite number of solutions

$$\begin{aligned} -3(3x - 2y - 8 = 0) & \quad \begin{array}{r} 3 \\ \times 2 \\ \hline -24 \\ 18 \end{array} \\ 9x - 6y - 42 = 0 & \\ \hline -9x + 6y + 24 = 0 & \\ + 9x - 6y - 42 = 0 & \\ \hline 0 \quad 0 \quad -18 = 0 & \\ \text{not true, no solution} & \end{aligned}$$

31.

Determine the x -value of the solution for:

- A. -43
- B. -40
- C. -3
- D. 5

$$\begin{aligned} -2(2x - 3y = 19) \\ 4x + 5y = 5 \end{aligned}$$

$$\begin{aligned} 2x - 3(-3) &= 19 \\ 2x + 9 &= 19 \end{aligned}$$

$$\begin{aligned} -4x + 6y &= -38 \\ 4x + 5y &= 5 \end{aligned}$$

$$2x = 10$$

$$x = 5$$

$$\begin{aligned} 0 \quad 11y &= -33 \\ y &= -3 \end{aligned}$$

Use the following information to answer question 32.

- A stadium sold 35 000 tickets to the Monster Truck show.
- The ticket price was \$35 per adult and \$20 per child.
- The Monster Truck show made a profit of \$15 per adult and \$10 per child.
- The total profit was \$462 500.
- Let a represent the number of adult tickets sold and let c represent the number of child tickets sold.

32. Which system of linear equations can be used to solve for a and c ?

A.
$$\begin{cases} a + c = 35\,000 \\ 15a + 10c = 462\,500 \end{cases}$$

B.
$$\begin{cases} a + c = 35\,000 \\ 35a + 20c = 462\,500 \end{cases}$$

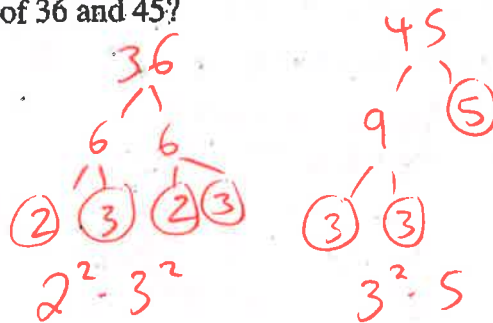
C.
$$\begin{cases} 35a + 20c = 35\,000 \\ a + c = 462\,500 \end{cases}$$

D.
$$\begin{cases} 35a + 20c = 35\,000 \\ 15a + 10c = 462\,500 \end{cases}$$

33.

What is the least common multiple of 36 and 45?

- A. 9
B. 30
C. 180
D. 1620



$$\begin{aligned} \text{LCM} &= 2^2 \cdot 3^2 \cdot 5 \\ &= 4 \cdot 9 \cdot 5 \\ &= 36 \cdot 5 \\ &= 180 \end{aligned}$$

34.

Which of the following numbers are irrational?

$$\sqrt{4}, \sqrt{8}, \sqrt[3]{9}, \sqrt[3]{27}$$

- A. $\sqrt{8}$ and $\sqrt[3]{9}$ only
B. $\sqrt{4}$ and $\sqrt{8}$ only
C. $\sqrt[3]{9}$ and $\sqrt[3]{27}$ only
D. $\sqrt{4}$, $\sqrt{8}$, $\sqrt[3]{9}$ and $\sqrt[3]{27}$

35.

Write $\frac{1}{\sqrt[3]{x^2}}$ in exponential form.

A. $x^{-\frac{3}{2}}$

B. $x^{\frac{3}{2}}$

C. $x^{-\frac{2}{3}}$

D. $-x^{\frac{2}{3}}$

$$\frac{1}{x^{\frac{2}{3}}} = x^{-\frac{2}{3}}$$

36.

A certain bacteria triples its population every hour. There are 5000 bacteria now. Which expression could be used to calculate the number of bacteria 4 hours ago?

A. $5000\left(\frac{1}{3}\right)^{-4}$

B. $5000(3)^{-4}$

C. $5000(4)^{-3}$

D. $5000(3)^4$

37.

