
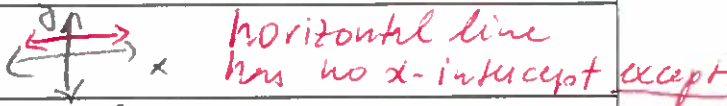


Answers

[10] A: Clearly identify whether the given statement is true or false. Correct each false statements so it is true.

F	There are 100 meters in one kilometer. 1000
T	A cube is rectangular prism. 
F	"x" is the base in the expression: $(5x)^7$ 5x
T	$\sqrt{5}a^3 - 2a^2 + a + 13$ is a polynomial.
F	$25x^2 - 289y^2$ is not factorable because 25 and 289 do not have a greatest common factor other than 1. $25x^2 - 289y^2 = (5x - 17y)(5x + 17y)$
T	Every real number is either rational or irrational.
F	Every linear graph has an x-intercept. Not 
F	When adding two powers of the same base one can add their exponents. cannot
T	Cosine ratio is the ratio of the adjacent side to the hypotenuse.
T	The inverse of a trigonometric ratio can be used to find an angle measure in degrees.

[10] B: Fill in the blanks so the statements are true and relevant.

- The point where a graph crosses the y-axis is called y-intercept.
- The number +3 in the polynomial $4x^6 + 3 + 8x$ is the constant (term).
- Every horizontal line has zero slope.
- $\sqrt{-8}$ is not a real number.
- The basic trigonometric ratios apply only to right-angled triangles.
- Zero belongs in the following sets of numbers: whole, integers, \mathbb{R} and \mathbb{Q} .
real rational
- An inch is greater than a centimeter.
- Volume can be measured in m^3 , L, mL, gal. (Give one example).
- A hypotenuse is always the longest side of a right-angled triangle.

[10] C: Multiple-choice questions: choose the best answer. Show work.

skip

1 $2\sqrt{x}$ and $\sqrt{4x}$

A) $\sqrt{4x} > 2\sqrt{x}$ C) cannot be compared

B) $\sqrt{4x} < 2\sqrt{x}$ D) $2\sqrt{x} = \sqrt{4x}$

skip

2. $\sqrt[4]{x^3} =$

A) $x^{\frac{4}{3}}$ C) cannot be simplified

B) $x^{\frac{3}{4}}$ D) x^{12}

skip

3. $-\sqrt[3]{-27} = -(-3) = 3$

A) -9 C) is not a real number

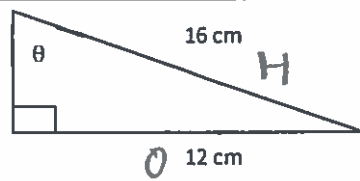
B) 9 D) 3

4. Volume of a cube with surface area 937.5 cm^2 is

A) 1.9 m^3 C) 19.53 m^3

B) 1953.13 cm^3 D) 19531.3 mm^3

Handwritten work:
 $V = s^3$
 $V = 12.5^3$
 $V = 1953.13 \text{ cm}^3$
 $SA = 6s^2$
 $937.5 = \frac{6s^2}{6}$
 $s^2 = 156.25$
 $s = \sqrt{156.25} = 12.5 \text{ cm}$

5.  Tangent theta is

A) $\frac{5.3}{6}$ C) $\frac{6}{5.3}$

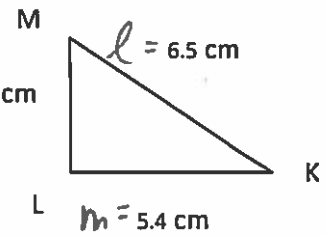
B) $\frac{4}{3}$ D) $\frac{5.3}{8}$

Handwritten work:
 $\tan \theta = \frac{O}{A} \rightarrow \frac{12}{10.6} = \frac{6}{5.3}$

Check if $l^2 = k^2 + m^2$
 $6.5^2 = 3.1^2 + 5.4^2$
 $42.25 \neq 38.77$

6. What is true about triangle KLM?

- A) Triangle KLM is not a right-angled triangle.
 B) Triangle KLM is a right-angled triangle.
 C) Angle M = 56° .
 D) Angle K = 28° .



