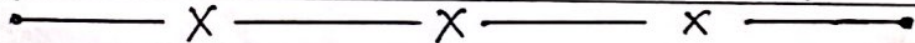


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Q1. Expand the brackets and simplify.

$$4(5w+3) - 2(w-1)$$

M-17/22/Q1 --- [2]

Q2 Find the value of s , when $u=2$ and $t=3$; $s = ut + 16t^2$ --- [2]

M-17/22/Q5

Q3 Factorise completely.

(a) $15c^2 - 5c$ --- [2]

(b) $2kp - km + 6p - 3m$ --- [2]

M-17/22/Q13

Q4 Factorise completely. $12n^2 - 4mn$ --- [2]

S-17/21/Q5

Q5 Write as a single fraction in its simplest form.

(a) $\frac{x^2 - 3x}{x^2 - 9}$ --- [3]

(b) $\frac{3}{x-4} + \frac{2}{2x+5}$ --- [3]

S-17/21/Q22

Q6 Factorise. $14x - 21y$ --- [1]

S-17/22/Q6

Q7 Find the value of $5a - 3b$ when $a=7$ and $b=-2$ --- [2]

S-17/22/Q7

Q8 Solve: $2 - x = 5x + 1$ --- [2]

S-17/22/Q10

Q9 Solve the inequality. $3x - 11 > 5x - 18$ --- [2]

S-17/22/Q13

Q10 Make q the subject of the formula. $p = 2q^2$ --- [2]

S-17/22/Q15

Q11 Write as a single fraction in its simplest form. --- [3]

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

S-17/22/Q20

Factorise completely:

Q12. (a) $q^2 - u^2$ --- [2]

S-17/22/Q22

(b) $2c - 4d - pc + 2pd$ --- [2]

S-17/22/Q23

Q13 Factorise completely. $4x^2 - 8xy$ --- [2]

S-17/23/Q2

Q14 Make a the subject of the formula. $x = y + \sqrt{a}$ --- [2]

S-17/23/Q4

Q15 (a) Solve the inequality. $x + 13 \geq 3x + 7$ --- [2]

S-17/23/Q16

(b) List the positive integers that satisfy the inequality in part (a). --- [1]

S-17/23/Q16

Q16 Solve the equation $5x^2 + 10x + 2 = 0$
 show all your working and give your answer correct to 2 decimal places. [S-17/23/Q8]

Q17 (a) Simplify. $\frac{4(x-6)^2}{(x-6)}$ ---[1] [S-17/23/Q23]

(b) Expand the brackets and simplify. $(x+4)^2 + 5(3x+2)$ ---[3]

Q18 Factorise completely. $12x^2 + 15xy - 9x$ ---[2] [W-17/21/Q5]

Q19 Write as a single fraction in its simplest form:
 $\frac{5}{x-3} + \frac{3}{x+7} + \frac{1}{2}$ ---[4] [W-17/21/Q19]

Q20 Expand the brackets and simplify. $(5-n)(3+n)$ ---[2] [W-17/22/Q12]

Q21 Find the integers which satisfy the inequality $-5 < 2n - 1 \leq 5$ ---[3] [W-17/22/Q14]

Q22 Write as a single fraction in its simplest form: $\frac{x+1}{x} - \frac{y-1}{y}$ ---[3] [W-17/22/Q15]

Q23 Solve the simultaneous equations:
 You must show all your working. $y = x/2$
 $2x - y = 1$ ---[3] [W-17/22/Q18]

Q24 Make x the subject of the formula, $y = \sqrt{x^2 + 1}$ ---[3] [W-17/22/Q19]

Q25 Solve the equations. (a) $7 - 3n = 11n + 2$ ---[2]
 (b) $\frac{p-3}{5} = 3$ ---[2] [W-17/22/Q24]

Q26 Factorise completely. (a) $x^2 - x - 132$ ---[2]
 (b) $x^3 - 4x$ ---[2] [W-17/22/Q25]

Q27 Factorise completely. $18x + 27y$ ---[1] [W-17/23/Q5]

Q28 Solve the inequality. $7 - 8x \geq 19 + 2x$ ---[2] [W-17/23/Q9]

Q29 Solve by factorising. $3x^2 - 7x - 20 = 0$ ---[3] [W-17/23/Q14]

Q30 Make x the subject of $3m + xy = \frac{xp}{4}$ ---[4] [W-17/23/Q16]

Q31 Solve. $(x-7)(x+4) = 0$ ---[1] [M-16/22/Q1]

- Q32 Factorise $2x - 4xy$ [M-16/22/Q22] --- [2]
- Q33 Solve the inequality, $6n + 3 > 8n$ [M-16/22/Q24] --- [2]
- Q34 Solve the equation, $3x^2 - 11x + 4 = 0$, show all your working and give your answers correct to 2 decimal places. [M-16/22/Q17] (4)
- Q35 $y = \frac{qx}{p}$, write x in terms of p, q and y . [S-16/21/Q8] -- [2]
- Q36 Solve the inequality, $n + 7 < 5n - 8$ [S-16/21/Q13] -- [2]
- Q37 Factorise completely: (a) $2a + 4 + ap + 2p$ --- [2]
(b) $16z - 8t^2$ [S-16/21/Q24] [2]
- Q38 Solve the inequality, $\frac{x}{3} + 5 > 2$ [S-16/22/Q8] -- [2]
- Q39 Make p the subject of the formula.
 $2p + 5 = 3p + 8z$ [S-16/22/Q10] - [3]
- Q40 $y = x^2 + 7x - 5$ can be written in the form $y = (x+a)^2 + b$
Find the value of a and the value of b . [S-16/22/Q15] -- [3]
- Q41 Solve the simultaneous equations, $3x + 4y = 14$
Show all your working. $5x + 2y = 21$ [S-16/22/Q16] [3]
- Q42 Solve the equation, $6(y+1) = 9$ [S-16/23/Q4] --- [2]
- Q43 Simplify, $\frac{x^3y + 2xy^3}{x^2y^2}$ [W-16/21/Q7] -- (2)
- Q44 Write as a single fraction, $1 - \frac{2}{p} - \frac{3}{t}$ [W-16/21/Q8] -- [2]
- Q45 Solve the simultaneous equations:
You must show all your working. $2x + 3y = 13$
 $x + 2y = 9$ [W-16/21/Q11] --- [3]
- Q46 Factorise completely. (a) $4p^2 - 9$ [W-16/21/Q13] --- [1]
(b) $2ax - 4bx - ay + 2by$ --- [2]
- Q47 $y = p^2 + qz$ (a) Find y when $p = -5, q = 3$ and $z = -7$. --- [2]
(b) Write p in terms of q, z and y . --- [2]
- Q48 Solve the equation, $2x^2 + 3x - 3 = 0$
Show all your working and give your answers correct to 2 decimal places. [W-16/21/Q18] --- [4]
[W-16/21/Q23]

Q49 Solve the equation. $6(k-8) = 78$ [W-16/22/Q3] ... [2]

Q50 Find the positive integers that satisfy the inequality. $t+2 > 3t-6$... [3]

Q51 Solve the simultaneous equations $\frac{1}{2}x + y = 8$
 $x - 2y = 2$ [W-16/22/Q7] [W-16/22/Q8] ... [3]

Q52 Factorise: (a) $m^3 + m$... [1]

(b) $25 - y^2$... [1]

(c) $x^2 + 3x - 28$ [W-16/22/Q13] ... [2]

Q53 $V = 4p^2$, Find V when $p = 3$. [W-16/23/Q1] ... [1]

Q54 Simplify. $\frac{42np - 7n}{12pt - 2t + 18mp - 3m}$ [W-16/23/Q23] ... [4]

Q55 Factorise $14p^2 + 21pq$ [M-15/22/Q4] ... [2]

Q56 Pavan saves \$ x each month. His two brothers each save \$4 more than Pavan each month.

Altogether the three boys save \$26 each month.

(a) Write down an equation in x . [M-15/22/Q10] ... [1]

(b) Solve your equation to find the amount Pavan saves each month. ... [2]

Q57 Solve the simultaneous equations. $\frac{1}{2}x - 8y = 1$
 $x + 2y = 6\frac{1}{2}$ [M-15/22/Q11] ... [3]

You must show all your working

Q58 Expand and simplify. $x(2x+3) + 5(x-7)$ [S-15/21/Q4] ... [2]

Q59 Solve the simultaneous equation. $5x + 2y = -2$
 $3x - 5y = 17.4$ [S-15/21/Q18] ... [2]

You must show all your working.

