

Skills for Success Curriculum Resource Cover Page

Organization

College Sector Committee for Adult Upgrading (CSC)

Curriculum Resource

Numeracy and Problem Solving for Trades and the Workplace

This is one in a series of five resources adapted from the "[Essential Skills Self-Assessment for the Trades](#)", originally produced by Employment and Social Development Canada. This resource contains an overview of the Skills for Success (Numeracy and Problem Solving), along with a self-assessment checklist and a short reflection activity. (Answer key is also included.)

OALCF Alignment

Competency	Task Group	Level
Competency A - Find and Use Information	A2. Interpret documents	2
Competency B - Communicate Ideas and Information	B1. Interact with others	2
Competency B - Communicate Ideas and Information	B2. Write continuous text	2
Competency B - Communicate Ideas and Information	B3. Complete and create documents	2
Competency C - Understand and Use Numbers	C1. Manage money	3
Competency C - Understand and Use Numbers	C3. Use measures	3

Goal Paths (check all that apply)

- Employment
 Postsecondary
 Apprenticeship
 Independence
 Secondary School Credit

Embedded Skills for Success (check all that apply)

- Adaptability
 Numeracy
 Collaboration
 Problem Solving
 Communication
 Reading
 Creativity and innovation
 Writing
 Digital

Notes:

The opinions expressed in this document are the opinions of the College Sector Committee for Adult Upgrading. The Government of Ontario and its agencies are in no way bound by any recommendations contained in this document.



Numeracy and Problem-Solving Self Assessment

Numeracy is your ability to find, understand, use, and report mathematical information presented through words, numbers, symbols, and graphics. For example, we use this skill to perform calculations, manage budgets, analyze and model data and make estimations.



Problem-solving is your ability to identify, analyze, propose solutions, and make decisions. Problem solving helps you to address issues, monitor success, and learn from the experience. For example, we use this skill to troubleshoot technical failures.

1. Louise makes a purchase of \$19.49 and pays 6% sales tax. To the nearest whole cent, what is the amount of sales tax on her purchase?

- a) \$0.79
- b) \$0.84
- c) \$0.92
- e) \$1.03
- f) \$1.17

2. Brigham loans his brother-in-law \$690 at 8% interest for 8 months. How much will the brother-in-law pay back when the loan is due?

- a) \$718.08
- b) \$726.80
- c) \$750.00
- d) \$764.25
- f) \$775.50

3. Which of the following represents 0.0037 written in scientific notation?

- a) 37×10^4
- b) 0.37×10^{-2}
- c) 3.7×10^3
- d) 0.037×10^1
- e) 3.7×10^{-3}

4. When 23 is subtracted from the sum of two consecutive numbers, the answer is 32. What are the consecutive numbers?

- a) 25 and 26
- b) 27 and 28
- c) 26 and 27
- d) 29 and 30
- e) 24 and 25

5. Factor $y^2 + y - 56$.

- a) $(y + 8)(y - 6)$
- b) $(y + 7)(y - 8)$
- c) $(y - 7)(y + 8)$
- d) $(y + 7)(y - 8)$
- e) $(y + 7)(y - 6)$

6. Gail, a hairdresser, kept a record of her sales for 5 days: Monday \$120; Tuesday, \$140; Wednesday, \$170; Thursday, \$140; Friday, \$160. She reported that her average sales were \$142. Which of the following is true?

- a) Only the median is \$142.
- b) Only the mean is \$142.
- c) Neither the median nor mean is \$142.
- d) Both the median and mean are \$142.
- e) More information is needed.

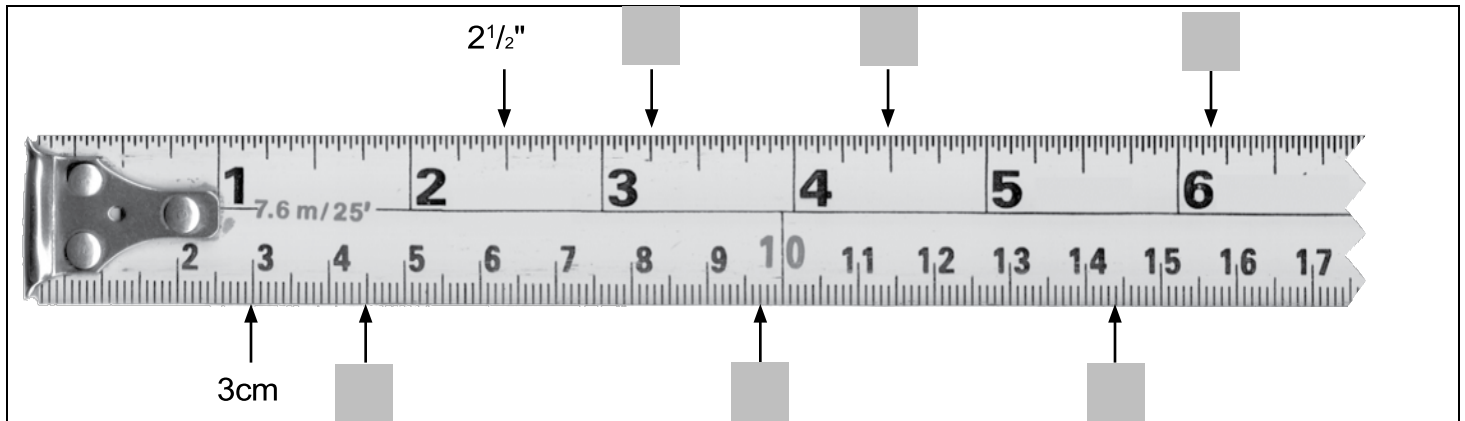
(Show your work below the questions)

