

6. (a) Solve the following equations:

(i) $a - 9\frac{1}{2} = 15$

Answer: $a = \dots\dots\dots$ (1)

(ii) $\frac{2b}{5} = 10$

Answer: $b = \dots\dots\dots$ (1)

(iii) $2c - 4 = 1 - 2c$

Answer: $c = \dots\dots\dots$ (2)

(iv) $\frac{3}{5}(3 - 4d) = 9$

Answer: $d = \dots\dots\dots$ (3)

7. (a) Simplify

(i) $3a^3 + 2a^3$

Answer: (1)

(ii) $3a^3 \times 2a^3$

Answer: (1)

(iii) $\frac{a^6b}{a^2b^4}$

Answer: (2)

(iv) $\frac{(3a^3)^2 + 3a^6}{3a^3}$

Answer: (2)

(b) Factorise completely

$12y^3 - 18y^2$

Answer: (2)

4. (a) Simplify

(i) $2a^2 + 4a^2$

Answer: (1)

(ii) $2b - 4b^2 + 3b$

Answer: (1)

(iii) $3a \times 4a^2b^3$

Answer: (2)

(iv) $\frac{2n^2 + 4n^2}{2n}$

Answer: (2)

(b) Multiply out the bracket and simplify

$10b + 10 - 3(2b + 5)$

Answer: (2)

(c) Factorise completely

$24bc - 36b^2$

Answer: (2)

7. (a) Simplify

(i) $5a^2 - 3a + 4a^2$

Answer: (1)

(ii) $4a^3 \times 3a^2$

Answer: (2)

(iii) $\frac{12a^2 + 8a}{4a}$

Answer: (2)

(b) (i) Multiply out the brackets and simplify

$4(c + 5) - 2(3c + 7)$

Answer: (3)

(ii) Factorise fully

$12g^2 + 18gh$

Answer: (2)

8. (a) Solve the following equations:

(i) $3a = 2$

Answer: $a = \dots\dots\dots$ (1)

(ii) $3(b - 3) = b + 1$

Answer: $b = \dots\dots\dots$ (2)

(iii) $\frac{2c}{3} + \frac{1}{2} = \frac{3}{4}$

Answer: $c = \dots\dots\dots$ (3)

(b) (i) Solve the following inequalities:

(a) $2x - 3 \leq 7$

Answer: $\dots\dots\dots$ (2)

(b) $1 - x < 4$

Answer: $\dots\dots\dots$ (2)

(ii) What is the smallest integer that satisfies both inequalities in parts (a) and (b) above?

Answer: $\dots\dots\dots$ (1)

7. (a) Solve

(i) $\frac{p}{4} = 4$

Answer: $p = \dots\dots\dots$ (1)

(ii) $5q - 3 = 3q - 9$

Answer: $q = \dots\dots\dots$ (2)

(iii) $\frac{2}{3}(2r - 3) = 6$

Answer: $r = \dots\dots\dots$ (3)

(b) Solve the inequalities

(i) $3x - 4 \leq 26$

Answer: $\dots\dots\dots$ (2)

(ii) $17 - 2x < 2$

Answer: $\dots\dots\dots$ (2)

(iii) What are the integer values that satisfy both the inequalities in parts (b) (i) and (ii)?

Answer: $\dots\dots\dots$ (1)

(a) Simplify

4. (a)

(i) $4n^2 - 6n - n^2$

Answer: (1)

(ii) $(3n)^2 \times n^2$

Answer: (2)

(iii) $\frac{12n^2}{20n^3}$

Answer: (2)

(b) Multiply out the brackets and simplify

$4b(2a - 3) - 3a(b + 3)$

Answer: (3)

(b)

c) Factorise completely

$18ac^2 - 12a^2c$

4. (a) Solve the following equations.

(i) $4 - a = -16$

Answer: $a = \dots\dots\dots$ (1)

(ii) $\frac{2}{3}b + 2 = 14$

Answer: $b = \dots\dots\dots$ (2)

(iii) $3(4c + 2) = 10 - 4(c - 2)$

Answer: $c = \dots\dots\dots$ (3)

(b) (i) Solve the inequality $48 - 12d > 3$

Answer: $\dots\dots\dots$ (2)

(ii) List all the positive integers which satisfy the inequality in part (b) (i).