7. $-\frac{\sqrt{15}}{2}$
 A) ... is a real number. ✓
 B) ... is an irrational number. ✗
 C) ... is a real and rational number. ✗
 D) ... is an irrational and real number. ✓✓

8. Volume of a cone with diameter 0.8 cm and height 30 mm is approximately

- A) 20 cm^3
 B) 5 cm^3
 C) 2011 mm^3
 D) 503 mm^3
- $V = \frac{1}{3}\pi r^2 h$
 $V = \frac{1}{3}\pi (4)^2 (30)$
- $r = 0.4 \text{ cm}$
 $r = 4 \text{ mm}$

$V = 502.655 \text{ mm}^3 \rightarrow V \doteq 503 \text{ mm}^3$

9. The degree of the polynomial $3x^3y^2 + 0.25y^2 - 1x^3y^1$ is
- A) 3
 B) 7
 C) 4
 D) 9

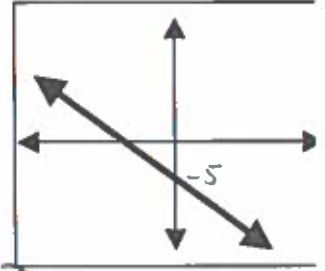
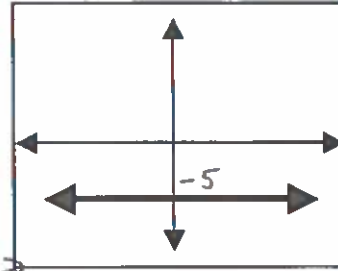
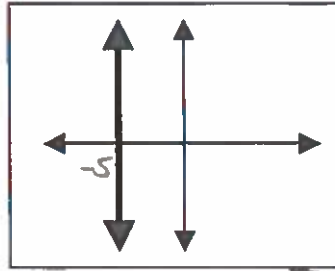
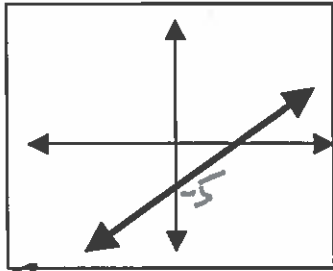
10. Radius of a sphere with surface area of 339.8 cm^2 is

- A) 5.2 cm^3
 B) 1.5 cm
 C) 27 cm
 D) 5.2 cm
- $SA = 4\pi r^2$
 $r^2 = \frac{SA}{4\pi}$

$r = \sqrt{\frac{SA}{4\pi}} \rightarrow \frac{339.8}{4\pi} \doteq 27 \text{ cm}$

D: Short response: Show all work for full marks. Clearly identify the final answer. Include a statement where appropriate.

[4] 1. Match the graphs with their equations.



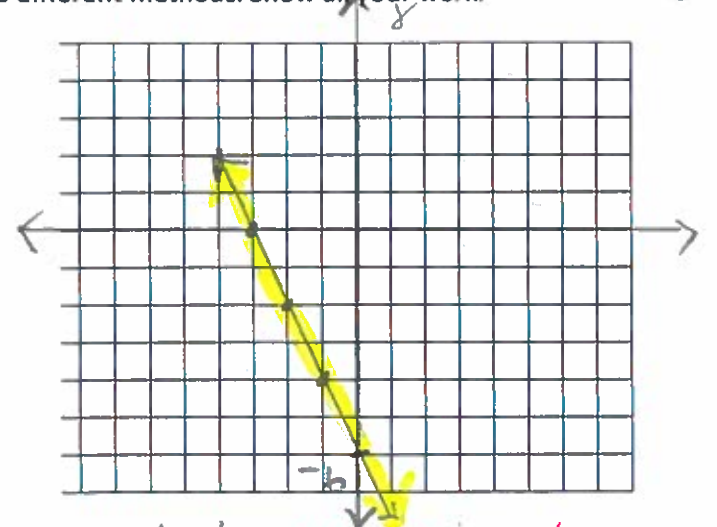
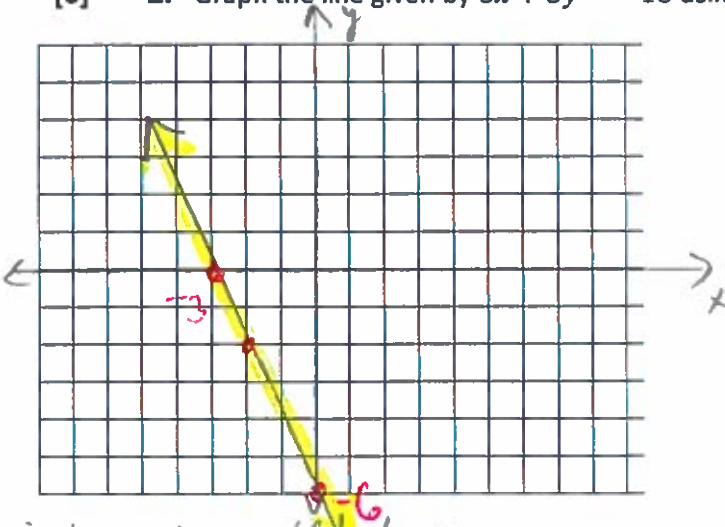
$y = -5$

