



TEST: Ch 4 Linear Equations

Section	Marks	Your mark
A: Vocabulary knowledge	5	
B: Multiple Choice	10	
C: Short Answer	30	
D: Analysis Problem	10	
Total Marks = 55		

Instructions

- Read questions carefully
- Calculators may be used. No Ipads.
- No sharing of equipment, including calculators.

Section A: Vocabulary Knowledge

(5 x 1 = 5 marks)

Complete the sentence by choosing the appropriate word from the word list below.

1. Only like terms can be added or subtracted.
2. Substitution involves replacing the pronumeral with a given value and evaluating.
3. If the same arithmetic operation is performed to both sides of an equation the equation remains a True Statement.
4. The expansion of two linear terms can be achieved by applying the FOIL method.
5. For an equation to be linear the pronumeral must not have any index or power other than one.

WORD LIST

Pronumeral	Constant
FOIL	One
True statement	
Highest common factor	
Number terms	
Like terms	

Section B: Multiple Choice questions

Question 1

Which of the following is *not* a linear equation?

- A $3 + x = -8$
- B $2x = \frac{x}{2} - 3$
- C $5x = 2x^2 + 3$
- D $\frac{x}{4} = \frac{5}{6}$
- E $2(x - 3) = 7(x - 2) + x$

Question 2

The solution to $x + 4 = -4$ is:

- A $x = -1$
- B $x = 8$
- C $x = -8$
- D $x = 0$
- E $x = 4$

Question 3

The solution to $2 + 3x = 15$ is:

- A $x = \frac{-13}{3}$
 - B $x = \frac{17}{-3}$
 - C $x = -7$
 - D $x = -5$
 - E $x = \frac{13}{3}$
- $3x = 13$
 $x = \frac{13}{3}$

Question 4

The solution to $3 + 5x = 6 + 2x$ is:

- A $x = -1$
 - B $x = 9$
 - C $x = -9$
 - D $x = 1$
 - E $x = \frac{-3}{7}$
- $3x = 3$
 $x = 1$

Question 5

What is the solution to $4(x + 3) = 25$?

- A $x = 9\frac{1}{4}$
 B $x = 6\frac{1}{4}$
 C $x = 3\frac{1}{4}$
 D $x = 7$
 E $x = 2\frac{1}{12}$

$$4x + 12 = 25$$

$$4x = 13$$

$$x = \frac{13}{4}$$

$$= 3\frac{1}{4}$$

Question 6

When rearranging $y = 2a - 3b$ in terms of b , we obtain:

- A $b = 2a - y$
 B $b = y - 2a$
 C $b = \frac{y - 2a}{3}$
 D $b = \frac{2a - y}{3}$
 E $b = 2a - 3y$

$$3b = 2a - y$$

$$b = \frac{2a - y}{3}$$

Question 7

The equation $4(x + 5) = 3x + 34$ is solved as shown below.

Step 1: $4x + 20 = 3x + 34$

Step 2: $7x + 20 = 34$

Step 3: $7x = 34$

Step 4: $x = 2$

Circle the first incorrect step?

Question 8

Which of the following is not the solution for a in the equation $\frac{5}{a} = \frac{4}{3}$?

- A $\frac{30}{8}$
 B $3\frac{3}{4}$
 C $\frac{45}{12}$
 D $\frac{3}{20}$
 E 3.75

Question 9The solution to $0.25x = 0.8$ is:

- A $x = 0.02$
 B $x = 0.32$
 C $x = 2$
 D $x = 3.2$
 E $x = 0.8$

$$x = \frac{0.8}{0.25}$$

Question 10The solution for t in the equation $\frac{t}{0.7} + 3 = 1.8$ is:

- A -0.84
 B -0.3
 C 3.36
 D 4.1
 E -1.2

$$t = (1.8 - 3) \times 0.7$$

Section C: Short answer questions**Question 1**

(3)

Solve to find the value of y :

$$\frac{3y-9}{6} = 3$$

$$3y - 9 = 3 \times 6$$

$$3y - 9 = 18$$

$$3y = 18 + 9$$

$$\begin{aligned} 3y &= 27 \\ y &= \frac{27}{3} \\ &= 9 \end{aligned}$$

Question 2

(3)

Solve to find the value of x :

$$3x + 6 = -5x - 8$$

$$3x + 5x = -8 - 6$$

$$8x = -14$$

$$x = -\frac{14}{8}$$

$$= -\frac{7}{4}$$

Question 3

(3)