7. What is 20% of 260?

8. \$3.15 is $5\frac{1}{4}\%$ of what number?

9. An apprentice needs sheet metal and screws to complete a job. The number of screws is five less than twenty-six times the number of sheets of metal. The job totals \$609.65. If screws are \$0.08/each and the sheet metal is \$26.97/sheet, how many screws and sheets of metal are needed to complete the job?

10. Enter the correct length beside each arrow on the measuring tape - include the correct unit (inches or centimetres).

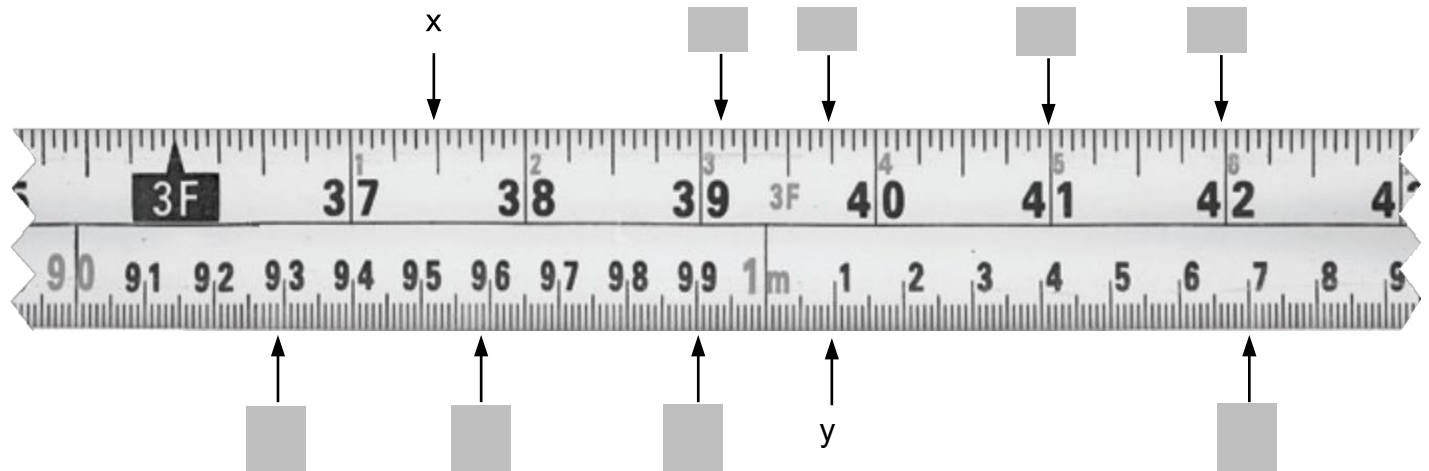


12. Label the following measurements (a–f) on the measuring tape with an arrow and the letter of the question. Two examples have been done for you.

x. $37 \frac{1}{2}$ "

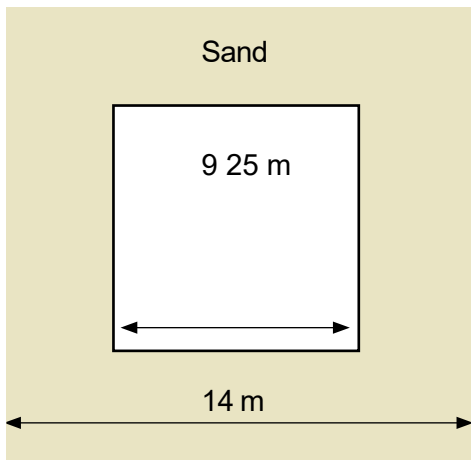
y. 1.01m

- a $39 \frac{1}{8}$ in.
- b 3ft. 5 in.
- c 3.5 ft.
- d 93 cm
- e. 0.992 m
- f 107 cm



13. A **carpenter** is building a temporary fence around a building site. How many metres of fencing are required for a site that is $47.8 \text{ m} \times 30.3 \text{ m}$? Round your answer up to the nearest metre.