$y = -2x - 5$

$x = -5$

$y = 2x - 5$

[6] 2. Graph the line given by $6x + 3y = -18$ using two different methods. Show all your work.



intercept method

x	y
0	-6
-3	0
-2	-2

$$6(-2) + 3y = -18$$

$$-12 + 3y = -18$$

$$3y = -6$$

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

$$y = -2$$

convert to $y = mx + b$

$$6x + 3y = -18$$

$$3y = -6x - 18$$

$$\frac{3y}{3} = \frac{-6x - 18}{3}$$

$y = -2x - 6$

slope \uparrow y-intercept

3. Determine which point is on the graph of a line given by the equation $y = 3x - 5$:

^{x y}
A (1,8)

^{x y}
B (1,-2)

^{x y}
C (2,1)

$$y = 3(1) - 5$$

$$y = 3 - 5$$

$$y \neq -2$$

$$-2 = 3(1) - 5$$

$$-2 = 3 - 5$$

$$-2 = -2 \checkmark$$

$$1 = 3(2) - 5$$

$$1 = 6 - 5$$

$$1 = 1 \checkmark$$

\therefore A is not on the graph. \therefore B is on the graph. \therefore C is on the graph.

4. A) Calculate the slope of a line that passes through points (2,1) and (-0.5, 4.75).

^{x₂ y₂}
P₂ ^{x₁ y₁}
P₁

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - 4.75}{2 - (-0.5)} = \frac{-3.75}{2.5} = \frac{-375}{250} = \underline{\underline{-1.5}} \text{ OR } \boxed{-\frac{3}{2}}$$

\therefore The slope is -1.5. OR $\boxed{-\frac{3}{2}}$

B) Find the missing coordinate if the line has the slope of -3 and goes through points (1, -2) and (6, ?).

$$m = -3$$

$$-3 = \frac{y_2 - (-2)}{6 - 1}$$

$$-3 = \frac{y_2 + 2}{5}$$

$$(-3)(5) = y_2 + 2$$

$$-15 = y_2 + 2$$

$$\boxed{y_2 = -17}$$

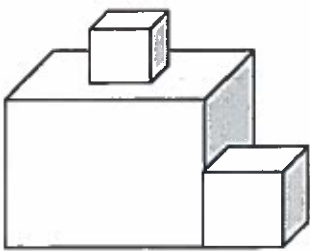
5. Find the surface area of the composite solid that consists of 3 differently sized cubes. The smallest cube has a side length 1.0 cm, the medium cube has a side length 2.0 cm and the largest cube has a side length 6.0 cm.

$$SA_s + SA_m + SA_L - \text{overlaps}$$

$$= 6(1.0)^2 - 2(1.0)^2 + 6(2.0)^2 - 2(2.0)^2 + 6(6.0)^2$$

$$= 4(1) + 4(4) + 6(36)$$

$$= \underline{\underline{236 \text{ cm}^2}}$$



\therefore The SA of the composite solid is 236 cm^2 .

skip

[4] 6. Convert the following and use scientific notation with 2 decimal places.