Simplify: $\frac{(2x^b y^2)^3}{(xy^2)^{-2}} = \frac{8x^{3b} y^6}{x^{-2} y^{-4}}$

A. $2x^{b+1} y^5$

B. $2x^{b+5} y^9$

C. $8x^{3b-2} y^2$

D. $8x^{3b+2} y^{10}$

$$= 8x^{3b} x^2 y^6 y^4 = 8x^{3b+2} y^{10}$$

38.

Simplify: $\left(\frac{75x^3y}{3x^{-5}y^3}\right)^{\frac{3}{2}}$

A. $\frac{15x^{12}}{y^3}$

B. $\frac{25x^3}{y^3}$

C. $\frac{125}{x^3y^3}$

D. $\frac{125x^{12}}{y^3}$

$$\begin{aligned} & \frac{75^{\frac{3}{2}} \cdot x^{\frac{9}{2}} \cdot y^{\frac{3}{2}}}{3^{\frac{3}{2}} \cdot x^{-\frac{15}{2}} \cdot y^{\frac{9}{2}}} \\ &= \left(\frac{75}{3}\right)^{\frac{3}{2}} \cdot x^{\frac{9}{2} - (-\frac{15}{2})} \cdot y^{\frac{3}{2} - \frac{9}{2}} \\ &= (25)^{\frac{3}{2}} \cdot x^{\frac{24}{2}} \cdot y^{-\frac{6}{2}} \\ &= \frac{5^3 \cdot x^{12}}{y^3} \\ &= \frac{125x^{12}}{y^3} \end{aligned}$$

39.

Multiply: $(2x+7)(x-2)$

A. $2x^2 - 14$

B. $2x^2 - 3x - 14$

C. $2x^2 + 3x - 14$

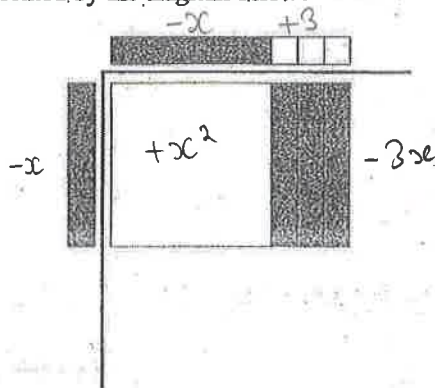
D. $2x^2 + 5x - 14$

$2x^2 + 7x - 4x - 14$

$2x^2 + 3x - 14$

40.

Which statement is represented by the diagram below?



A. $(x)(x-3) = x^2 - 3x$

B. $(-x)(-x+3) = x^2 - 3x$

C. $(-x)(x-3) = -x^2 + 3x$

D. $(-x)(-x+3) = x^2 - 5x + 3$

41.

Raj multiplied $(x+4)(x^2+x-2)$ as shown below.

Steps	
I.	$x(x^2+x-2)+4(x^2+x-2)$
II.	$x^3+x^2-2x+4x^2+4x-8$
III.	x^3+5x^2+2x-8

If Raj made a mistake, in which step was his first mistake?

- A. Step I
- B. Step II
- C. Step III
- D. Raj did not make a mistake.

42.

Which of the following expressions is a factor of $x^2-13x+12$?