14. A **landscape horticulturalist** needs to order enough sand to create a border 152 mm deep around a square surface, as shown below. How many cubic metres of sand are needed?

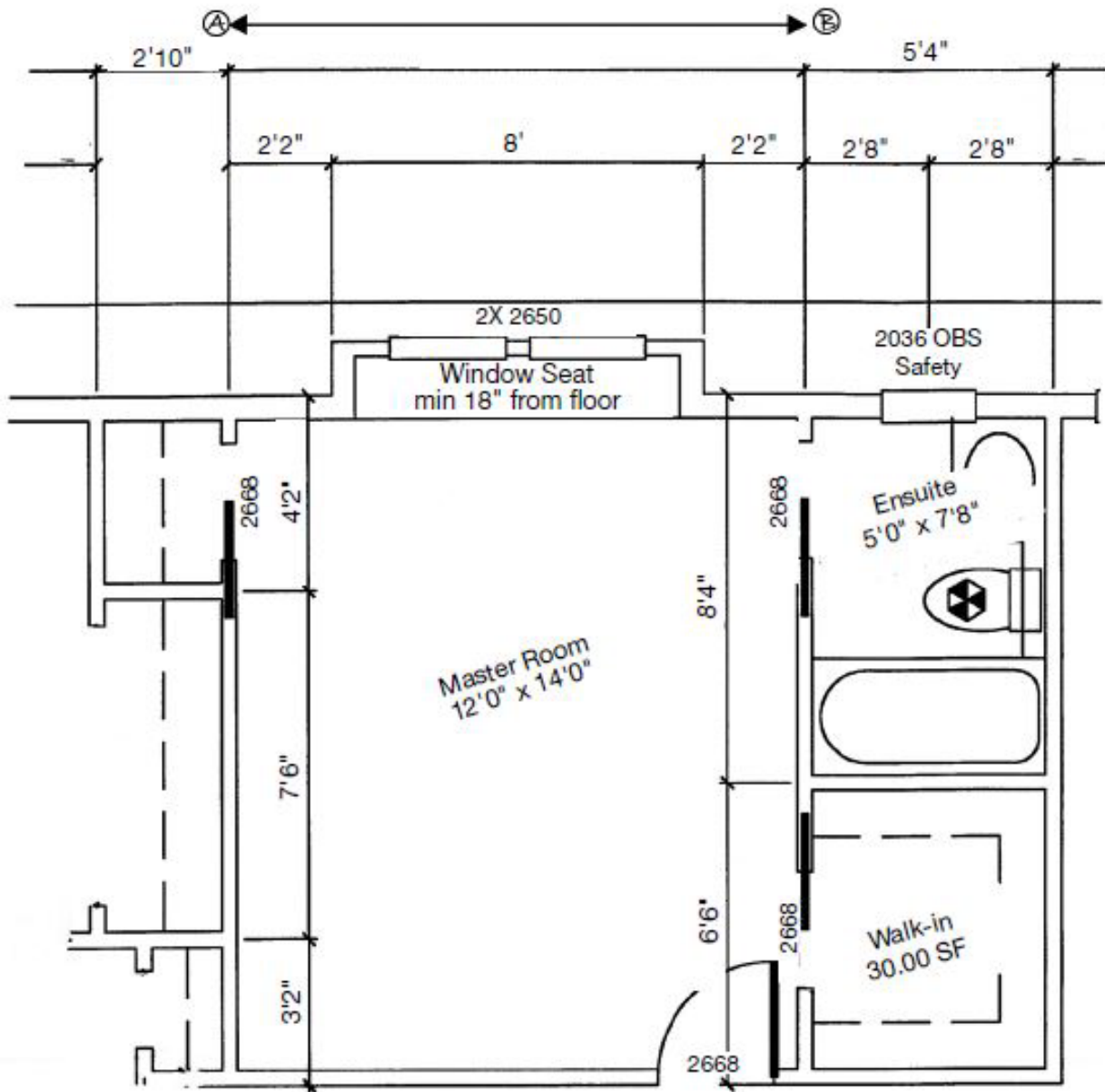


Look at the drawings for a residence on the next page to complete the questions below:

15. The walk-in closet measures $1\frac{1}{4}$ in \times $1\frac{1}{2}$ in on the drawing. What are the actual dimensions of the closet?

16. What is the exterior length from A to B ?

17. Carpet costs \$28.50 per square yard. What is the cost of carpet for the master bedroom and closet? ($1 \text{ yd}^2 = 9 \text{ ft}^2$)



Of — sheet A 3	Sheet	Date	SEPT 20
		Scale	1/4" = 1'0"
		Job	2K1-09271
		Drawn	F

Self-reflection: Numeracy

The modern economy requires numeracy skills that go beyond basic arithmetic. Understanding numbers remains critical to functioning in today's society. Many jobs require the ability to work with numbers and math.