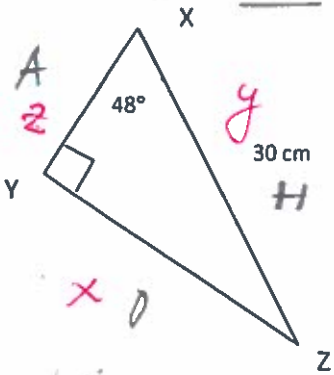
a) 198 ft = ? km

$$\frac{198 \text{ ft}}{1} \times \frac{1 \text{ mile}}{5280 \text{ ft}} \times \frac{1.609 \text{ km}}{1 \text{ mile}} = \underline{6.03 \times 10^{-2} \text{ km}}$$

b) 356 m = ? mi

$$\frac{356 \text{ m}}{1} \times \frac{1 \text{ km}}{1000 \text{ m}} \times \frac{1 \text{ mile}}{1.609 \text{ km}} = 0.221 \text{ mi} = \underline{2.21 \times 10^{-1} \text{ mi}}$$

[3] 7. Solve the triangle ABC without using the Pythagorean theorem.



$$\angle Z = 180^\circ - 90^\circ - 48^\circ$$

$$\therefore \angle Z = 42^\circ$$

$$\cos 48^\circ = \frac{z}{30}$$

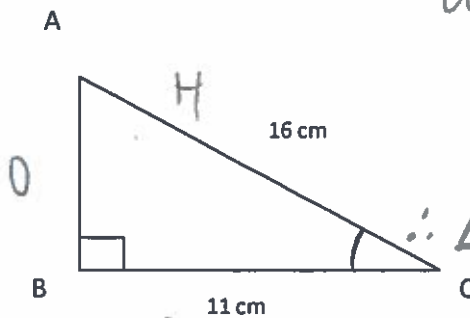
$$\sin 48^\circ = \frac{x}{30}$$

$$z = 30 (\cos 48^\circ)$$

$$\therefore x = 22.29 \text{ cm}$$

$$\therefore z = 20.07 \text{ cm}$$

[3] 8. Find the measure of both acute angles in the given triangle.



$$\cos C = \frac{11}{16}$$

$$\angle A = 180^\circ - 90^\circ - 47^\circ$$

$$C = \cos^{-1}\left(\frac{11}{16}\right) \therefore \angle A = 43^\circ$$

$$\therefore \angle C = 47^\circ$$

9. [2]

Express a mixed radical:	Express as an entire radical:
$\sqrt{80b^3} = \sqrt{16 \cdot 5b^3}$ $= \sqrt{4^2 \cdot 5 \cdot b^2 \cdot b}$ $= 4b\sqrt{5b}$	$4x^2\sqrt{5x} = \sqrt{(4x^2)^2 5x}$ $= \sqrt{16x^4 5x}$ $= \sqrt{80x^5}$

[3] 10. A) Solve by substitution. Check your answer.

① $y = 6x - 11$

② $-2x - 3y = -7$

$$-2x - 3(6x - 11) = -7$$

$$-2x - 18x + 33 = -7$$

$$-20x = -7 - 33$$

$$-20x = -40$$

$$\frac{-20x}{-20} = \frac{-40}{-20}$$

$$x = +2$$

Check:

① $1 = 6(2) - 11$
 $1 = 12 - 11$
 $1 = 1 \checkmark$ LS = RS \checkmark

② $-2(2) - 3(1) = -7$
 $-4 - 3 = -7$
 $-7 = -7 \checkmark$
LS = RS \checkmark

$y = 6(2) - 11$
 $y = 12 - 11$
y = 1

∴ x = 2 and y = 1

[3] 10. B) Solve by elimination. Check your answer.