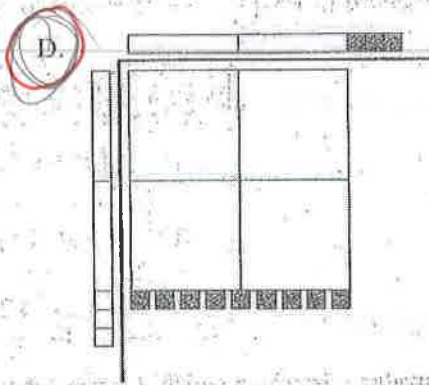
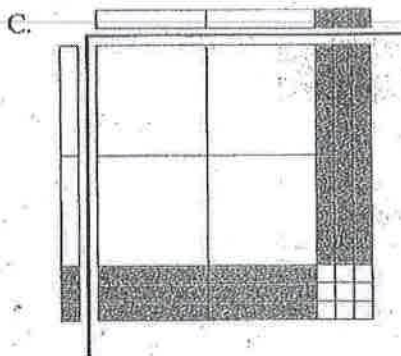
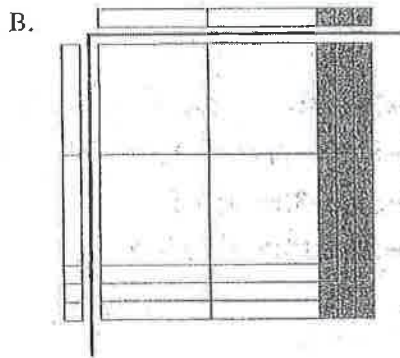
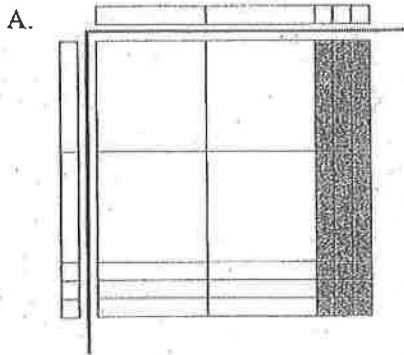
- A. $x+13$
- B. $x+1$
- C. $x-6$
- D. $x-12$

$$(x-12)(x-1)$$

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

43.

Which picture best represents the factoring of $4x^2 - 9$?



44.

Which of the following expressions is a factor of $4x^2 + 7x - 2$?

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

$$x = 8$$

$$+ 7$$

$$8, -1$$

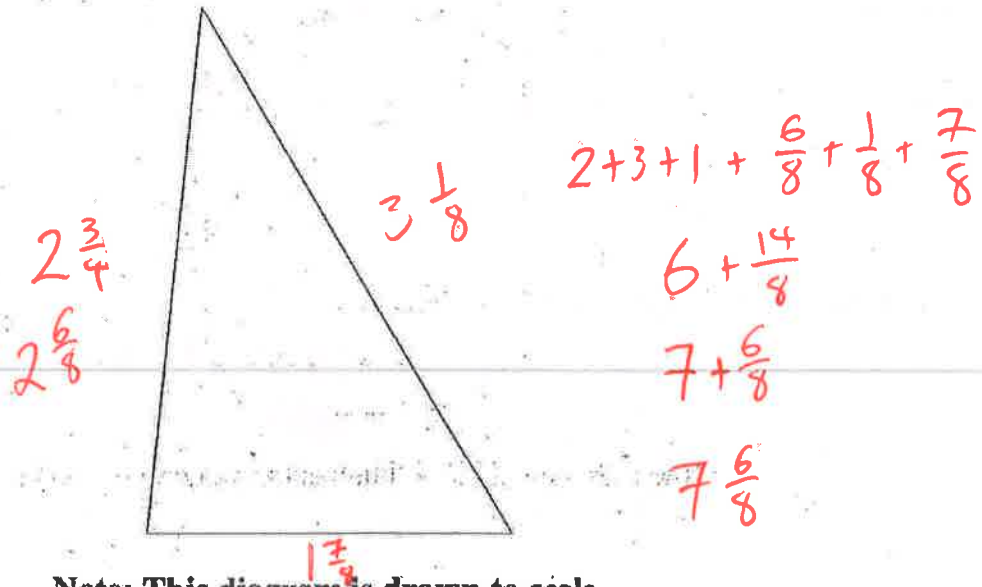
$$4x^2 + 8x - x - 2$$

$$4x(x+2) - 1(x+2)$$

$$(x+2)(4x-1)$$

45.

Determine the perimeter of the triangle in inches (use a ruler).



Note: This diagram is drawn to scale.

A. $6\frac{1}{8}$ "

B. $7\frac{1}{8}$ "

C. $7\frac{7}{8}$ "

D. 18"

46.

A grade 10 teacher took 7 steps to walk across a classroom to estimate its width. Which of the following measures would be a good estimate of the width?

A. 2 yd

B. 6 m

C. 7 ft

D. 1000 cm

47.

Ashley's learner's licence says she is 173 cm tall. Convert her height to feet and inches.