Numeracy skills are also needed in a wide variety of daily contexts, including managing your finances and making sense of statistics in the news.

- ❖ Reflecting on your answers to the questionnaire above, what would you say are your strengths when it comes to numeracy?

- ❖ Reflecting on your answers to the questionnaire above, what are skills you could build when it comes to numeracy?

Self-reflection: Problem-solving

Every day you use information to make decisions, solve problems, and take actions. This can include thinking about different ways to complete a task and choosing the best solution or deciding what to do first when several activities are competing for your attention. The ability to think, make decisions, and solve problems effectively improves the way you carry out activities, and meet goals and deadlines at work or in other daily life situations.

Strong problem-solving skills will help you gather the right information, identify, and solve problems, and make better decisions.

As you learn from these experiences, you will strengthen your problem-solving skills and more quickly and effectively adapt to change.

- ❖ Reflecting on your answers to the questionnaire above, what would you say are your strengths when it comes to problem-solving Skills?

- ❖ Reflecting on your answers to the questionnaire above, what are skills you could build when it comes to problem-solving?

Answer Key



Numeracy and Problem-Solving Self Assessment

Numeracy is your ability to find, understand, use, and report mathematical information presented through words, numbers, symbols, and graphics. For example, we use this skill to perform calculations, manage budgets, analyze and model data and make estimations.



Problem solving is your ability to identify, analyze, propose solutions, and make decisions. Problem solving helps you to address issues, monitor success, and learn from the experience. For example, we use this skill to troubleshoot technical failures.

1. Louise makes a purchase of \$19.49 and pays 6% sales tax. To the nearest whole cent, what is the amount of sales tax on her purchase?

- a) \$0.79
- b) \$0.84
- c) \$0.92
- e) \$1.03
- f) \$1.17

To find the amount of sales tax on Louise's purchase, we need to multiply the purchase price by the sales tax rate, which is 6% or 0.06 as a decimal:

Sales tax = Purchase price x Sales tax rate

Sales tax = \$19.49 x 0.06

Sales tax = \$1.17

Rounding this to the nearest whole cent, we get \$1.17.

Therefore, the amount of sales tax on Louise's purchase is \$1.17.

2. Brigham loans his brother-in-law \$690 at 8% interest for 8 months. How much will the brother-in-law pay back when the loan is due?

- a) \$718.08
- b) \$726.80
- c) \$750.00
- d) \$764.25
- f) \$775.50

The interest on the loan is calculated as follows:

Interest = Principal x Rate x Time

where Principal is the amount of the loan, Rate is the interest rate per period, and Time is the length of the loan in the same time units as the rate.

In this case, the Principal is \$690, the Rate is 8% per year, and the Time is 8 months. However, the Rate needs to be converted to a monthly rate by dividing by 12 months:

Monthly Rate = $8\% / 12 = 0.0067$ (rounded to 4 decimal places)

Now we can calculate the interest on the loan:

Interest = $\$690 \times 0.0067 \times 8 = \36.89 (rounded to 2 decimal places)

So the brother-in-law will have to pay back the Principal plus the Interest:

Total = Principal + Interest = $\$690 + \$36.89 = \$726.89$ (rounded to 2 decimal places)

Therefore, when the loan is due, Brigham's brother-in-law will have to pay back \$726.89.

3. Which of the following represents 0.0037 written in scientific notation?

- a) 37×10^4
- b) 0.37×10^{-2}
- c) 3.7×10^3
- d) 0.037×10^1
- e) 3.7×10^{-3}

To write 0.0037 in scientific notation, we need to express it as a number between 1 and 10 multiplied by a power of 10.

First, we can move the decimal point to the right until we have a number between 1 and 10. To do this, we need to move the decimal point three places to the right:

$0.0037 = 0.00037$ (move decimal point 3 places to the right)

Next, we can express this number as a product of a number between 1 and 10 and a power of 10. The power of 10 will be equal to the number of places we moved the decimal point to the right. Since we moved the decimal point 3 places to the right, the power of 10 will be -3 (a negative exponent indicates that the number is less than 1).

So, 0.0037 in scientific notation is:

3.7×10^{-3}

4. When 23 is subtracted from the sum of two consecutive numbers, the answer is 32. What are the consecutive numbers?

- a) 25 and 26
- b) 27 and 28
- c) 26 and 27
- d) 29 and 30
- e) 24 and 25

Let's call the two consecutive numbers "x" and "x+1". Since they are consecutive, the second number is 1 more than the first number.