① $5x + y = 9$

② $10x - 7y = -18$

$$-2(5x + y) = -2(9)$$

$$10x - 7y = -18$$

$$\frac{-10x - 2y = -18}{10x - 7y = -18}$$

$$0x - 9y = -36$$

$$\frac{-9y}{-9} = \frac{-36}{-9}$$

$$y = +4$$

Check:

① $5(1) + 4 = 9$
 $5 + 4 = 9$
 $9 = 9 \checkmark$
LS = RS \checkmark

② $10(1) - 7(4) = -18$
 $10 - 28 = -18$
 $-18 = -18 \checkmark$
LS = RS \checkmark

$5x + 4 = 9$
 $5x = 5$
 $\frac{5x}{5} = \frac{5}{5}$
x = 1

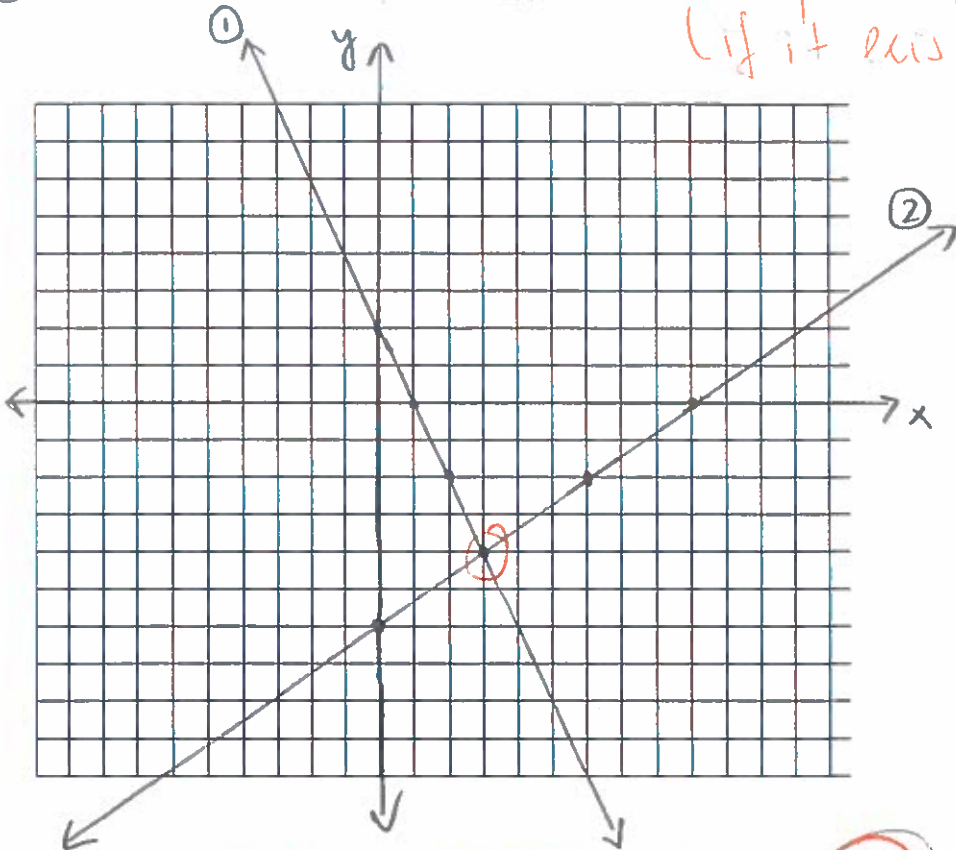
∴ x = 1 and y = 4

[3] 10. C) Solve by graphing. Clearly identify the complete solution.

① $y = -2x + 2$

② $y = \frac{2}{3}x - 6$

∴ The solution of the system is the point of intersection (if it exists): $x = 3$ and $y = -4$.