- A. 5'5"
- B. 5'6"
- C. 5'7"
- D. 5'8"

$$173 \text{ cm} \times \frac{1 \text{ ft}}{30.48 \text{ cm}} = 5.675853$$

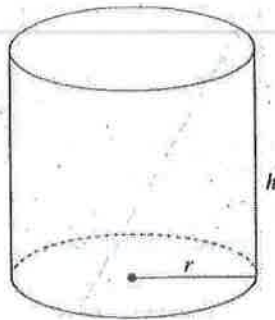
5ft

$$0.675853 \text{ ft} \times \frac{12 \text{ inch}}{1 \text{ ft}} = 8.11$$

8"

48.

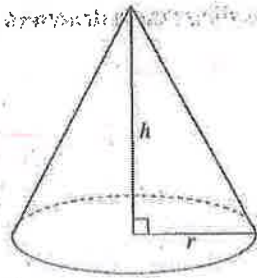
The volume of the right cylinder below is 300 cm^3 .



$$V = (\pi r^2)(h)$$

~~300~~

What is the volume of the right cone below that has the same radius (r) and height (h) as the cylinder above?



$$V = \frac{1}{3} (\pi r^2)(h)$$

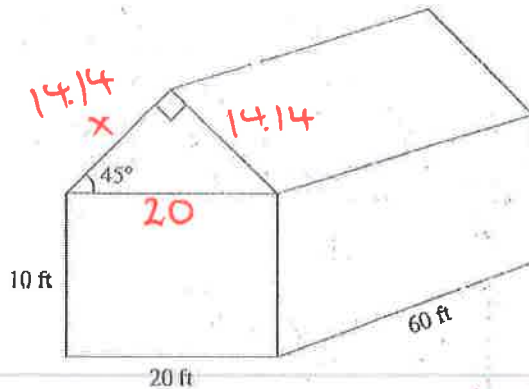
↑

$\therefore \frac{1}{3}$ of the size

- A. 100 cm^3
- B. 150 cm^3
- C. 900 cm^3
- D. There is not enough information to determine the volume of the cone.

49.

Calculate the volume of the building below:



$$\sin 45 = \frac{x}{20}$$

$$x = 14.14$$

- A. 12 000 ft³
- B. 15 000 ft³
- C. 18 000 ft³
- D. 24 000 ft³

$$V_{\text{rectangle}} = (20)(10)(60) = 12000$$

$$V_{\text{triangle}} = \left(\frac{bh}{2}\right) \cdot l = \frac{(14.14)(14.14)}{2} \cdot 60$$

$$12000 + 5998.188$$

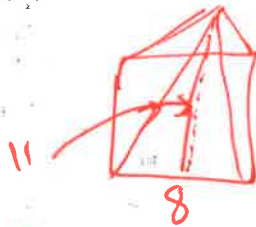
$$= 17998.188$$

$$= 5998.188$$

50.

A right square-based pyramid has a base length of 8 cm and a slant height of 11 cm. Calculate the volume of the pyramid.

- A. 161.1 cm³
- B. 218.6 cm³
- C. 234.7 cm³
- D. 249.7 cm³



$$V = \frac{1}{3} \times b^2 \times h$$

$$= \frac{1}{3} \times (8)^2 \times \sqrt{105}$$

$$= 218.6$$

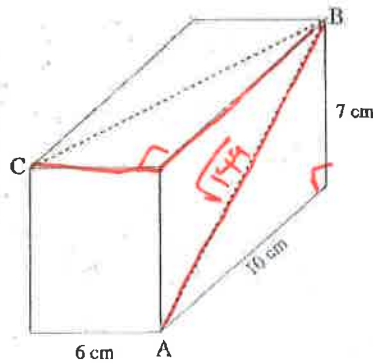


$$11^2 = x^2 + 4^2$$

$$x = \sqrt{105}$$

51.