Answer: $\dots\dots\dots$ (1)

8. Multiply out the brackets and simplify

$$3(2p - 5) - 2(p + 4)$$

Answer:

8. (a) Solve the following equations:

(i) $3a = 2$

Answer: $a = \dots\dots\dots$ (1)

(ii) $3(b - 3) = b + 1$

Answer: $b = \dots\dots\dots$ (2)

(iii) $\frac{2c}{3} + \frac{1}{2} = \frac{3}{4}$

Answer: $c = \dots\dots\dots$ (3)

(b) (i) Solve the following inequalities:

(a) $2x - 3 \leq 7$

Answer: $\dots\dots\dots$ (2)

(b) $1 - x < 4$

Answer: $\dots\dots\dots$ (2)

(ii) What is the smallest integer that satisfies both inequalities in parts (a) and (b) above?

5. (a) Solve

(i) $\frac{3a}{4} - 1 = 8$

Answer: $a = \dots\dots\dots$ (2)

(ii) $2(3b + 1) = 6 - 2b$

2n

Answer: $b = \dots\dots\dots$ (3)

(b) Solve

(i) $3x + 5 > -1$

Answer: $\dots\dots\dots$ (2)

(ii) $1 \leq 7 - 2x$

Answer: $\dots\dots\dots$ (2)

(iii) What are the smallest and largest integers which satisfy both the inequalities above?

7. (a) Solve the following equations:

(i) $\frac{x}{4} - 7 = 5$

Answer: $x = \dots\dots\dots$ (

(ii) $5y + 20 = 3(y + 4)$

Answer: $y = \dots\dots\dots$ (

(b) (i) Solve the inequality
 $2n + 5 > 13 + 6n$

Answer: $\dots\dots\dots$ |

(ii) Write down the largest integer which satisfies your answer to (b) (i).

6. (a) Multiply out and simplify

$$5(2a + b) - 2(a - 4b)$$

)

Answer: (2)

(b) Factorise fully $12c^3 + 4c^2$

Answer: (2)

(c) Simplify $\frac{6d + d^2}{2d}$

6. Simplify

(i) $4x^3 + 3x^3 - x^3$

Answer: (1)

(ii) $4x^3 \times 3x^4$

Answer: (2)

(iii) $(2x^2)^4$

Answer: (2)

(iv) $\frac{8x^3}{6x^6}$

6. (a) Simplify

(i) $3b^4 \times 2b$

Answer: $6b^5$ (2)

(ii) $\frac{6c^3}{9c^6}$

Answer: $\frac{2}{3c^3}$ (2)

(iii) $\frac{8d^3 + 4d^3}{12}$

$\frac{12d^3}{12}$

Answer: d^3 (2)

(b) Remove the brackets and simplify

$3(3p - 2q) - 4(p + 2q)$

$9p - 6q - 4p - 8q$

Answer: $5p - 14q$ (3)

(c) Factorise completely

$8x^8 + 2x^2$

$2x^2(4x^6 + 1)$

Answer: $2x^2(4x^6 + 1)$ (2)

7. (a) Solve the following equations:

(i) $\frac{d+2}{5} = 10$

Answer: $d = \dots\dots\dots$ (1)

(ii) $\frac{2}{3}e - 5 = 7$

Answer: $e = \dots\dots\dots$ (2)

(iii) $11 - 4f = 2(3f - 2)$

Answer: $f = \dots\dots\dots$ (3)

(b) (i) Solve the inequality $10 - 3g < 4$

Answer: $\dots\dots\dots$ (2)

(ii) What is the smallest even number which satisfies the inequality in part (b) (i)?

9. (a) Solve the following equations:

(i) $2a - 3 = 4$

Answer: $a = \dots\dots\dots$ (1)

(ii) $5b + 7 = 2b - 8$

Answer: $b = \dots\dots\dots$ (2)

(iii) $\frac{2}{5}(2c+1) = 10$

Answer: $c = \dots\dots\dots$ (3)

(b) (i) Solve the following inequalities:

(a) $3d + 2 \geq 6 - d$

Answer: $\dots\dots\dots$ (2)

(b) $4(d - 2) < 28$

Answer: $\dots\dots\dots$ (2)

6. (a) Simplify

(i) $3a^2 - 7a + 2a - 5a^2$

Answer: (2)

(ii) $(3a^2b^3)^3$

Answer: (2)

(iii) $\frac{18c^6}{12c^2}$

Answer: (2)

(b) Multiply out

$2d^3(d^3 - 3)$

Answer: (2)