Q60 Factorise completely. (a) $yp + yt + 2xp + 2xt$... [2]

(b) $7(k+h)^2 - 21(k+h)$ [S-15/21/Q20] ... [2]

Q61 Solve. $5(w + 4 \times 10^3) = 6 \times 10^4$ [S-15/22/Q6] ... [2]

Q62 Write as a single fraction in its simplest form. $\frac{3}{x+2} - \frac{4}{2x-5}$ [S-15/22/Q15] ... [3]

Q63 $f(x) = x^2 + 4x - 6$
(a) $f(x)$ can be written in the form $(x+m)^2 + n$
Find the value of m and the value of n [2]

(b) Use your answer to part (a) to find the positive solution to $x^2 + 4x - 6 = 0$ [S-15/22/Q21] ... [2]

Q64 Factorise completely. $9x^2 - 6x$ [S-15/23/Q2] ... [2]

- Q65 Factorise. $2x^2 - 5x - 3$ [S-15/23/Q5] --- [2]
- Q66 Solve the equation. $3(x+4) = 2(4x+1)$ [S-15/23/Q9] --- [3]
- Q67 Solve the equation. $2x^2 + x - 2 = 0$, show your working --- [4]
and give your answers correct to 2 decimal places. [S-15/23/Q14]
- Q68 Factorise completely. (a) $ax + ay + 3cx + 3cy$ --- [2]
(b) $3a^2 - 12b^2$ [W-15/21/Q9] --- [3]
- Q69 Make x the subject of the formula, $y = ax^2 + b$ [W-15/21/Q13] --- [3]
- Q70 Simplify. $\frac{x^2 - 16}{x^2 - 3x - 4}$ --- [4] [W-15/21/Q15]
- Q71 Factorise: (a) $9w^2 - 100$ --- [1]
(b) $mp + np - 6mq - 6nq$ [W-15/22/Q15] --- [2]
- Q72 Solve the equation. $5x^2 - 6x - 3 = 0$, show all your working and give your answers correct to 2 decimal places. [W-15/22/Q19] --- [4]
- Q73 Simplify $1 - 2u + u + 4$ [W-15/23/Q6] --- [2]
- Q74 Factorise completely. $2x - 4x^2$ [W-15/23/Q7] --- [2]
- Q75 Write the following as single fraction. (a) $x + \frac{x}{2}$ --- [1]
[W-15/23/Q11] (b) $x + \frac{2}{x}$ --- [1]
- Q76 Make a the subject of the formula. $s = ut + \frac{1}{2}at^2$ --- [3] [W-15/23/Q16]
- Q77 Solve the equation. $3x^2 + 4x - 5 = 0$. show all your working --- [4]
and give your answers correct to 2 decimal places. [W-15/23/Q21]
- Q78 Simplify. $\frac{4 + 10w}{8 - 50w^2}$ [W-15/23/Q2] --- [4]
- Q79 $y = \frac{2}{x^2} + \frac{x^2}{2}$. Find the value of y when $x = 6$. Give your answer as a mixed number in its simplest form. [S-14/21/Q2] --- [2]
- Q80 Solve the equation. $\frac{n-8}{2} = 11$ [S-14/21/Q3] --- [2]
- Q81 Make x the subject of the formula $y = (x-4)^2 + 6$ [S-14/21/Q7] --- [3]
- Q82 Write as a single fraction in its simplest form. $\frac{2}{x} - \frac{2}{x+1}$ --- [3] [S-14/21/Q8]
- Q83 Factorise completely.
(a) $ax + ay + bx + by$ --- [2]
(b) $3(x-1)^2 + (x-1)$ [S-14/21/Q10] --- [2]

Q84 Solve the inequality for positive integer values of x . ---[4]

$$\frac{21+x}{5} > x+1 \quad \boxed{S-14/21/Q15}$$

Q85 Solve the simultaneous equations $2x-y=7$ ---[2]

$$3x+y=3 \quad \boxed{S-14/22/Q3}$$

Q86 $V = \frac{1}{3}Ah$ (a) Find V when $A=15$ and $h=7$ ---[1]

(b) Make h the subject of the formula. ---[2]

Q87 Solve the equation. $\frac{3}{2x} + \frac{1}{x+1} = 0$ ---[3]

$$\boxed{S-14/22/Q12}$$

Q88 Factorise Completely. (a) $4p^2q - 6q^2p$, ---[2]

(b) $u+4t+4x+4tx$ ---[2]

Q89 Simplify. $\frac{x^2+6x-7}{3x+21}$ ---[4]

$$\boxed{S-14/22/Q19}$$

Q90 Factorise Completely. $15a^3 - 5ab$ ---[2]

$$\boxed{S-14/23/Q4}$$

Q91 Solve the inequality. $5t+23 < 17-2t$ ---[2]

$$\boxed{S-14/23/Q9}$$

Q92 (a) Factorise $3x^2+2x-8$ ---[2]

(b) Solve the equation. $3x^2+2x-8=0$ ---[1]

$$\boxed{S-14/23/Q12}$$

Q93 Robbie pays \$10.80 when he buys 3 notebooks and 4 pencils.

Poniz pays \$14.50 when she buys 5 notebooks and 2 pencils. ---[5]

Write down simultaneous equations and use them to find the cost of a notebook and the cost of a pencil.

$$\boxed{S-14/23/Q19}$$

Q94 Solve the equation. $\frac{x+5}{x} = \frac{7}{3}$ ---[3]

$$\boxed{W-14/21/Q10}$$

Q95 Solve the simultaneous equations. $0.4x - 5y = 27$ ---[3]

$$2x + 0.2y = 9 \quad \boxed{W-14/21/Q12}$$

Q96 Make x the subject of this formula. $v = \sqrt[3]{p+x}$ ---[2]

$$\boxed{W-14/22/Q5}$$

Q97 (a) Write as a single fraction in its simplest form. $\frac{3}{2x-1} - \frac{1}{x+2}$ ---[3]

(b) Simplify. $\frac{4x^2-16x}{2x^2+6x-56}$ ---[4]

$$\boxed{W-14/22/Q21}$$

Q98 Solve the equation. $\frac{2x+5}{3} = 8$ ---[3]

$$\boxed{W-14/23/Q6}$$

Q99 Make x the subject of the formula. $y = 2 + \sqrt{x-8}$ ---[3]

$$\boxed{W-14/23/Q8}$$

Q100 Write as a single fraction, in its simplest form: $\frac{3}{2x} + \frac{2x}{3} + \frac{3+2x}{3}$ ---[4]

$$\boxed{W-14/23/Q13}$$

- Q101 Factorise Completely. $12x^4 - 3x^2$ [S-13/21/Q6] ---[2]
- Q102 Solve the inequality. $3x - 1 \leq 11x + 2$ [S-13/21/Q8] ---[2]
- Q103 Factorise Completely. $ap + bp - 2a - 2b$ [S-13/21/Q10] ---[2]
- Q104 (a) Factorise. $x^2 + x - 30$ ---[2]
 (b) Simplify. $\frac{(x-5)(x+4)}{x^2 + x - 30}$ [S-13/21/Q18] ---[1]
- Q105 Write a single fraction in its simplest form, $\frac{2}{x+3} + \frac{3}{x+2}$ [S-13/21/Q22] ---[3]
- Q106 Factorise Completely. $kp + 3k + mp + 3m$ [S-13/22/Q2] ---[2]
- Q107 Solve the equation. $5(2y - 17) = 60$ [S-13/22/Q12] ---[3]
- Q108 Use the quadratic equation formula to solve. $2x^2 + 7x - 3 = 0$ ---[4]
 Show all your working and give your answers correct to 2 decimal places. [S-13/22/Q15]
- Q109 Solve $6x + 3 < x < 3x + 9$ for integer values of x , [S-13/22/Q18] ---[4]
- Q110 Find the value of $2x + y$ for the simultaneous equations.
 $3x + 5y = 48$ ---[4]
 $2x - y = 19$ [S-13/23/Q10]
- Q111 Write as a single fraction in its simplest form. $\frac{x+3}{x-3} - \frac{x-1}{x+1}$ [S-13/23/Q13] ---[4]
- Q112 (a) Solve. $3n + 23 < n + 41$ ---[2]
 (b) Factorise completely. $ab + bc + ad + cd$ [S-13/23/Q14] ---[2]
- Q113 (a) $y = \sqrt{8 + \frac{4}{x}}$, Find y when $x = 2$
 give your answer correct to 4 decimal places. ---[2]
 (b) Rearrange $y = \sqrt{8 + \frac{4}{x}}$ to make x the subject. [S-13/23/Q20] ---[4]
- Q114 Solve the equation. $5 - 2x = 3x - 19$ [W-13/21/Q5] ---[2]
- Q115 Make b the subject of the formula $c = \sqrt{a^2 + b^2}$ [W-13/21/Q10] ---[3]
- Q116 Write as a single fraction in its simplest form. $3 - \frac{t+2}{t-1}$ ---[3]
 [W-13/21/Q14]
- Q117 Factorise completely. (a) $a + b + at + bt$ ---[2]
 (b) $x^2 - 2x - 24$ ---[2] [W-13/21/Q17]
- Q118 Rearrange the formula to make x the subject.
 $y = x^2 + 4$ [W-13/22/Q6] ---[2]
- Q119 Find the co-ordinates of the point of intersection of the two lines.
 $2x - 7y = 2$
 $4x + 5y = 42$ ---[3]
 [W-13/22/Q15]

- Q120 Solve the inequality: $\frac{x}{2} + \frac{x-2}{3} < 5$ [W-13/20/Q16] ---[4]
- Q121 Solve the equation. $1 + 2x = -15$. [W-13/23/Q3] ---[2]
- Q122 The solutions of the equation $x^2 - 6x + d = 0$ are both integers. d is a prime number. Find d . [W-13/23/Q7] ---[3]
- Q123 (a) Expand and simplify. $(a+b)^2$ ---[2]
(b) Find the value of $a^2 + b^2$ when $a+b=6$ and $ab=7$ ---[1]
- [W-13/23/Q9]
- Q124 Solve the simultaneous equations. $y = 5x^2 + 4x - 19$ ---[5]
 $y = 4x + 1$ [SP-20/02/Q28]
- Q125 Solve the inequality $x + 7 < 5x - 8$ --- [2] [SP-20/02/Q13]
- Q126 Rearrange the formula: $5w - 3y + 7 = 0$ --- [2]
to make w the subject, [SP-20/02/Q9]
- Q127 $y = mx + c$, Find the value of y when $m = -2$, $x = -7$ and $c = -3$ [SP-20/02/Q5] - [2]