An ant travelled from A to B to C along the dotted path on the rectangular prism. How far did it travel?



$$10^2 + 7^2 = c^2$$

$$\sqrt{149} = c$$

$$x^2 = 10^2 + 6^2$$

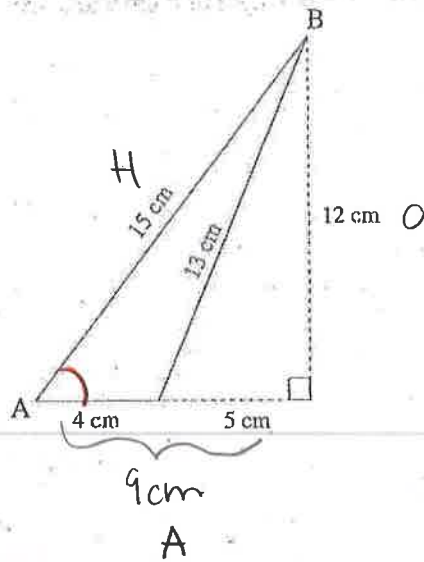
$$x = \sqrt{136}$$

$$\sqrt{149} + \sqrt{136} = 23.87$$

- A. 23.0 cm
- B. 23.3 cm
- C. 23.9 cm
- D. 33.0 cm

52.

Which of the following trigonometric ratios would be used to determine the measure of $\angle A$?



A. $\cos A = \frac{4}{15}$

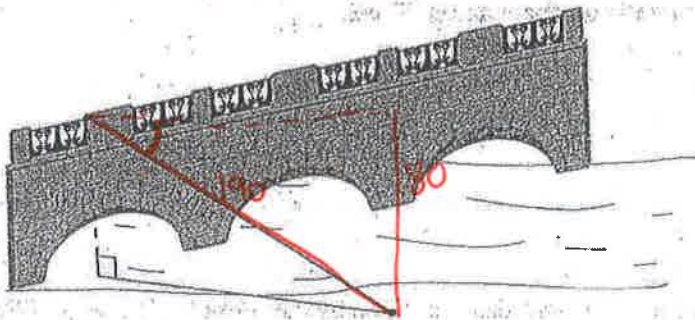
B. $\cos A = \frac{9}{13}$

C. $\sin A = \frac{13}{15}$

D. $\tan A = \frac{12}{9}$

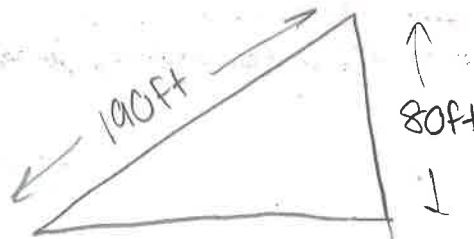
53.

A 190-ft long zipline is attached to a bridge 80 ft above the water. The company needs to report the angle of depression to the insurance company.



Calculate the angle of depression.

- A. 23°
- B. 25°
- C. 33°
- D. 65°

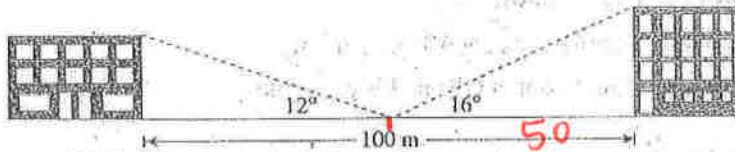


$\sin \theta = \frac{80}{190}$

$\theta = 24.9$

54.

Two buildings are 100 m apart. From a point halfway between them, the angles of elevation to their tops are 12° and 16° .



$\tan 16 = \frac{opp}{50}$

What is the difference in the heights of the buildings?

- A. 3.4 m
- B. 3.7 m
- C. 59.1 m
- D. 60.9 m

$\tan 12 = \frac{opp}{50}$

Opp =

55.

Determine the x -intercept of the graph of $5x - 4y + 20 = 0$. Answer as an integer.

Record your answer neatly on the Answer Sheet.

$$0 = 5x - 4y + 20$$

$$0 = 5x - 4(0) + 20$$

$$0 = 5x + 20$$

$$\frac{5x}{5} = \frac{-20}{5}$$

$x = -4$ ✓

The profit, P , in dollars, made from a dance is given by the formula $P(n) = 5n - 800$, where n is the number of students attending the dance. What is $P(190)$? Answer to the nearest dollar.

Record your answer neatly on the Answer Sheet.

$$P(n) = 5n - 800$$

$$P(190) = 5(190) - 800$$

$$P(190) = 950 - 800$$

$P(190) = 150$ ✓

57.