6. Simplify

(i) $4x^3 + 3x^3 - x^3$

Answer: (1)

(ii) $4x^3 \times 3x^4$

Answer: (2)

(iii) $(2x^2)^4$

Answer: (2)

(iv) $\frac{8x^3}{6x^6}$

6. (a) Solve the following equations:

(i) $2(a - 5) = -7$

Answer: $a = \dots\dots\dots$ (2)

(ii) $\frac{2b}{3} + 1 = 13$

Answer: $b = \dots\dots\dots$ (2)

(b) Solve the following inequalities:

(i) $c^3 \leq 64$

Answer: $\dots\dots\dots$ (1)

(ii) $3 - 2c < 11$

Answer: $\dots\dots\dots$ (2)

(iii) What is the largest prime number value of c which satisfies both parts (b) (i) and (b) (ii)?

6. (a) Simplify

(i) $3b^4 \times 2b$

Answer: (2)

(ii) $\frac{6c^3}{9c^6}$

Answer: (2)

(iii) $\frac{8d^3 + 4d^3}{12}$

Answer: (2)

(b) Remove the brackets and simplify

$3(3p - 2q) - 4(p + 2q)$

Answer: (3)

(c) Factorise completely

$8x^8 + 2x^2$

5. (a) Simplify

(i) $3y^3 + 3y^3$

Answer: (1)

(ii) $3y^3 \times 3y^3$

Answer: (2)

(iii) $\frac{6y^3}{3y^6}$

Answer: (2)

(b) Multiply out the brackets and simplify

$2(3p - 4q) - 5(p + 2q)$

Answer: (3)

(c) Factorise completely

$16a^2 + 20a$

6. (a) Solve

(i) $5a + 3 = 21 - a$

Answer: $a = \dots\dots\dots$ (2)

(ii) $\frac{2}{3}(b + 1) = 10$

Answer: $b = \dots\dots\dots$ (2)

(b) (i) Solve these inequalities

(a) $2n + 1 > 8 - 1$

Answer: $\dots\dots\dots$ (2)

(b) $2(n - 3) \leq 6$

Answer: $\dots\dots\dots$ (2)

(ii) Write down the integers that satisfy both inequalities in part (b)(i).



(ii) $5b + 7 = 2b - 8$

Answer: $b = \dots\dots\dots$ (2)

(iii) $\frac{2}{5}(2c+1) = 10$

Answer: $c = \dots\dots\dots$ (3)

(b) (i) Solve the following inequalities:

(a) $3d + 2 \geq 6 - d$

Answer: $\dots\dots\dots$ (2)

(b) $4(d - 2) < 28$



6. (a) Multiply out the bracket and simplify

$$5q - 3(4r + q) - 7r$$

(0 2)

Answer: (2)

(b) Simplify

$$\frac{8s^4 - 12s^2}{4s^2}$$

Answer: (2)

(c) Factorise completely

$$8t^2 + 24t$$

Answer: (2)



8. (a) Solve the following equations:

(i) $9 - x = 3 - 5x$

Answer: $x = \dots\dots\dots$ (2)

(ii) $\frac{1}{2}(7y + 1) - 3 = 8$

Answer: $y = \dots\dots\dots$ (3)

(b) Solve the following inequalities:

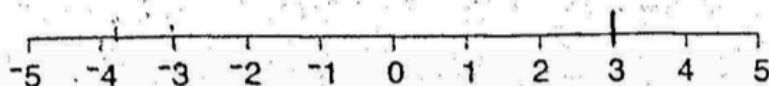
(i) $\frac{3z}{2} > -6$

Answer: $\dots\dots\dots$ (1)

(ii) $7 - 2z \geq 1$

Answer: $\dots\dots\dots$ (2)

(iii) Show the range of values which z can have on the number line below.