According to the problem, when 23 is subtracted from the sum of these two consecutive numbers, the answer is 32. We can write this as an equation:

$$(x + x+1) - 23 = 32$$

Simplifying this equation, we first combine the terms inside the parentheses:

$$2x + 1 - 23 = 32$$

Then we simplify the expression by adding 23 to both sides:

$$2x + 1 = 55$$

Finally, we isolate the variable "x" by subtracting 1 from both sides and dividing by 2:

$$2x = 54$$

$$x = 27$$

So the first consecutive number is 27. The second consecutive number is 1 more than this, so:

$$x+1 = 27+1 = 28$$

Therefore, the two consecutive numbers are 27 and 28.

5. Factor $y^2 + y - 56$.

- a) $(y + 8)(y - 6)$
- b) $(y + 7)(y - 8)$
- c) $(y - 7)(y + 8)$
- d) $(y + 7)(y - 8)$
- e) $(y + 7)(y - 6)$

To factor the quadratic expression $y^2 + y - 56$, we need to find two numbers that multiply to -56 and add up to 1 (the coefficient of y).

We can begin by listing the factor pairs of -56:

**-56 and 1
-28 and 2
-14 and 4
-7 and 8**

Out of these factor pairs, only -7 and 8 add up to 1.

So we can write $y^2 + y - 56$ as:

$$Y^2 + 8y - 7y - 56$$

Next, we group the terms with common factors:

$$(y^2 + 8y) - (7y + 56)$$

We can factor out a "y" from the first group of terms, and a "-7" from the second group of terms:

$$y(y + 8) - 7(y + 8)$$

Notice that we now have a common factor of $(y + 8)$ in both terms. So we can write the expression as a product:

$$(y + 8)(y - 7)$$

Therefore, the factored form of $y^2 + y - 56$ is $(y + 8)(y - 7)$ or $(y - 7)(y + 8)$

6. Gail, a hairdresser, kept a record of her sales for 5 days: Monday \$120; Tuesday, \$140; Wednesday, \$170; Thursday, \$140; Friday, \$160. She reported that her average sales were \$142. Which of the following is true?

- a) Only the median is \$142.
- b) Only the mean is \$142.
- c) Neither the median nor mean is \$142.
- d) Both the median and mean are \$142.
- e) More information is needed.

Since the data set only has 5 values, we can calculate both the median and the mean to check which of the given options is true:

To find the median:

Arrange the values in order from smallest to largest: \$120, \$140, \$140, \$160, \$170.

Since there are an odd number of values, the median is the middle value, which is \$140.

To find the mean:

Add up the values: $\$120 + \$140 + \$170 + \$140 + \$160 = \730

Divide the sum by the number of values: $\$730 \div 5 = \146

Therefore, we can see that neither the median nor the mean is \$142, so the option that is true is: Neither the median nor mean is \$142.

7. What is 20% of 260?

To find 20% of 260, we can multiply 260 by 20% written as a decimal:

$$20\% = 0.20$$

So we have:

$$20\% \text{ of } 260 = 0.20 \times 260$$

Multiplying these values, we get:

$$20\% \text{ of } 260 = 52$$

Therefore, 20% of 260 is 52.

8. \$3.15 is 5 $\frac{1}{4}$ % of what number?

The problem states that \$3.15 is 5 $\frac{1}{4}$ % of the unknown number x. We can write this as an equation:

$$\$3.15 = 0.0525x$$

To solve for x, we need to isolate it on one side of the equation.

First, we can divide both sides by 0.0525:

$$\$3.15 \div 0.0525 = x$$

Simplifying this expression, we get:

$$x = 60$$

Therefore, \$3.15 is 5 $\frac{1}{4}$ % of the number 60.

9. An apprentice needs sheet metal and screws to complete a job. The number of screws is five less than twenty-six times the number of sheets of metal. The job totals \$609.65. If screws

are \$0.08/each and the sheet metal is \$26.97/sheet, how many screws and sheets of metal are needed to complete the job?

Let's call the number of sheets of metal needed "s" and the number of screws needed "x".

From the problem statement, we know that:

The number of screws is five less than twenty-six times the number of sheets of metal. We can write this as:

$$x = 26s - 5$$

The total cost of the job is \$609.65, and we can find the total cost by adding the cost of the sheet metal and the cost of the screws:

Total cost = (cost per sheet metal) x (number of sheets of metal) + (cost per screw) x (number of screws)

$$\text{Total cost} = \$26.97s + \$0.08x$$

We can now substitute the first equation into the second equation to get an equation that only involves s:

$$\text{Total cost} = \$26.97s + \$0.08(26s - 5)$$

Simplifying this expression:

$$\$609.65 = \$26.97s + \$2.08s - \$0.40$$

$$\$609.65 = \$29.05s - \$0.40$$

$$\$609.65 + \$0.40 = \$29.05s$$

$$\$610.05 = \$29.05s$$

$$s = 21$$

Now that we know that 21 sheets of metal are needed, we can use the first equation to find the number of screws:

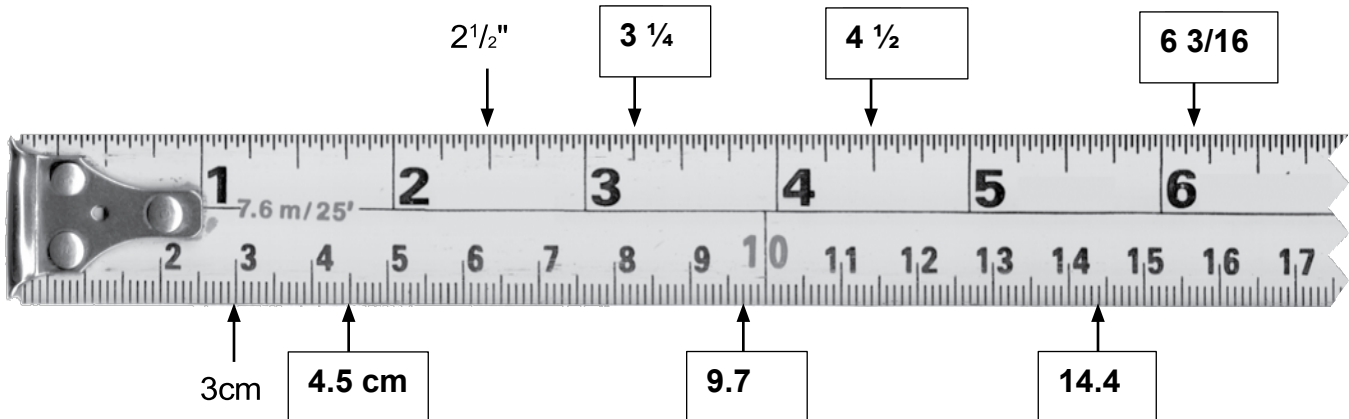
$$x = 26s - 5$$

$$x = 26(21) - 5$$

$$x = 541$$

Therefore, the apprentice needs 21 sheets of metal and 541 screws to complete the job.

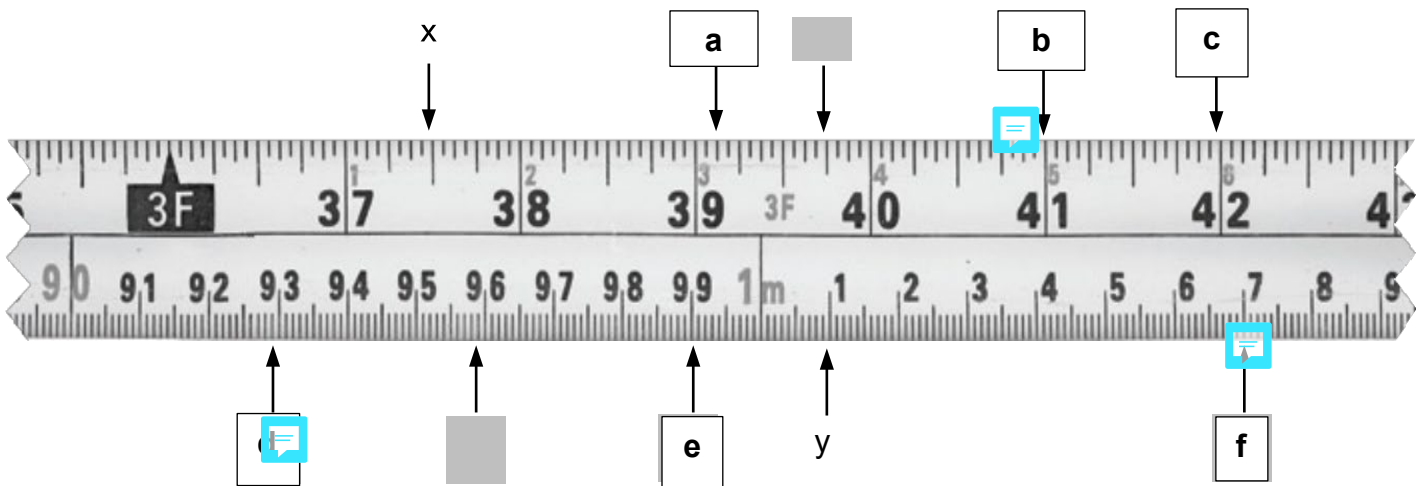
10. Enter the correct length beside each arrow on the measuring tape - include the correct unit (inches or centimetres).