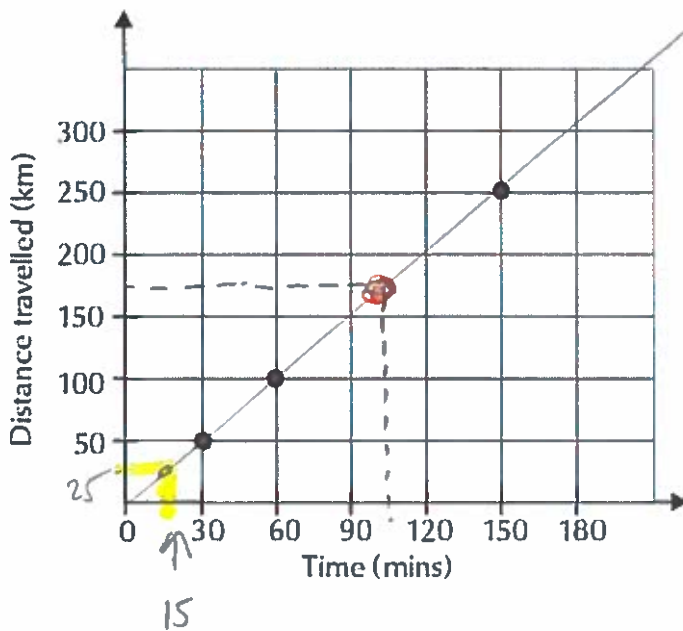


Check:

① $-4 = -2(3) + 2$
 $-4 = -6 + 2$
 $-4 = -4$ ✓
LS = RS ✓

② $-4 = \frac{2}{3}(3) - 6$
 $-4 = \frac{6}{3} - 6$
 $-4 = -4$ ✓
LS = RS ✓

[4] 11. Use the graph below to estimate the time needed to travel 175 km and distance travelled in 15 minutes.



Time needed: ~ 105 minutes.
 Method used: interpolation.
 (Interpolation or extrapolation).
 Distance traveled: ~ 25 km.
 Method used: extrapolation.
 (Interpolation or extrapolation).

factor by
↓
grouping

factor by
↓
inspection

[4] 12. Factor fully if possible:

A) $6x^2 + x - 2$

$$\begin{array}{c} \swarrow \searrow \\ 6x^2 + 4x - 3x - 2 \\ \hline \end{array}$$

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

$$\therefore \underline{(2x-1)(3x+2)}$$

B) $x^2 + 2x - 15$

$$\therefore (x-3)(x+5)$$

[10] 13. Bridget has a cell-phone plan that allows for unlimited texting and local calls. She, however, is charged a monthly fee and for every minute she calls long distance. In September Bridget spent an hour and half talking with her friend in Alberta and her bill was \$65.00. She used 35 long-distance minutes in October and her cell-phone bill was \$51.25. How much is Bridget charged for this plan a month?

Graph the relation.

- Identify the independent variable: Minutes = time spent calling long distance
- Identify the dependent variable: \$ charged per month
- What axis is the independent variable graphed on? x-axis (min)
- What axis is the dependent variable graphed on? y-axis (\$)
- Fill in the chart using the information in the word problem above.

	min	\$
$X_1 =$	90	$Y_1 =$ 65.00
$X_2 =$	35	$Y_2 =$ 51.25

f) Find the slope of the linear relation.

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

$$m = \frac{51.25 - 65.00}{35 - 90} = \frac{-13.75}{-55} = 0.25/\text{min} \text{ \$}$$

What does the slope stand for in this particular scenario?

\$ 0.25 per minute of long distance call

g) Use one of the ordered pairs (either, (x_1, y_1) or (x_2, y_2)) to find the value of **b** in the linear equation in slope intercept form. SHOW ALL WORK.

$(90, 65)$

$$y = mx + b$$

$$65 = 0.25(90) + b$$

$$65 = 22.50 + b$$

$$65 - 22.50 = b$$

$$\rightarrow \underline{b = 42.50}$$

h) Write a linear equation that shows the relationships between the cost of the a cell-phone plan and the time spent talking long-distance:

$$\underline{y = 0.25x + 42.50}$$

What does the y-intercept (**b**) stand for in this particular scenario?

