Year 9 Mathematics
Topic Test 3
Linear Equations & Inequalities

PEN Education

2024

Contents

1 Introduction:

Today we are going to spend an hour doing an in-class topic test! It is well known how much you all *despise* such **tests**, but according to the literature, testing yourself is the most effective way to learn!

You should acknowledge that you have just completed all of the theory surrounding Linear Equations and Inequalities at the Year 9 level. As such you should be able to answer questions about this topic in a quiet and timed environment.

This topic test following quiz has deliberately interleaved the subtopics together to force your brain to change gears between the different types of problems: thus working harder and enabling you to learn more. Goodluck!

2 Questions:

2.1 Problems:

1. David weighs 5 kg less than Christos. If Christos weighs w kg, express David's weight in terms of w. [1]

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2. When John's age is doubled, the number is 5 more than Kayla's age. If John is x years old, what is Kayla's age in terms of x ? [1]

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3. The length of a rectangle is 10 m greater than the width of the rectangle. [2]

   (a) If w m is the width of the rectangle, express the length of the rectangle in terms of w.

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   (b) If the length of the rectangle is ℓm, express the width of the rectangle in terms of ℓ.

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4. Solve these equations: [6]

(a) $a + 7 = 5$

(b) $-3m = 18$

(c) $6a + 21 = -1$

(d) $7b - 27 = -16$

(e) $18 - 7x = 3x - 15$

(f) $-5p + 8 = 6 - 7p$

5. Now solve these: [8]

(a) $5(x+3)=18$

(b) $5(x-2)=15$

(c) $12(x-1)=96$

(d) $7(3-x)=20$

(e) $6(11-x)=17$

(f) $6(a+1)-4(a+2)=24$

(g) $15(3a-1)=2(6a+7)$

(h) $-4(5m+6)=-3(4-5m)$

6. The length of a rectangular lawn is 15 m more than four times its width. [4]

   (a) If x m is the width of the lawn, express the length of the lawn in terms of x.

   (b) If the perimeter of the lawn is 265 m, find the length and width of the lawn.

7. Solve for the pronumeral: [4]

   (a)

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

(b)

$$-2(z-1) = 5(z+6)$$

(c)

$$\frac{3s-2}{5} + 1 = 6s$$

(d)

$$\frac{x+2}{5} + \frac{x-1}{2} = \frac{x+1}{3}$$

8. A person has a number of 10 -cent and 20 -cent coins. If their total value is \$18, how many are there of each coin if there are: 3

   (a) equal numbers of each coin?

   (b) twice as many 10 -cent coins as there are 20 -cent coins?

(c) twice as many 20 -cent coins as there are 10 -cent coins?

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9. The distance between two towns A and B is 450 km. Find x if: [3]

(a) the trip takes x hours at an average speed of 90 km/h

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(b) the trip takes $5\frac{1}{4}$ hours at an average speed of x km/h

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(c) the trip takes 5 hours, travelling x hours at 110 km/h and the remaining time at 60 km/h

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10. A room has a length 8 m shorter than its width and a perimeter of 80 m. Find the length and width of the room. [3]

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11. Solve these equations for x. [4]

(a) $\dfrac{mx+n}{a} = b$

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(b) $m(x-n) = p$

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(c) $a(bx-c) = d$

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(d) $\dfrac{m(x+n)}{a} = b$

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12. Copy each statement and insert the correct symbol, $\geq$ or $\leq$. [6]

(a) $11 \geq 5$
(b) $-8 \geq -12$
(c) $-14 \leq -16$
(d) $-8 \leq -7$
(e) $-11 \leq 5$
(f) $-10 \geq -100$

13. Graph each set on the number line. [12]

(a) $\{x : x > 2\}$

(b) $\{x : x < 3\}$

(c) $\left\{x : x < -1\frac{1}{2}\right\}$

(d)

$\{x : x \geq 4\}$

(e)

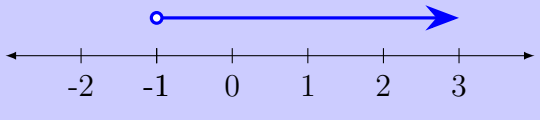
$\left\{x : x \geq \frac{1}{3}\right\}$

(f)

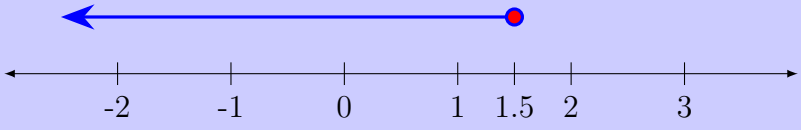
$\left\{x : x \leq 2\frac{1}{4}\right\}$

14. Use *correct* set notation to describe each interval. [4]

(a)



(b)



15. Solve these inequalities. 12

(a)

$$x + 7 \geq 17$$

(b)

$$x - 7 \leq -4$$

(c)

$$-2x \geq 16$$

(d)

$$\frac{x}{5} - \frac{1}{2} \geq 2$$

(e)

$$6(x - 3) \leq 15$$

(f)

$$7 - 4x \leq -12$$

(g)

$$11 - 3x > 18$$

(h)

$$6(1 - x) \leq 2.4(15 - 12x)$$

(i)

$$\frac{x - 3}{3} \leq \frac{3 + x}{2}$$

(j)

$$\frac{2x + 3}{2} - \frac{x - 4}{3} > 2$$

(k)

$$\frac{4 - x}{2} + \frac{3 - x}{4} < 1$$

(l)

$$\frac{3 - 2x}{2} \geq \frac{7 - 10x}{5}$$

16. At 2 p.m., two aeroplanes leave airports 2880 km apart and fly towards one another. The average speed of one plane is twice that of the other. If they pass each other at 5 p.m., what is the average speed of each plane? [4]

17. When a mathematics teacher was asked her age she replied, 'One-fifth of my age three years ago, when added to half my age last year, gives my age 11 years ago.' How old is she? [3]

18. 3$420 is divided between A, B and C.B receives \$20 less than A, and C receives half as much as A and B together. How much does each receive? [3]

19. In a printing works, 75000 leaflets are run off by two printing presses in $18\frac{3}{4}$ hours. One press delivers 200 more leaflets per hour than the other. Find the number of leaflets produced per hour by each of the machines. [3]

20. A salesman makes a trip to visit a client. The traffic he encounters keeps his average speed to 40 km/h. On the return trip, he takes a route 6 km longer, but he averages 50 km/h. If he takes the same time each way, how long was the total journey? [4]

21. Solve these inequalities: [4]

(a)

$$\frac{5-2x}{3} - \frac{5+2x}{4} \geq -1$$

(b)

$$\frac{2x-1}{7} \geq \frac{2x+3}{4}$$

(c)

$$\frac{6x+1}{3} > \frac{3x-1}{2} + 3$$

(d)

$$\frac{6-3x}{2} \geq \frac{3x-6}{5}$$

3 Homework

This week homework is a little different. The only thing that will be marked from you is a reattempt of every single question that you got incorrect on the class quiz. Tutors should have handed out extra lined paper.

4 Marking

Question:	1	2	3	4	5	6	7	8	9	10	11
Points:	1	1	2	6	8	4	4	3	3	3	4
Score:											

Question:	12	13	14	15	16	17	18	19	20	21	Total
Points:	6	12	4	12	4	3	3	3	4	4	94
Score:											