Dominique invested \$17 000 as follows:

- a portion of it in a term deposit at 6% per annum
- the remaining portion of it in a GIC at 8% per annum

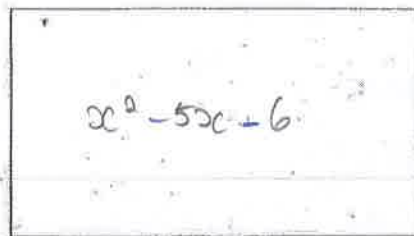
After one year, the investments had earned a total of \$1165. How much did Dominique invest in the GIC? Answer to the nearest dollar.

Record your answer neatly on the Answer Sheet.

$$\begin{aligned} a + b &= 17000 & a &= 17000 - b & a &= \$ \text{ in } 6\% \text{ deposit} \\ & & & & b &= \$ \text{ in } 8\% \text{ deposit (GIC)} \\ 0.06a + 0.08b &= 1165 \\ 0.06(17000) + 0.08b &= 1165 \\ 58. \quad 1020 + 0.08b &= 1165 \\ & 0.08b = 1165 - 1020 \\ & & & \rightarrow 0.08b = 145 \\ & & & b = 1812.5 \end{aligned}$$

\$1812.50

The area of the rectangle below can be represented by the expression $x^2 - 5x + 6$.



The longest side can be written as $x + k$. What would the value of k be? Answer as an integer.

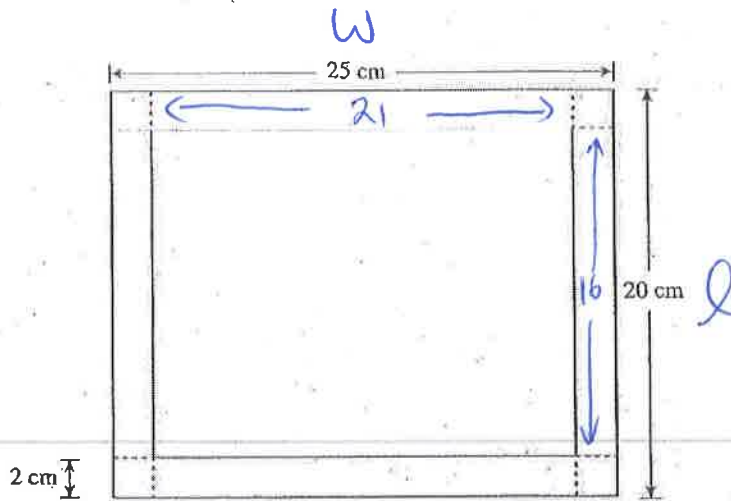
Record your answer neatly on the Answer Sheet.

$$A = x^2 - 5x + 6$$

$$\text{factor: } (x-6)(x+1)$$

$$k = 1$$

An open box is to be made from a rectangular piece of cardboard measuring 25 cm by 20 cm. Squares measuring 2 cm on each side are cut from each corner and the sides are folded up to make the box.



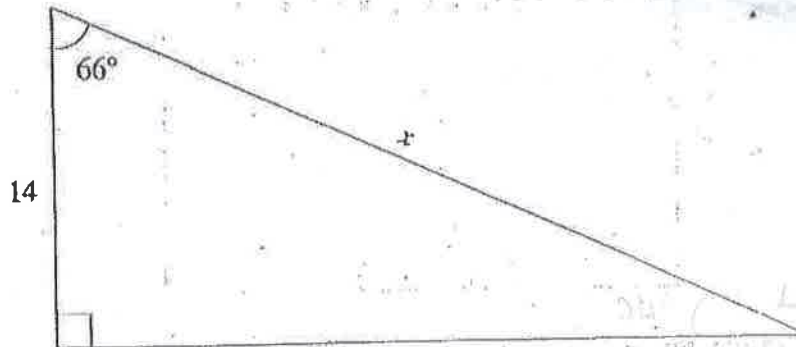
$$(16)(21)(2) = 672 \text{ cm}^3$$

Calculate the volume of the box. Answer as a whole number.

Record your answer neatly on the Answer Sheet.

60.

Calculate the length of x . Answer to one decimal place.



Record your answer neatly on the Answer Sheet.

$$\cos 66 = \frac{14}{x}$$

$$x = \frac{14}{\cos 66}$$

$$x = 34.4$$

