

Y9 Maths

Unit 3 Test

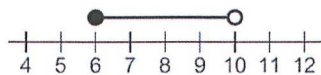
Inequalities, Equations & Formulae

Name: _____

Markscheme

MARKS

1. Write the inequality shown below for x :



$$6 \leq x < 10$$



(B1)

or BI for $x \geq 6$ and $x < 10$

2. Solve these linear inequalities

a. $-3x > 15$

$$x < -5$$

(B1)

b. $4c - 7 \leq 2(c - 1)$

$$4c - 7 \leq 2c - 2$$

$$2c \leq 5$$

$$c \leq \frac{5}{2}$$

(M1) expanding brackets on RHS

(M1) isolating terms in c onto one side

(A1) for $c \leq \frac{5}{2}$

c. $-5 < 2x + 3 < 7$

$$-8 < 2x < 4$$

$$-4 < x < 2$$

(M1) for process to separate x and non- x term in both inequalities

(M1) for either $-4 < x$ or $x < 2$

(A1) for $-4 < x < 2$ cao

3. Evaluate $10p^0 = 10$

(B1)

MARKS

4. Simplify the following. Write your answers as a fraction AND a negative power:

2

a. $\frac{y^2}{y^8}$

(FRAC)

$$\frac{1}{y^6}$$

(B1) cao

(NEG POWER)

$$y^{-6}$$

(B1) cao

4

b. $\frac{8r^3}{72r^{10}}$

(FRAC)

$$\frac{1}{9r^7}$$

(B2) cao

OR B1 for $\frac{9}{r^7}$

(NEG POWER)

$$\frac{1}{9}r^{-7}$$

(B2) cao

OR B1 for $9r^{-7}$

2

5. Simplify $\frac{12m^7n^2}{2m^5n^3} = \frac{6m^2}{n}$ (B2) cao OR B1 for two of 12, m^2 , $\frac{1}{n}$ in a product

OR $6m^2n^{-1}$

2

6. The formula for the surface area of a sphere is $A = 4\pi r^2$, where r is the radius of the sphere. Make r the subject of the formula.

$$A = 4\pi r^2$$

$$\frac{A}{4\pi} = r^2$$

(M1) for correctly isolating r^2 on one side

$$r = \sqrt{\frac{A}{4\pi}}$$

← (A1) oe.

condone $\pm$ before $\sqrt{\quad}$ sign

MARKS

7. Solve these equations

3

a. $-4(t+4) = -8t - 24$

$$-4t - 16 = -8t - 24$$

$$4t = -8$$

$$t = -2$$

(M1) expanding bracket on LHS

(M1) isolating terms in t onto one side

(A1)

3

b. $\frac{4(x+2)}{3} = x - 1$

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

$$4x + 8 = 3x - 3$$

$$x = -11$$

(M1) eradicating fraction correctly

(M1) expanding brackets

(A1)

4

c. $\frac{3e}{2} = \frac{3(e+6)}{5}$

$$15e = 6(e+6)$$

$$15e = 6e + 36$$

$$9e = 36$$

$$e = 4$$

(M1) eradicating at least one fraction correctly

(M1) expanding brackets

(M1) isolating terms in e onto one side

(A1)

8. Write this expression as a single fraction: $\frac{k}{m} - \frac{2a}{b}$

2

$$= \frac{kb}{mb} - \frac{2am}{mb}$$

(M1) choosing correct common denominator

$$= \frac{bk - 2am}{bm}$$

(A1) writing as a single fraction

9. Make y the subject of these formulae:

a. $xy - z = 12 + 4y$

$$xy - 4y = 12 + z$$

$$y(x-4) = 12 + z$$

$$y = \frac{12+z}{x-4}$$

(M1) for collecting y terms on one side

(M1) for taking y as a common factor

(A1) for expression in rectangle, oe.

TOTAL 3

b. $D = 3x + \frac{\sqrt{7y}}{k}$

$$D - 3x = \frac{\sqrt{7y}}{k} \quad \text{OR}$$

$$Dk = 3kx + \sqrt{7y}$$

$$k(D - 3x) = \sqrt{7y}$$

$$Dk - 3kx = \sqrt{7y}$$

$$k^2(D - 3x)^2 = 7y$$

$$(Dk - 3kx)^2 = 7y$$

$$y = \frac{k^2(D - 3x)^2}{7}$$

$$y = \frac{(Dk - 3kx)^2}{7}$$

More than one possibility of answer, but in any order:

(M1) for getting rid of $\div k$ fraction

(M1) for isolating $\sqrt{7y}$ on one side

(M1) for squaring both sides correctly

(A1) for one of the solutions in the rectangles or another equivalent expression

TOTAL 4

c. $\frac{m}{n} + \frac{e}{y} = \frac{f}{4}$

$$\frac{4my}{4ny} + \frac{4en}{4ny} = \frac{fny}{4ny}$$

$$\frac{4my + 4en}{4ny} = \frac{fny}{4ny}$$

$$4my + 4en = fny$$

$$4en = fny - 4my$$

$$4en = y(fn - 4m)$$

$$y = \frac{4en}{fn - 4m}$$

$$y = \frac{-4en}{4m - fn}$$

(M1) choosing common denominator

(M1) eradicating fractions

(M1) for collecting y terms on one side

(M1) for taking y as common factor

(A1) for one of solutions in the rectangles or another equivalent expression

TOTAL 5

a likely jump

award

(M2) at this point

10. Simplify $\frac{(g+h)^2 - (g-h)(g+h)}{8}$

$$= \frac{g^2 + 2gh + h^2 - (g^2 - h^2)}{8}$$

$$= \frac{g^2 + 2gh + h^2 - g^2 + h^2}{8}$$

$$= \frac{2h^2 + 2gh}{8}$$

$$= \boxed{\frac{h^2 + gh}{4}}$$

OR $\boxed{\frac{h(h+g)}{4}}$

(M1) for expanding $(g+h)^2$ and getting 3 of 4 terms correct: g^2, gh, gh, h^2

(B1) for correct ending to numerator stated either $-(g^2 - h^2)$ or $-g^2 + h^2$

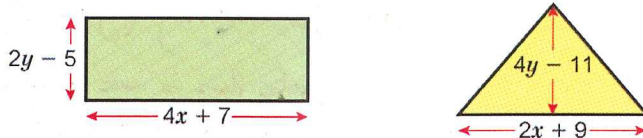
(M1) collecting like terms and simplifying numerator to $2h^2 + 2gh$

(A1) either answer in the rectangles or a simplified equivalent

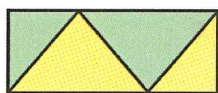
If you've finished, and checked your work, try this challenge.

YOU WILL **NOT** BE MARKED ON THIS SECTION

The diagram shows a rectangle and a triangle.



Carrie makes this pattern using the triangle and the rectangle.



- Write two equations using the information given and solve them to work out the value of x and y .
- Work out the area of the rectangle and the triangle.
- What can you say about the areas of the rectangle and the triangle?

I'm not doing this bit !

It's a snip from the Unit Test 3 in the textbook.

I think it should be a class discussion once you've gone through the test answers 😊