Q1 Work out. (a) $t^{24} \div t^4$ --- [1]
 (b) $(x^5)^2$ --- [1]
 (c) $(81m^8)^{3/4}$ --- [2]

Q2 (a) $2^2 = \frac{1}{16}$; Find the value of 2 . --- [1]
 (b) $3^t = 5\sqrt{3}$, find the value of t . --- [1]

Q3 (a) Simplify. $(16x16)^{3/4}$ --- [2]
 (b) $2p^{3/2} = 54$ Find the value of p . --- [2]

Q4 Simplify. $(\frac{8}{a^{12}})^{1/3}$ --- [2]

Q5 Simplify. (a) $6w^0$ --- [1]
 (b) $5x^3 - 3x^3$ --- [1]
 (c) $3y^6 \times 5y^{-2}$ --- [2]

Q6 Simplify. (a) $(m^5)^2$ --- [1]
 (b) $4x^3y \times 5x^2y$ --- [2]

Q7 Simplify. (a) $81^{3/4}$ --- [1]
 (b) $x^{7/3} \div x^{-4/3}$ --- [1]
 (c) $(\frac{8}{y^6})^{-1/3}$ --- [2]

Q8 Simplify. (a) $x^3y^4 \times x^5y^3$ --- [2]
 (b) $(3p^2m^5)^3$ --- [2]

Q9 Simplify. $(16p^{16})^{1/4}$ --- [2]

Q10 Simplify: $(\frac{1}{2}x^{2/3})^3$ --- [2]

Q11 Simplify: $(32x^{10})^{3/5}$ --- [2]

Q12 Simplify. $(36x^{16})^{1/2}$ --- [2]

Q13 Simplify. $36y^5 \div 4y^2$ --- [2]

Q14 Simplify. $n^2 \times n^5$ --- [1]

Q15 (a) Simplify: (i) x^0 ---[1]

(ii) $m^4 \times m^3$ ---[1]

(iii) $(8p6)^{1/3}$ ---[2]

(b) $243^x = 3^2$, Find the value of x . M-15/22/21 ---[2]

Q16 Simplify. $64W^{-3} \times 4W^6$ S-15/21/27 ---[2]

Q17 $81^x = 3$, find the value of x . S-15/22/23 ---[1]

Q18 Simplify. (a) $12x^{12} \div 3x^3$ ---[2]

(b) $(256y^{256})^{1/8}$ S-15/23/23 ---[2]

Q19 Simplify. $\left(\frac{x^{64}}{16y^{16}}\right)^{1/4}$ W-15/23/27 ---[3]

Q20 $p = 4 \times 10^5$ $q = 5 \times 10^4$

Find giving your answer in standard form.

(a) pq ---[2]

(b) q/p S-14/21/22 ---[2]

Q21 (a) $(2^{24})^{1/2} = p^4$, find the value of p . ---[2]

(b) Simplify $\frac{q^2 + q^2}{q^{1/4} \times q^{1/4}}$ S-14/21/26 ---[3]

Q22 (a) Simplify $(3125t^{125})^{1/5}$ ---[2]

(b) Find the value of p when $3^p = 1/9$ S-14/22/27 ---[1]

(c) Find the value of n when $x^{72} \div x^n = x^8$ ---[1]

Q23 Simplify. $3x^2y^3 \times x^4y$ S-14/23/26 ---[2]

Q24 Simplify. (a) $x^8 \div x^2$ ---[1]

(b) $\left(\frac{x^6}{27}\right)^{1/3}$ W-14/21/21 ---[2]

Q25 Write $(27x^{12})^{1/3}$ in its simplest form. S-13/21/21 ---[2]

Q26 (a) $3^x = 4\sqrt{35}$ Find the value of x . ---[1]

(b) Simplify $(32y^{15})^{2/5}$ W-13/21/23 ---[2]

Q27 (a) Simplify $(64q^{-2})^{1/2}$ ---[2]

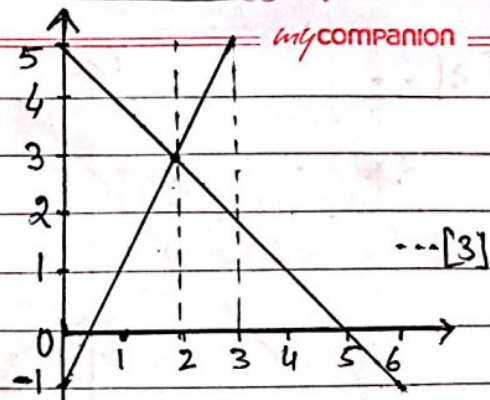
(b) $5^7 \div 5^9 = p^2$ find p . W-13/23/24 ---[2]

Graph of Linear Inequalities

Exercise

Q1. By shading the unwanted regions of the grid, find and label the region R that satisfies the following four inequalities.

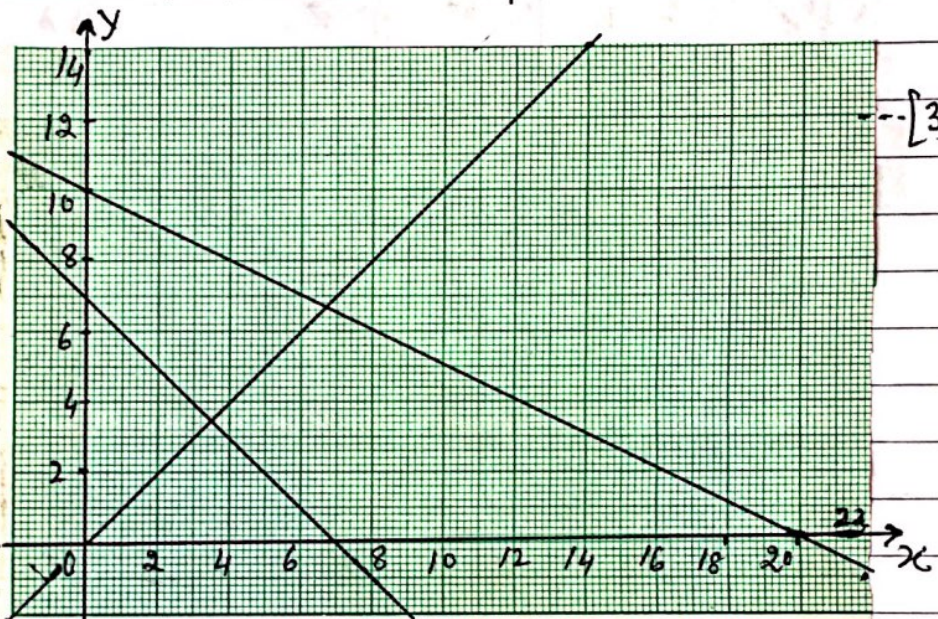
$y \leq 2, y \geq 1, y \leq 2x-1, y \leq 5-x$



S-17/21/Q10

Q2. By shading the unwanted regions of the grid above, find and label the region R that satisfies the following four inequalities:

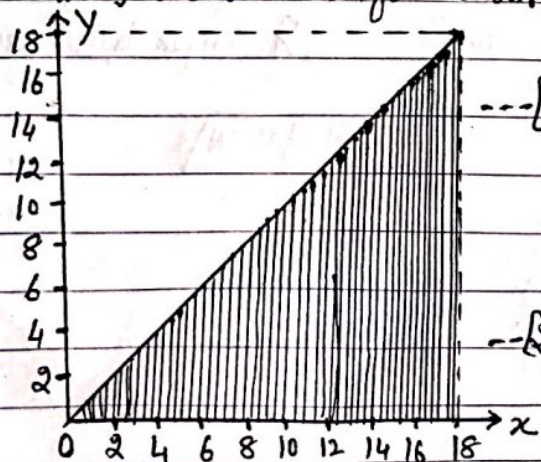
$x \geq 0, x+y \geq 7, y \geq x, x+2y \leq 20$



S-17/23/Q11

Q3. In one week, Neha spends x hours cooking and y hours cleaning. The time she spends cleaning is at least equal to the time she spends cooking. This can be written as $y \geq x$. She spends no more than 16 hours in total cooking and cleaning. She spends at least 4 hours cooking.