12. Label the following measurements (a–f) on the measuring tape with an arrow and the letter of the question. Two examples have been done for you.

x. 37 1/2"
y. 1.01m

- a 39 1/8 in.
- b 3 ft. 5 in.
- c 3.5 ft.
- d 93 cm
- e. 0.992 m
- f 107 cm



13. A **carpenter** is building a temporary fence around a building site. How many metres of fencing are required for a site that is 47.8 m × 30.3 m? Round your answer up to the nearest metre.

The carpenter needs to find the total perimeter of the rectangular building site to know how many meters of fencing are required.

The formula for the perimeter of a rectangle is:

$$\text{Perimeter} = 2 \times (\text{length} + \text{width})$$

Plugging in the values given in the problem, we get:

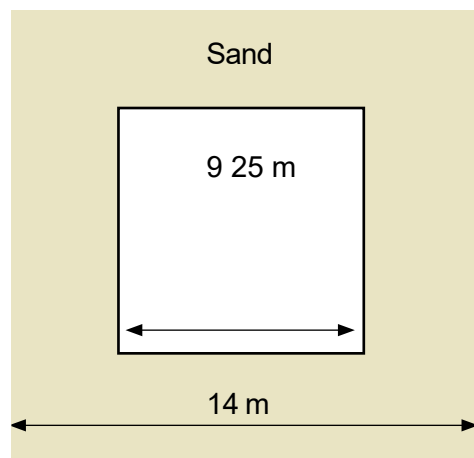
$$\text{Perimeter} = 2 \times (47.8\text{m} + 30.3\text{m})$$

$$\text{Perimeter} = 2 \times (78.1\text{m})$$

$$\text{Perimeter} = 156.2\text{m}$$

Therefore, the carpenter needs 156 meters of fencing to surround the building site, rounded up to the nearest meter.

14. A landscape horticulturalist needs to order enough sand to create a border 152 mm deep around a square surface, as shown below. How many cubic metres of sand are needed?



$$(14 \text{ m})^2 - (9.25 \text{ m})^2 = 110.44 \text{ m}^2$$
$$110.44 \text{ m}^2 \times 0.152 \text{ m} = 16.79 \text{ m}^3$$

Look at the drawings for a residence on the next page to complete the questions below:

15. The walk-in closet measures $1\frac{1}{4}$ in \times $1\frac{1}{2}$ in on the drawing What are the actual dimensions of the closet?

$$5/4 \times 1 \text{ ft} = 5 \text{ ft } 3/2 \times 1 \text{ ft} = 6 \text{ ft Dimensions} = 5 \text{ ft} \times 6 \text{ ft}$$

16. What is the exterior length from A to B ?

$$2' 2'' + 8' + 2' 2'' = 12' 4''$$

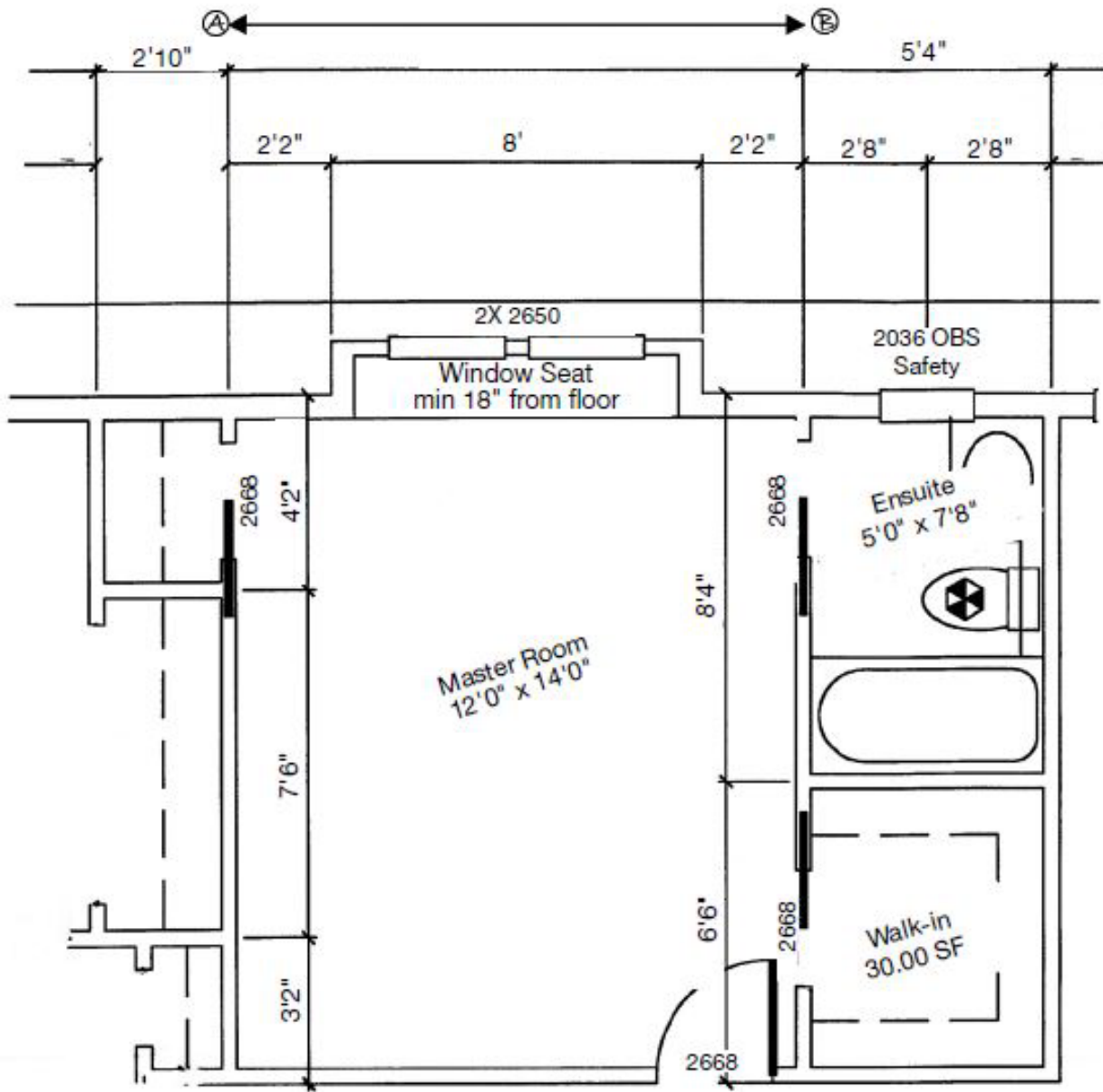
17. Carpet costs \$28 50 per square yard What is the cost of carpet for the master bedroom and closet? ($1 \text{ yd}^2 = 9 \text{ ft}^2$)