(2)



(iii) $(3c^3)^3$

Answer: (2)

(iv) $\frac{6d^6 - 3d^6}{12}$

Answer: (2)

10. (a) Factorise completely
 $8x^3y - 16x^2$

Answer: (2)

(b) Multiply out the bracket and simplify
 $7b - 3(3a - b) - 2a$

Answer: (3)



7. (a) Solve

(i) $\frac{p}{4} = 4$

Answer: $p = \dots\dots\dots$ (1)

(ii) $5q - 3 = 3q - 9$

Answer: $q = \dots\dots\dots$ (2)

(iii) $\frac{2}{3}(2r - 3) = 6$

Answer: $r = \dots\dots\dots$ (3)

(b) Solve the inequalities

(i) $3x - 4 \leq 26$

Answer: $\dots\dots\dots$ (2)

(ii) $17 - 2x < 2$

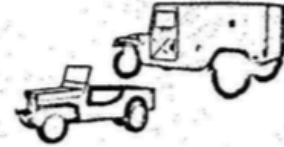
Answer: $\dots\dots\dots$ (2)

(iii) What are the integer values that satisfy both the inequalities in parts (b) (i) and (ii)?

Answer: $\dots\dots\dots$ (1)



13. The *Hippo* and the *Rhino* are two types of armoured personnel carriers. The *Hippo* can carry h soldiers and the *Rhino* can carry r soldiers.



- (a) (i) 14 soldiers fill 1 *Hippo* and 1 *Rhino*.
Write down this information in terms of h and r .

Answer: (1)

- (ii) Write down the value of $3h + 3r$

Answer: $3h + 3r =$ (1)

- (iii) 54 soldiers fill 3 *Hippos* and 5 *Rhinos*.
Write down this information in terms of h and r .

Answer: (1)

- (iv) Showing your working, solve a pair of simultaneous equations to find the values of h and r .

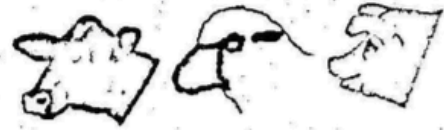
Answer: $h =$

$r =$ (3)

TURN OVER FOR THE REST OF QUESTION 13



11. At Brockfield Farm there are x cows.
There are twice as many sheep as there are cows.



(i) How many sheep are there in terms of x ?

Answer: (1)

The number of pigs is 6 less than the number of sheep.

(ii) How many pigs are there in terms of x ?

Answer: (1)

(iii) Write down an expression, in terms of x , for the total number of cows, sheep and pigs.
Simplify your answer.

Answer: (2)

There are 54 animals on the farm, all either cows, sheep or pigs.

(iv) Form an equation, in terms of x , to show this and solve it.

Answer: $x =$ (2)

(v) How many pigs are there on the farm?

Answer: (1)



14. Simon thinks of two numbers. The first number is x and the second number is y .
When he doubles the first number and subtracts the second number the answer is $5\frac{1}{2}$

(i) Write down an equation, in terms of x and y , to show this.

Answer: (1)

When he doubles the second number and subtracts the first number the answer is 1

(ii) Write down an equation, in terms of x and y , to show this.

Answer: (1)

(iii) Solve the equations and hence find Simon's original numbers.

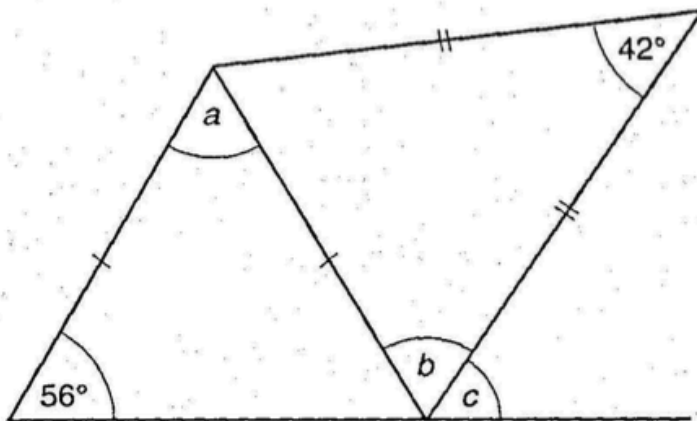
Answer: $x = \dots\dots\dots$ and $y = \dots\dots\dots$ (4)



(b) Multiply out the brackets and simplify
 $3(2a - b) - 2(2b + a)$

Answer: (3)

7.



not to scale

Calculate the size of each of the angles marked a , b and c .

Answer: $a =$ (2)

$b =$ (2)

$c =$ (1)

22. a) Find the values of a and b when $p = 10$.

$$a = \frac{3p^3}{2} \qquad b = \frac{2p^2(p-3)}{7p}$$

$$a = \dots\dots\dots$$

1 mark

$$b = \dots\dots\dots$$

1 mark

b) Simplify this expression as fully as possible:

$$\frac{3cd^2}{5cd}$$