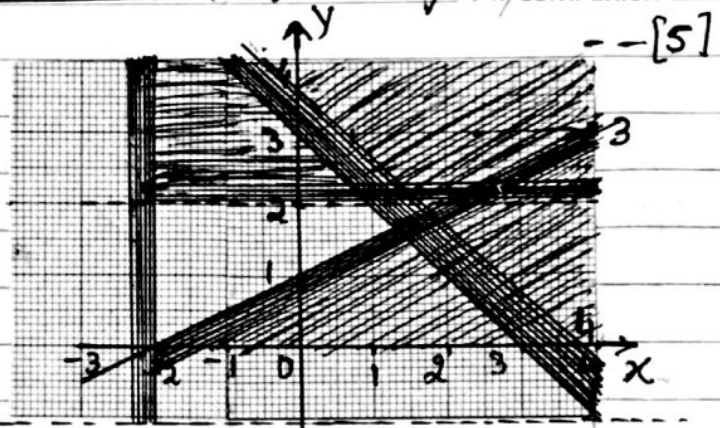
- (a) Write down two more inequalities in x and/or y to show this information. [2]
- (b) Complete the diagram to show the three inequalities. Shade the unwanted regions. [3]
- (c) Neha receives \$10 for each hour she spends cooking and \$8 for each hour she spends cleaning. Work out the largest amount she could receive. [3]



W-17/21/23

Graph of Linear Inequation and Linear Programming Problems

Q4 Find the four inequalities that define the region that is **not** shaded.



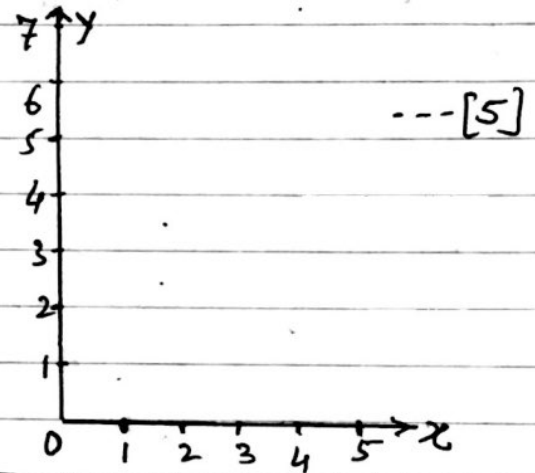
M-16/22/Q19

Q5

The region R satisfies these inequalities.
 $y \leq 2x$, $3x + 4y \geq 12$, $x \leq 3$

On the grid, draw and label the region R that satisfies these inequalities.

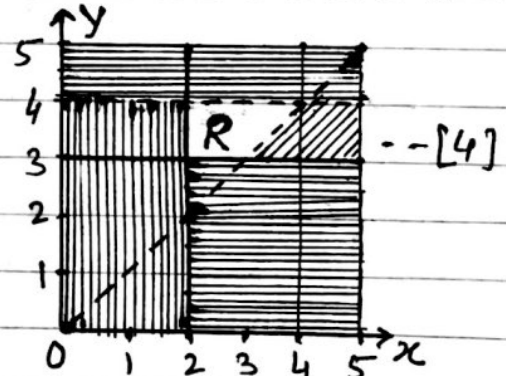
Shade the unwanted region.



S-16/23/Q23

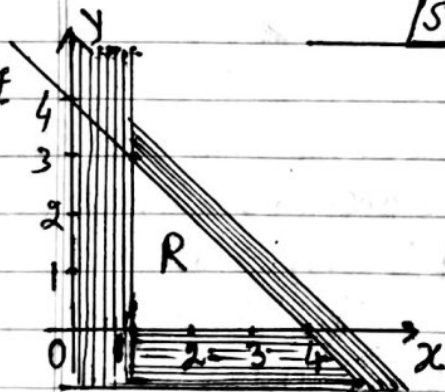
Q6

Find four inequalities that define the region, R, on the grid.



S-16/23/Q20

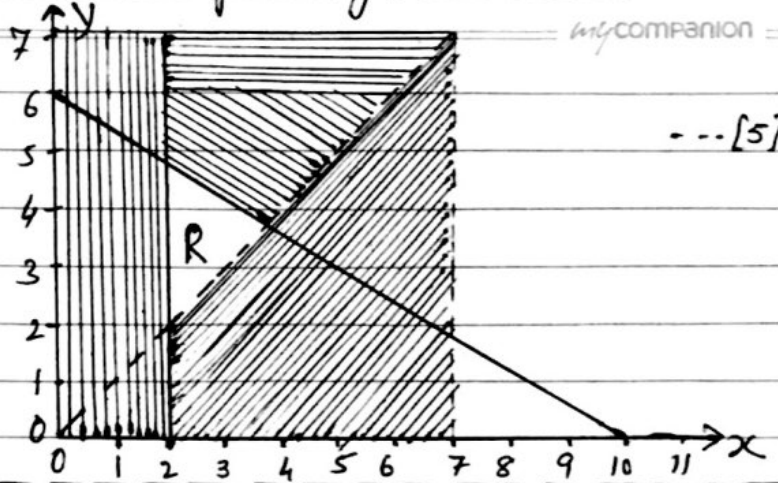
Q7



write down the three inequalities that define the unshaded region, R. ---[4]

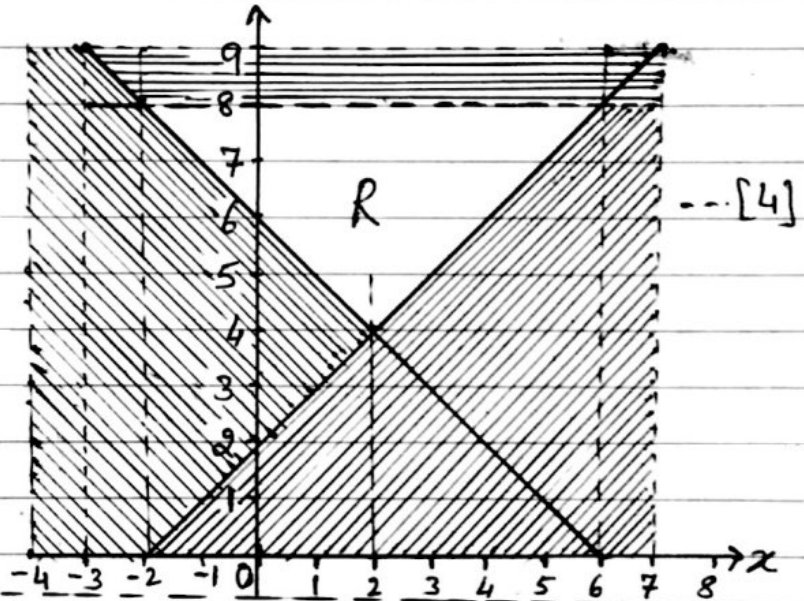
W-16/21/Q21

Q8 Find the three inequalities that define the unshaded region R.



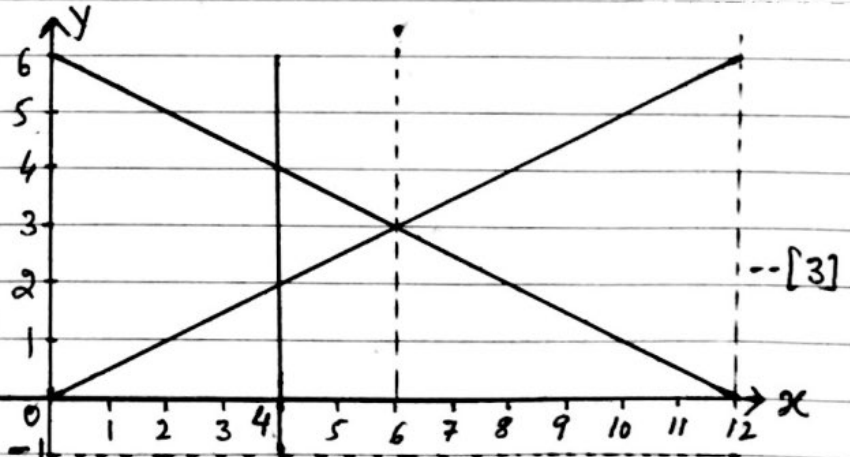
W-16/23/Q24

Q9 Write down the three inequalities which define the unshaded region R.



S-15/21/Q15

Q10 By shading the unwanted regions of the grid, find and label the region R which satisfy the following four inequalities.
 $y \geq 0$, $x \geq 4$, $2y \leq x$, $2y + x \leq 12$.