Find the value of x in the following expression:

$$5(3x + 1) = 20x - 5$$

$$15x + 5 = 20x - 5$$

$$15x - 20x = -5 - 5$$

$$-5x = -10$$

$$x = 2.$$

Question 4

(4)

Find the value of x in the following expression:

$$3x + 9 = \frac{6x + 15}{3}$$

$$3(3x + 9) = 6x + 15$$

$$9x + 27 = 6x + 15$$

$$9x - 6x = 15 - 27$$

$$3x = -12$$

$$x = \frac{-12}{3} = -4.$$

Question 5

(5)

Jason is solving the following equation: $\frac{9-5x}{3} = -3$. He performs the following operations to both sides of the equation in order $\div 3, +3$.

- (a) Explain why Jason will not find the correct value for x using his order of operations.

First he should multiply both sides by 3
then subtract 9 from both sides

- (b) Use the correct order of operations to solve for x .

$$\frac{9-5x}{3} = -3$$

$$9-5x = -9$$

$$-5x = -9 - 9$$

$$-5x = -18$$

$$x = \frac{18}{5}.$$

Question 6

(3)

Rearrange the following equation to make x the subject

$$5y = 2ax + b$$

$$2ax + b = 5y$$

$$2ax = 5y - b$$

$$x = \frac{5y - b}{2a}$$

Question 7

(4)

Solve the following linear equation

$$x + 7(4 - x) = 3x + 2(x - 1)$$

$$x + 28 - 7x = 3x + 2x - 2$$

$$-6x + 28 = 5x - 2$$

$$-11x = -30$$

$$x = \frac{-30}{-11}$$

$$= \frac{30}{11}$$

Question 8

(5)

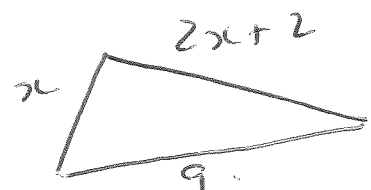
The lengths of the sides of a triangle are x , $2x+2$ and 9 centimetres. If the perimeter is 35 cm, what are the lengths of the two unknown sides?

$$x + 2x + 2 + 9 = 35$$

$$3x + 11 = 35$$

$$3x = 24$$

$$x = 8$$



∴ one side is 8 cm

the other is $2(8) + 2 = 18$ cm.

Section D: Analysis question

Question 1

(5)

Susan has \$24 000 saved for a holiday and a new ipad. Her travel expenses are \$5400 and her daily expenses are \$250.

- a. Write down an equation for the cost of her holiday if she stays for d days.

$$C = 250d + 5400 \quad (2)$$

Upon return from her holiday Susan looks at buying an ipad for herself at a cost of \$550.

- b. How many days can she spend on her holiday if she wishes to purchase two new ipads (one for herself and one for her daughter) when she returns from her holiday?

$$24000 - \overset{(2 \times 550)}{1100} = 5400 + 250d$$

$$22900 = 5400 + 250d$$

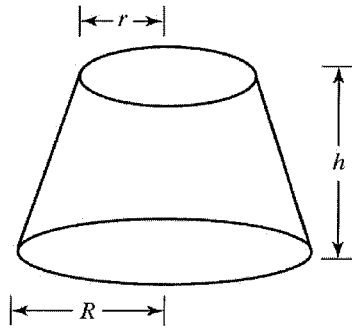
$$\frac{22900 - 5400}{250} = d$$

$$d = 70$$

She can spend 70 days
on holiday

Question 2**(5)**

The volume V of the solid is given by the formula $V = \frac{\pi h}{3}(R^2 + Rr + r^2)$.



- (a) Calculate the volume V when $R = 10$ cm, $r = 4.5$ cm and $h = 5$ cm.
(Give your answer to 2 decimal places.)

$$\begin{aligned} V &= \frac{\pi \times 5}{3} (10^2 + 10 \times 4.5 + 4.5^2) \\ &= 865.25 \text{ cm}^3 \end{aligned}$$

- (b) Rearrange the formula to make h the subject.

$$\begin{aligned} V &= \frac{\pi h}{3} (R^2 + Rr + r^2) \\ \frac{3V}{\pi (R^2 + Rr + r^2)} &= h \end{aligned}$$