$$A = 12 \text{ ft} \times 14 \text{ ft} = 168 \text{ ft}^2$$

$$168 \text{ ft} + 30 \text{ ft}^2 = 198 \text{ ft}^2$$

$$198 \text{ ft}^2 \div 9 \text{ ft } 2/\text{yd}^2 = 22 \text{ yd}^2$$

$$\text{\$}28 \text{ } 50/\text{yd}^2 \times 22 \text{ yd}^2 = \text{\$}627.00$$



Of — sheet A 3	Sheet	Date	SEPT 20
		Scale	1/4" = 1'0"
		Job	2K1-09271
		Drawn	F

18. Jane, an automotive service technician, needs to convert kilometres to miles for an American customer. The customer's oil change is due at 35,000 km. What is the same distance in miles? (1 km = 0.621mi.)

To convert 35,000 km to miles, we can multiply 35,000 by 0.621:

$$35,000 \text{ km} \times 0.621 \text{ mi/km} = 21,745.5 \text{ mi}$$

Therefore, the distance of 35,000 km is equivalent to 21,745.5 miles when rounded to one decimal place.

19. Gail, a hairdresser, is mixing a hair treatment. The client has long hair, so Gail starts with $1 \frac{1}{4}$ scoops of power lightener.

These are the mixing instructions: Measure 1 level scoop of power lightener into a non-metallic bowl or bottle. Add 1 oz. (30g) of the booster and 2 fl. Oz (60ml) of conditioner crème. Mix thoroughly to achieve a creamy consistency.

a) Calculate the number of grams of booster Gail will need to use.

If $1 \frac{1}{4}$ scoops of power lightener is needed for a client with long hair, then we need to find out how much booster to add based on the instructions.

The instructions say to add 1 oz (30g) of booster for each scoop of power lightener. Since 1 scoop is equivalent to 30 grams of booster, then $1 \frac{1}{4}$ scoops of power lightener will require:

$$(1 \frac{1}{4}) \times 30\text{g/scoop} = 37.5\text{g of booster}$$

Therefore, Gail will need to use 37.5 grams of booster for a client with long hair when starting with $1 \frac{1}{4}$ scoops of power lightener.

b) Calculate the number of millilitres of conditioner creme Gail will need to use.

According to the instructions, Gail needs to mix 1 level scoop of power lightener with 1 oz (30g) of booster and 2 fl. oz (60ml) of conditioner crème.

Since Gail is starting with $1 \frac{1}{4}$ scoops of power lightener, she will need to use $(1 \frac{1}{4}) \times 60 \text{ ml} = 75 \text{ ml}$ of conditioner creme.

Therefore, Gail will need to use 75 millilitres of conditioner crème when starting with $1 \frac{1}{4}$ scoops of power lightener for a client with long hair.