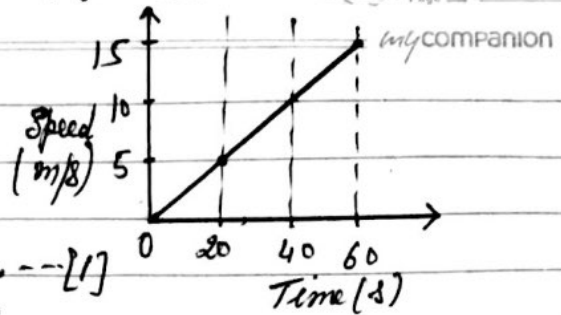


W-14/22/Q12

- Q1 y is inversely proportional to x^2 . When $x=5$, $y=16$
Find y , when $x=10$ [M-17/22/Q12] --- [3]
- Q2 h is directly proportional to the square root of p .
 $h=5.4$ when $p=1.44$, find h when $p=2.89$ [S-17/21/Q9] -- [3]
- Q3 y is inversely proportional to $\sqrt{1+x}$, when $x=8$, $y=2$ -- [3]
Find y when $x=15$. [S-17/22/Q21]
- Q4 y is inversely proportional to x^2 . when $x=2$, $y=8$
Find y in terms of x . [S-17/23/Q7] --- [2]
- Q5 y is inversely proportional to $(x+1)^2$, $y=50$ when $x=0.2$
(a) Write y in terms of x . --- [2]
(b) Find the value of y when $x=0.5$ [W-17/21/Q17] -- [1]
- Q6 y is directly proportional to the positive square root of x . -- [3]
when $x=9$, $y=12$. Find y when $x=\frac{1}{4}$. [S-16/21/Q21]
- Q7 y is directly proportional to $(x+2)^2$. --- [3]
when $x=8$, $y=250$. Find y when $x=4$. [S-16/23/Q16]
- Q8 y is directly proportional to the square root of $(x+2)$ --- [3]
when $x=7$, $y=2$; find y when $x=98$. [W-16/21/Q14]
- Q9 d is inversely proportional to $(W+1)^2$. $d=3.2$ when $W=4$.
Find d when $W=7$. [W-16/23/Q16] -- [3]
- Q10 x varies directly as the cube root of y . $x=6$ when $y=8$
Find the value of x when $y=64$. [M-15/22/Q13] --- [3]
- Q11 p is inversely proportional to the square of $(q+4)$, $p=2$ when $q=2$.
Find the value of p when $q=-2$. [S-15/21/Q12] -- [3]
- Q12 V is directly proportional to the cube of $(z+1)$; when $z=1$, $V=24$
Work out the value of V when $z=2$. [W-15/21/Q12] -- [3]
- Q13 y is directly proportional to the square of $(x-1)$; $y=63$ when $x=4$
Find the value of y when $x=6$. [W-15/22/Q17] --- [3]
- Q14 y is inversely proportional to $(x+2)^2$. when $x=1$, $y=2$
Find y in terms of x . [W-15/23/Q19] --- [2]

- Q15 w varies inversely as the square root of x . When $x=4$, $w=4$
Find w when $x=25$. [S-14/22/Q13] --- [3]
- Q16 y varies as the cube root of $(x+3)$. When $x=5$, $y=1$
Find the value of y when $x=340$. [S-14/23/Q11] --- [3]
- Q17 y varies directly with $\sqrt{x+5}$, $y=4$ when $x=-1$.
Find y when $x=11$. [W-14/21/Q13] --- [3]
- Q18 The cost of a circular patio, $\$C$, varies as the square of the radius, r metres, $C=202.80$ when $r=2.6$
Calculate the cost of a circular patio with $r=1.8$. [W-14/22/Q10] --- [3]
- Q19 y varies inversely as $(x+5)$; $y=6$ when $x=3$
Find y when $x=7$. [W-14/23/Q9] --- [3]
- Q20 t varies inversely as the square root of u , $t=3$ when $u=4$
Find t when $u=49$. [S-13/21/Q19] --- [3]
- Q21 y is inversely proportional to x^3 , $y=5$ when $x=2$
Find y when $x=4$. [S-13/22/Q14] --- [3]
- Q22 The mass, m , of a sphere varies directly with the cube of its radius, r . $m=160$ when $r=2$.
Find m when $r=5$. [S-13/23/Q8] --- [3]
- Q23 The speed, v , of a wave is inversely proportional to the square root of the depth, d , of the water, $v=30$ when $d=400$.
Find v , when $d=25$. [V-13/22/Q11] --- [3]
- Q24 m varies directly as the cube of x , $m=200$ when $x=2$
Find m when $x=0.4$. [W-13/23/Q8] --- [3]

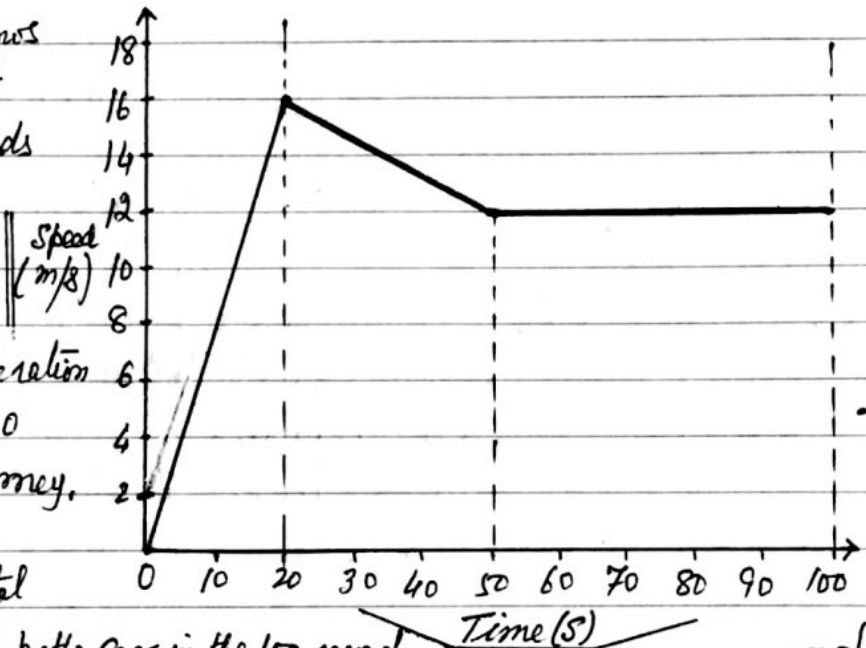
Q1. The speed-time graph shows the first 60 seconds of train journey.



- (a) Find the acceleration of the train. --- [1]
 (b) Calculate the distance the train has travelled in this time. Give your answer in kilometres. --- [3]

M-17/22/Q16

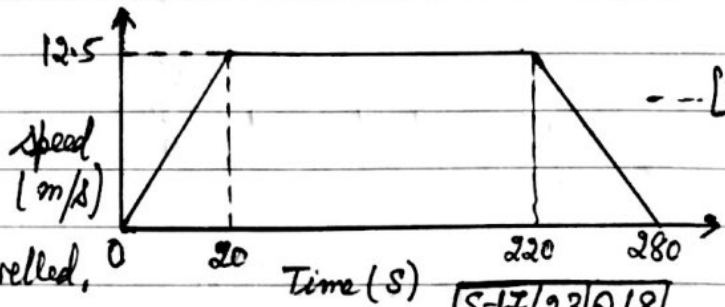
Q2. The diagram shows information about the first 100 seconds of a car journey.



- (a) Calculate the acceleration during the first 20 seconds of the journey. --- [1]
 (b) Work out the total distance travelled by the car in the 100 seconds. --- [3]

S-17/21/Q15

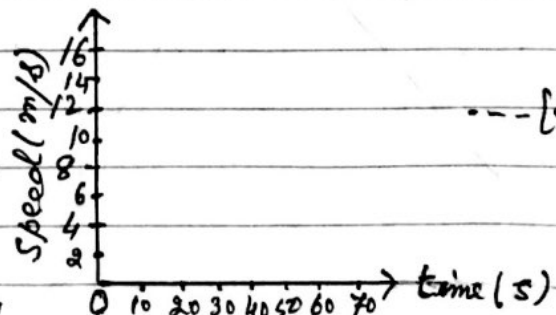
Q3. The diagram shows a speed-time graph for the journey of a car.



Calculate the total distance travelled.

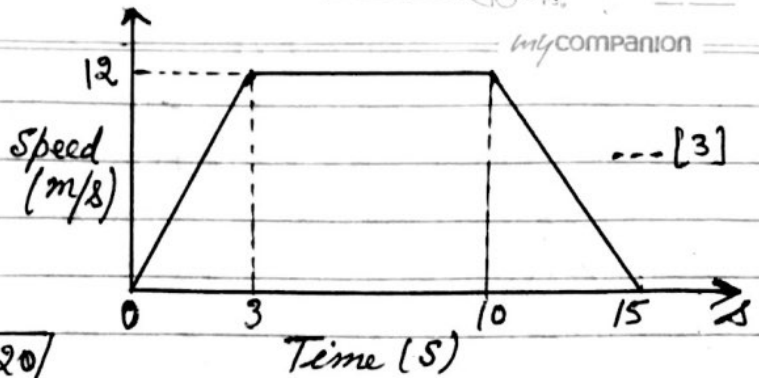
S-17/23/Q18

Q4. Petra begins a journey in her car. She accelerates from rest at a constant rate of 0.4 m/s^2 for 30 seconds. She then travels at a constant speed for 40 seconds. On the grid, draw the speed-time graph for the first 70 seconds of Petra's journey.



W-17/21/Q7

Q5 The diagram shows a speed-time graph. Calculate the total distance travelled.