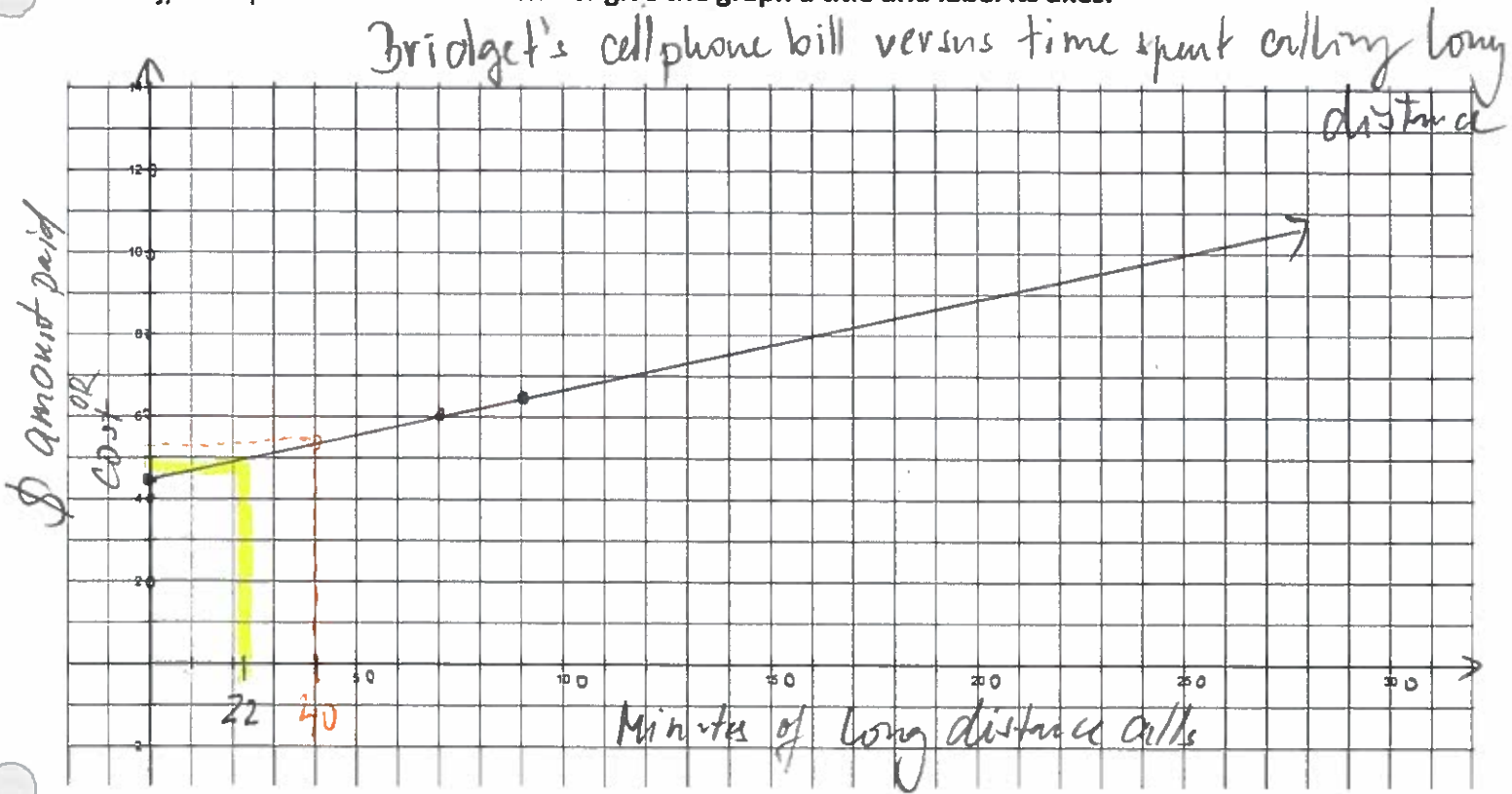
The cost of the cell phone plan without long distance calls.

i) Find how much Bridget pays when she makes no long-distance calls and how much is her bill when she talks long-distance for 70 minutes.

\therefore Bridget pays \$42.50 when she makes no long-distance calls

\therefore Bridget pays $0.25(70) + 42.50 = \underline{\$60.00}$ when she talks for 70 minutes long distance.

j) Graph the relation. Remember give the graph a title and label its axes.



k) Using the graph, estimate the cost of the bill when 40 minutes of long-distance minutes are used. ~ \$ 54.00 (\$52.5 exactly)

l) Using the graph, estimate how much time was spent on long-distance calls if the bill was \$49.00

~ 22 minutes (26 min exactly)

m) What assumptions do you make?

→ Assume no other hidden fees for the cellphone, no data etc.

Note: Estimates are not to be exact but your extrapolation/interpolation must be shown on your graph!

☺ CONGRATULATIONS ☺