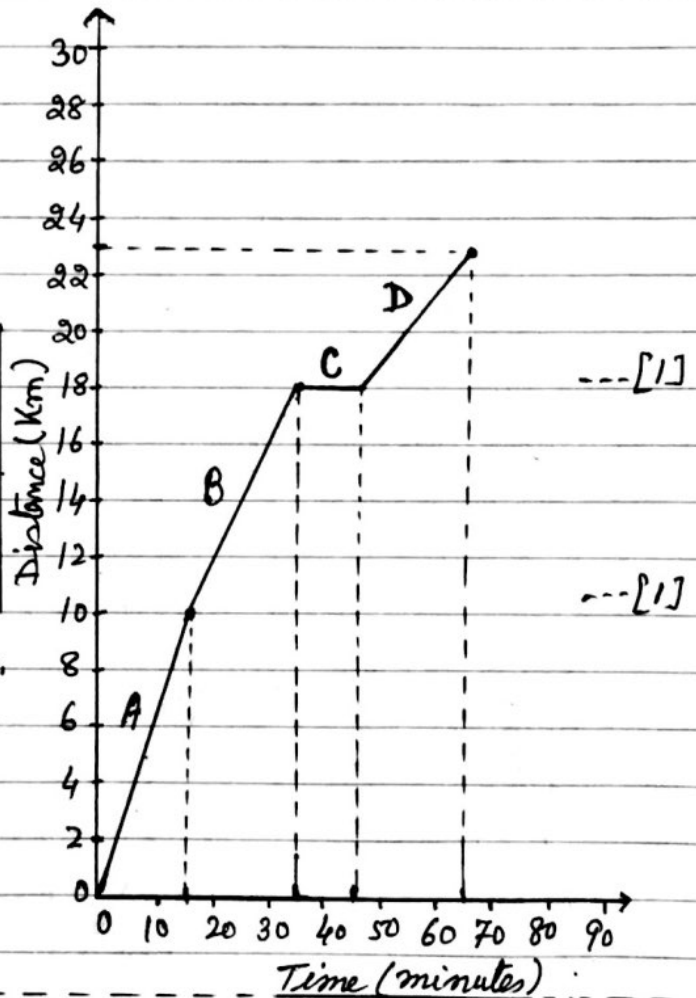


W-17/22/Q20

Q6 The diagram shows the distance-time graph for the first 65 minutes of a bicycle journey.

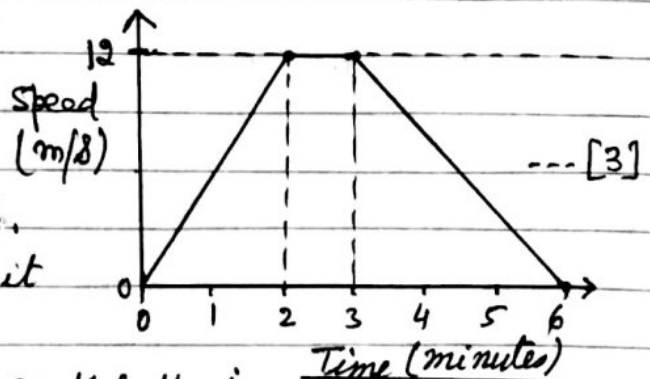
(a) There are four different parts to the journey labelled A, B, C and D. Write down the part of the journey with the fastest speed.

(b) After the first 65 minutes the bicycle travels at a constant speed of 20 km/h for 15 minutes. Draw this part of the journey on the diagram.



W-16/23/Q9

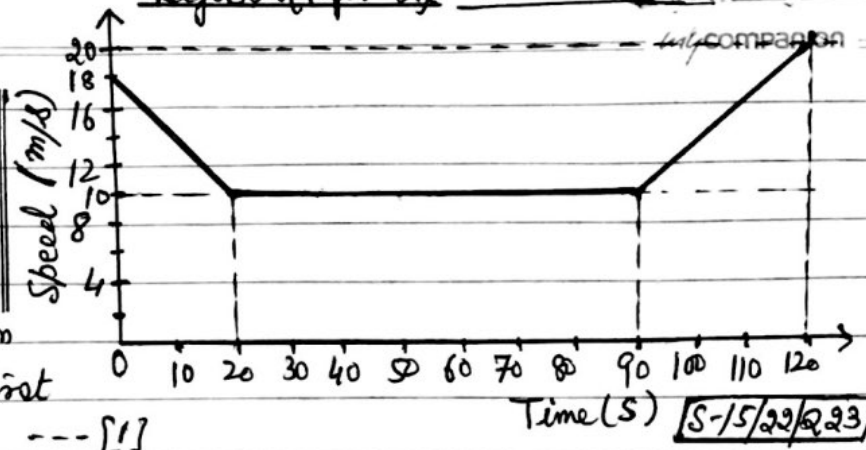
Q7 A tram leaves a station and accelerates for 2 minutes until it reaches a speed of 12 m/s. It continues at this speed for 1 minute. It then decelerates for 3 minutes until it stops at the next station.



The diagram shows the speed-time graph for this journey. Calculate the distance, in metres, between the two stations.

S-15/21/Q10

Q8 The diagram shows the speed-time graph for 120 seconds for a car journey.

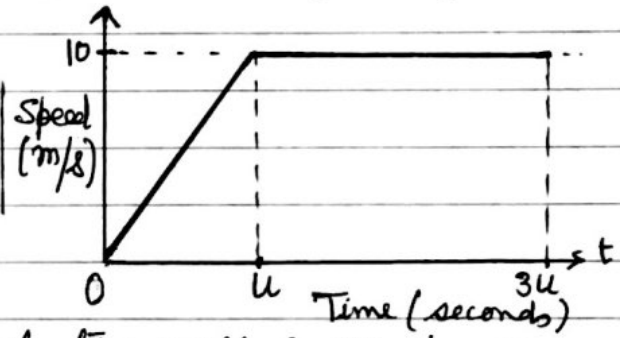


(a) Calculate the deceleration of the car during the first 20 seconds. --- [1]

(b) Calculate the total distance travelled by the car during 120 seconds. --- [3]

(c) Calculate the average speed for this 120 second journey. --- [1]

Q9 A car starts from rest and accelerates for u seconds until it reaches a speed of 10 m/s . A car then travels at 10 m/s for $2u$ seconds.

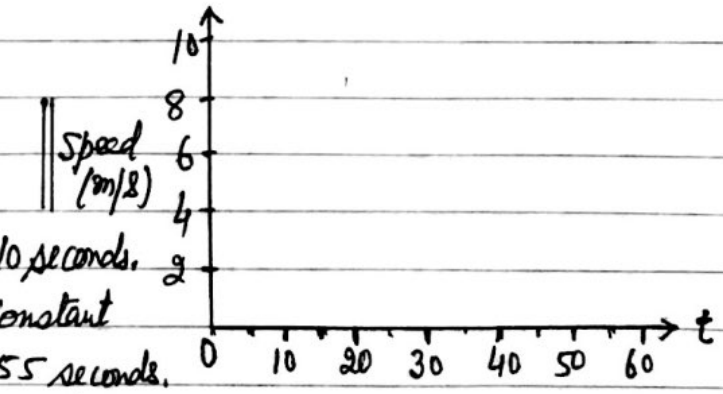


The diagram shows the speed-time graph for this journey. The distance travelled by the car in the first $3u$ seconds is 125 m .

(a) Find the value of u . --- [3]

(b) Find the acceleration in the first u seconds. --- [1]

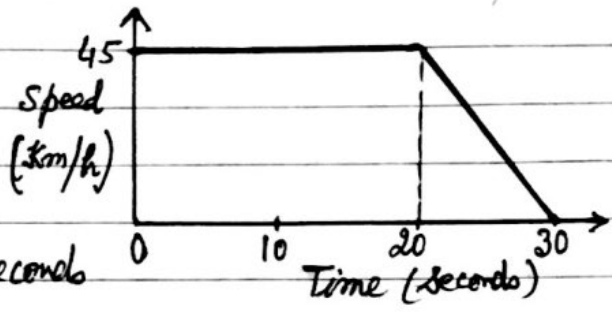
Q10 A car passes through a checkpoint at $t=0$ seconds, travelling at 8 m/s . It travels at this speed for 10 seconds. The car then decelerates at a constant rate until it stops when $t=55$ seconds.



(a) On the grid, draw the speed-time graph. --- [2]

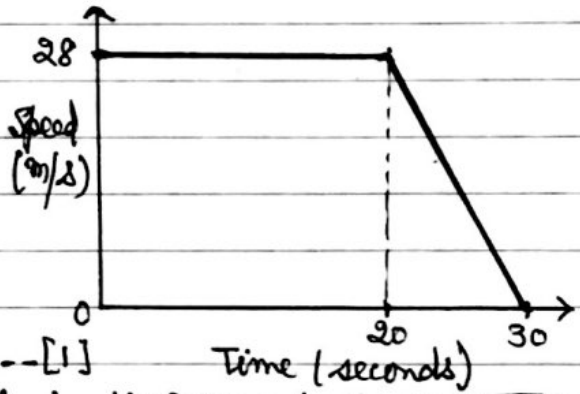
(b) Calculate the total distance travelled by the car after passing through the checkpoint. --- [3]

Q11 The diagram shows the speed-time graph of a car. The car travels at 45 km/h for 20 seconds. The car then decelerates for 10 seconds until it stops.



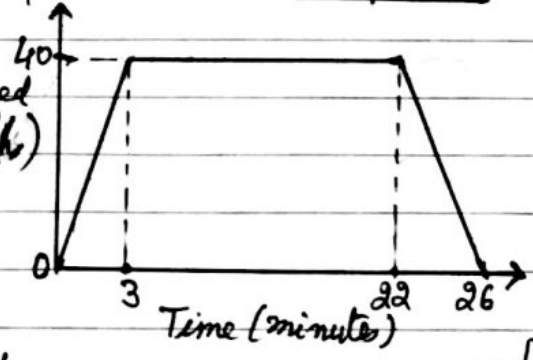
- (a) Change 45 km/h into m/s. --- [2]
- (b) Find the deceleration of the car, giving your answer in m/s². --- [1]
- (c) Find the distance travelled by the car during 30 seconds, giving your answer in metres. W-15/23/Q26 --- [3]

Q12 The diagram shows the speed-time graph of a car. It travels 28 m/s for 20 seconds and then decelerates until it stops after a further 10 seconds.



- (a) Calculate the deceleration of the car. --- [1]
- (b) Calculate the distance travelled during the 30 seconds. S-13/21/Q25 --- [3]

Q13 The diagram shows the speed-time graph of a train journey between two stations. The train accelerates for 3 minutes, travels at constant maximum speed of 40 km/h, then takes 4 minutes to slow to a stop. Calculate the distance in kilometres between the two stations.



- Calculate the distance in kilometres between the two stations. S-13/22/Q16 --- [4]

Q1. Here are the first four terms of a sequence, 23, 17, 11, 5

(a) Find the next term, ---[1]

(b) Find the n th term, W-17/22/Q16 ---[1]

Q2 (a) The n th term of a sequence is $6-5n$.

Write down the first three terms of this sequence. ---[1]

(b) The n th term of another sequence is $5n^2+3$. W-17/23/Q17

Is 848 a term in this sequence? Explain how you decide. ---[3]

Q3 The n th term of a sequence is an^2+bn .

(a) Write down an expression, in terms of a and b , for the third term. ---[1]

(b) The 3rd term of this sequence is 21 and the 6th term is 96.

Find the value of a and the value of b .

You must show all your working.

M-16/22/Q20 ---[4]

Q4.

7, 5, 3, 1, -1, ----

(a) Find the next term in this sequence, ---[1]

(b) Find the n th term of the sequence.

S-16/21/Q15 ---[2]

Q5. Find the n th term of each of these sequences.

(a) 16, 19, 22, 25, 28, ---

S-16/22/Q18 ---[2]

(b) 1, 3, 9, 27, 81, ---

---[2]

Q6 Find the n th term of each sequence (a) 7, 13, 19, 25, 31, --- ---[2]

W-16/21/Q19 (b) 9, 16, 25, 36, 49, --- ---[2]

Q7. These are the first five terms of a sequence. 13, 8, 3, -2, -7

Find the n th term of this sequence.

M-15/22/Q5 ---[2]

Q8 Find the n th term of each sequence. (a) 4, 8, 12, 16, 20, --- ---[1]

(b) 11, 20, 35, 56, 83, ---

S-15/21/Q11 ---[2]

Q9 5, 11, 21, 35, 53, --- Find the n th term of this sequence. S-15/22/Q2 ---[2]

Q10 These are the first five terms of a sequence. 32, 25, 18, 11, 4

find (a) the 6th term. ---[1]

(b) the n th term. ---[2]

(c) which term is equal to -332. ---[2]

S-14/22/Q20

Q11 (a) Here are first three terms of a sequence.

$$U_1 = 1^3 \quad U_2 = 1^3 + 2^3 \quad U_3 = 1^3 + 2^3 + 3^3$$

The n th term is given by $U_n = \frac{1}{4} n^2 (n+1)^2$

Work out the value of U_{39} .

---[2]

(b) Here are the first three terms of another sequence.

$$V_1 = 2^3 \quad V_2 = 2^3 + 4^3 \quad V_3 = 2^3 + 4^3 + 6^3$$

By comparing this sequence with the sequence in part (a), find a formula for the n th term, V_n .

[W-14/23/Q11]

---[1]

Q12 The first five terms of a sequence are, 13, 9, 5, 1, -3,

---[2]

Find the n th term of this sequence.

[5-13/22/Q3]

Q13 Find the n th term in each of the following sequences.

(a) $\frac{1}{3}, \frac{2}{4}, \frac{3}{5}, \frac{4}{6}, \frac{5}{7}, \dots$

---[1]

(b) 0, 3, 8, 15, 24, ----

---[2]

[W-13/21/Q9]

Q1 $f(x) = \frac{x}{4} - 3$ $g(x) = 6x - 7$ $h(x) = 2^x$

(a) Work out the value of x when $f(x) = -0.5$ --- [2]

(b) Find $g^{-1}(x)$ --- [2]

(c) Work out the value of x when $h(x) = f(13)$ --- [2]

M-17/22/Q21

Q2 $f(x) = 3 + 4x$ $g(x) = 6x + 7$
Find in its simplest form.

(a) $f(3x)$ --- [1]

(b) $fg(x)$ --- [2]

S-17/23/Q12

Q3 $f(x) = 5x - 3$ $g(x) = x^2 + 6x + 1$

W-17/23/Q15

Find $gf(x)$, Give your answer in its simplest form, --- [3]

Q4 $f(x) = x^2$ $g(x) = \frac{x-3}{2}$

Find. (a) $f(-5)$ --- [1]

(b) $gf(x)$ --- [1]

(c) $g^{-1}(x)$ --- [2]

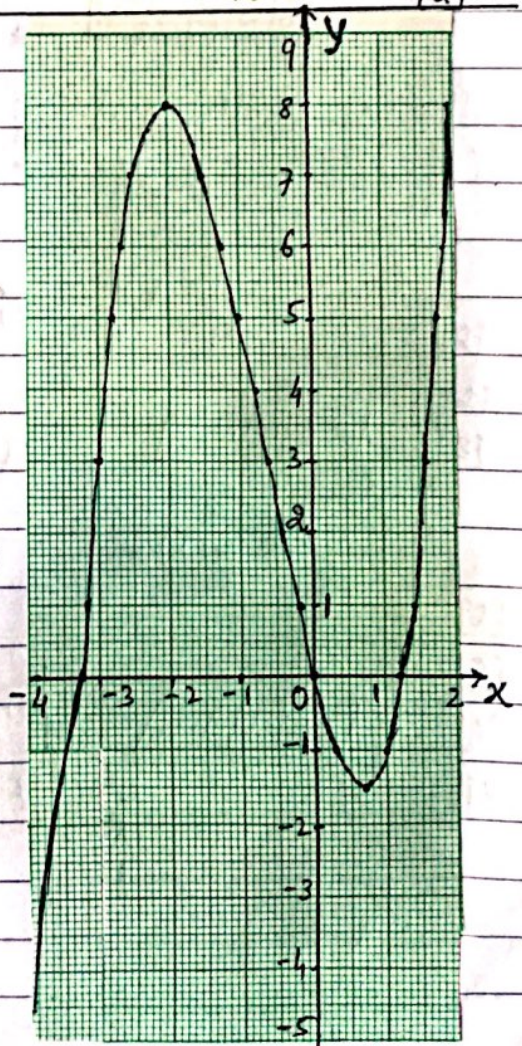
W-16/23/Q18

Q5 The curve $y = x^3 + 2x^2 - 4x$ is shown on the grid.

(a) By drawing suitable tangent, find an estimate of the gradient of the curve when $x = 1$. --- [3]

(b) A point D lies on the curve. The x co-ordinate of D is negative. The gradient of the tangent at D is 0. Write down the co-ordinates of D, --- [1]

W-16/23/Q19



Q6

$f(x) = 5x - 3$

$g(x) = x^2$

- (a) Find $fg(-2)$ --- [2]
- (b) Find $gf(x)$, in terms of x , in its simplest form. --- [2]
- (c) Find $f^{-1}(x)$ M-15/22/Q22 --- [2]

Q7

$f(x) = 5 - 3x$

- (a) Find $f(6)$ --- [1]
- (b) Find $f(x+2)$ --- [1]
- (c) Find $ff(x)$, in its simplest form. --- [2]
- (d) Find $f^{-1}(x)$, the inverse of $f(x)$. S-15/21/23 --- [2]

Q8

$f(x) = 3x + 5$

$g(x) = x^2$

- (a) find $g(3x)$ --- [1]
- (b) Find $f^{-1}(x)$, the inverse function. --- [2]
- (c) Find $ff(x)$. Give your answer in its simplest form. S-15/22/Q24 --- [2]

Q9

$f(x) = x^3$

$g(x) = 3x - 5$

$h(x) = 2x + 1$

- Work out
- (a) $ff(2)$ N-15/21/Q21 --- [2]
 - (b) $g(h)x$ and simplify your answer. --- [2]
 - (c) $h^{-1}(x)$, the inverse of $h(x)$ --- [2]

Q10

$f(x) = 3x - 2$

$g(x) = \frac{2}{x+1}, x \neq -1$

- (a) find $gf(2)$ --- [2]
- (b) Solve $g(x) = 10$ --- [2]
- (c) Simplify. $f(2x) - f(x+2)$ W-14/21/Q20 --- [3]

Q11

$f(x) = (x-3)^2$

$g(x) = \frac{x-1}{4}$

$h(x) = x^3$

- Find
- (a) $hf(1)$ --- [2]
 - (b) $g^{-1}(x)$ --- [2]
 - (c) $gh(x)$ W-14/23/Q16 --- [1]
 - (d) the solution to the equation $f(x) = 0$ --- [1]

Q12 $f(x) = 5x + 4$ $g(x) = \frac{1}{2x}, x \neq 0$ $h(x) = \left(\frac{1}{2}\right)^x$

- Find:
- (a) $fg(5)$ --- [2]
 - (b) $gg(x)$ in its simplest form. --- [2]
 - (c) $f^{-1}(x)$ --- [2]
 - (d) the value of x when $h(x) = 8$ S-13/22/Q21 --- [2]

Q13 $f(x) = x + \frac{2}{x} - 3, x \neq 0$ $g(x) = \frac{x}{2} - 5$

- Find:
- (a) $fg(18)$ --- [2]
 - (b) $g^{-1}(x)$ S-13/23/Q16 --- [2]

Q14 $f(x) = 2x + 3$ $g(x) = x^2$

- (a) Find $fg(6)$ --- [2]
- (b) Solve the equation $gf(x) = 100$ --- [3]
- (c) Find $f^{-1}(x)$ --- [2]
- (d) Find $ff^{-1}(5)$ --- [1]

W-13/23/Q19

Algebraic Expressions, Factorise, Linear and Quad. Equations

Exercise - 1

Answers

- Q1 $18w+14$
 Q2 150
 Q3 (a) $5c(3c-1)$
 (b) $(2p-m)(k+3)$
 Q4 $4n(3n-m)$
 Q5 (a) $\frac{x}{x+3}$ (b) $\frac{8x+7}{(x-4)(2x+5)}$
 Q6 $7(2x-3y)$
 Q7 41
 Q8 $\frac{1}{6}$
 Q9 $n < 3.5$
 Q10 $\pm \sqrt{\frac{b}{2}}$
 Q11 $\frac{2x^2+x-7}{3(x+1)}$
 Q12 (a) $(3t+u)(3t-u)$
 (b) $(p-2)(2d-c)$
 Q13 $4x(x-2y)$
 Q14 $(x-y)^2$
 Q15 (a) $x \leq 3$ (b) $1, 2, 3$
 Q16 -0.23 ; -1.77
 Q17 (a) $4(x-6)$
 (b) $x^2+23x+26$
 Q18 $3x(4x+5y-3)$
 Q19 $\frac{x^2+20x+31}{2(x-3)(x+7)}$
 Q20 $15+2n-n^2$
 Q21 $-1, 0, 1, 2, 3$
 Q22 $\frac{y+x}{xy}$
 Q23 $x = \frac{2}{3}$ or 0.667
 $y = \frac{1}{3}$ or 0.333
 Q24 $\pm \sqrt{y^2-1}$
 Q25 (a) $\frac{5}{14}$ or 0.357 (b) 18

- Q26 (a) $(x-12)(x+11)$
 (b) $x(x+2)(x-2)$
 Q27 $9(2x+3y)$
 Q28 $x \leq -1.2$
 Q29 4 and $-\frac{5}{3}$
 Q30 $\frac{12m}{p-4y}$ or $\frac{-12m}{4y-p}$
 Q31 $7, -4$
 Q32 $2x(1-2y)$
 Q33 $n < 1.5$
 Q34 0.41 and 3.26
 Q35 $\frac{py}{q}$
 Q36 $n > 3.75$
 Q37 (a) $(a+2)(2+p)$
 (b) $2(9+2t)(9-2t)$
 Q38 $x > -9$
 Q39 $p = \frac{8x-5}{x-3}$
 Q40 $a = \frac{3.5 \text{ or } 7}{2}$ and $b = \frac{-17.25 \text{ or } -69/4}{1}$
 Q41 $x=4$ and $y=0.5$
 Q42 0.5 or $\frac{1}{2}$
 Q43 $\frac{x^2+2y^2}{xy}$ or $\frac{x}{y} + \frac{2y}{x}$
 Q44 $\frac{pt-2t-3p}{pt}$
 Q45 $x=-1$ and $y=5$
 Q46 (a) $(2p-3)(2p+3)$
 (b) $(a-2b)(2a-y)$
 Q47 (a) 4 (b) $\sqrt{y-9}x$
 Q48 -2.19 ; 0.69
 Q49 21
 Q50 $1, 2, 3$

Exercise 1 Factorise, Solution of linear and quad. eqn.

Q51 $x=9$ and $y=3.5$ [Answers/Q75 (a) $3x/2$

Q52 (a) $m(m^2+1)$, (b) $(5-y)(5+y)$ (b) $\frac{x^2+2}{x}$

(c) $(x-4)(x+7)$ Q76 $\frac{2(8-4t)}{t^2}$

Q53 36.

Q54 $\frac{7n}{2t+3m}$

Q55 $7p(2p+3q)$

Q77 $-2.12, 0.79$

Q78 $\frac{1}{2-5w}$

Q56 (a) $x+x+4+x+4=26$

Q79 $18\frac{1}{18}$

(b) 6

Q80 30

Q57 $x=6$ and $y=\frac{1}{4}$

Q81 $4 \pm \sqrt{y-6}$

Q58 $2x^2+8x-35$

Q82 $\frac{2}{x(x+1)}$

Q59 $x=0.8$ and $y=-3$

Q83 (a) $(a+b)(x+y)$

Q60 (a) $(p+t)(y+2x)$

(b) $(x-1)(3x-2)$

(b) $7(k+h)(k+h-3)$

Q84 1, 2, 3

Q61 8×10^3 or 8000

Q85 $x=2, y=-3$

Q62 $\frac{2x-23}{(x+2)(2x-5)}$

Q86 (a) 35 (b) $3\frac{1}{A}$ or $3VA^{-1}$

Q87 $-3/5$

Q63 (a) $m=2, n=-10$

Q88 (a) $2pq(2p-3q)$

(b) 1.16

(b) $(u+4t)(1+x)$

Q64 $3x(x-2)$

Q89 $\frac{x-1}{3}$

Q65 $(2x+1)(x-3)$

Q90 $5a(3a^2-b)$

Q66 2.8

Q91 $t < -6/7$

Q67 -1.28 and 0.78

Q92 (a) $(3x-4)(x+2)$

Q68 (a) $(a+3c)(x+y)$

(b) $1\frac{1}{3}, -2$

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

Q93 $3x+4y=10.8$ } $x=2.6$

Q69 $\pm \sqrt{\frac{y-b}{a}}$

$5x+2y=14.50$ } $y=0.75$

Q70 $\frac{x+4}{x+1}$

Q94 3.75

Q71 (a) $(3w+10)(3w-10)$

Q95 $x=5, y=-5$

(b) $(m+n)(p-69)$

Q96 v^3-p

Q72 $-0.38, 1.58$

Q97 (a) $\frac{x+7}{(2x-1)(x+2)}$ (b) $\frac{2x}{x+7}$

Q73 $5-u$

Q98 9.5 or $19/2$

Q74 $2x(1-2x)$

Q99 $8+(y-2)^2$

Factorise, Solution of Equⁿ.

Answers

- Q100 $\frac{16x^2 + 18x + 9}{6x}$ Ex-2
- Q101 $3x(4y - x)$
- Q102 $x \geq -3/8$
- Q103 $(a+b)(p-2)$
- Q104 (a) $(x+6)(x-5)$
(b) $\frac{x+4}{x+6}$
- Q105 $\frac{5x+13}{(x+3)(x+2)}$
- Q106 $(p+3)(k+m)$
- Q107 14.5
- Q108 0.39, -3.89
- Q109 -1, -2, -3, -4
- Q110 25
- Q111 $\frac{8x}{(x-3)(x+1)}$
- Q112 (a) $n < 9$
(b) $(b+d)(a+c)$
- Q113 (a) ± 3.1623
(b) $\frac{4}{y^2 - 8}$
- Q114 4.8
- Q115 $\pm \sqrt{c^2 - a^2}$
- Q116 $\frac{2t-5}{t-1}$
- Q117 (a) $(a+b)(1+t)$
(b) $(x-6)(x+4)$
- Q118 $\pm \sqrt{y-4}$
- Q119 (8, 2)
- Q120 $x < 6.8$
- Q121 -8
- Q122 5
- Q123 (a) $a^2 + 2ab + b^2$
(b) 22
- Q124 $x = 2$ } or { $x = -2$
 $y = 9$ } { $y = -7$

- Q125 $n > 3.75$
- Q126 $w = \frac{3y-7}{5}$
- Q127 II.
-
- Exercise - 2,
"Algebraic Indices"
- Q1 (a) t^{20} (b) x^{10} (c) $27m^6$
- Q2 (a) -4 (b) $\frac{1}{5}$ or 0.2
- Q3 (a) $8x^{12}$ (b) 9
- Q4 $2/a^4$ or $2a^{-4}$
- Q5 (a) 6 (b) $2x^3$ (c) $15y^4$
- Q6 (a) m^{10} (b) $20x^5y^2$
- Q7 (a) 27 (b) x^2 (c) $y^2/2$
- Q8 (a) x^8y^7 (b) $27p^6m^{15}$
- Q9 $2p^4$
- Q10 $\frac{1}{8}x^2$ or $0.125x^2$
- Q11 $8x^6$
- Q12 $6x^8$
- Q13 $9y^3$
- Q14 n^7
- Q15 (a) (i) 1 (ii) m^7 (iii) $2p^2$
(b) $2/5$ or 0.4
- Q16 $24u^2w^3$
- Q17 $\frac{1}{4}$ or 0.25
- Q18 (a) $4x^9$ (b) $2y^{32}$
- Q19 $x^{16}/2y^4$
- Q20 (a) 2×10^{10} (b) 1.25×10^{-1}
- Q21 (a) 8 (b) $29^{3/2}$
- Q22 (a) $5t^{25}$ (b) -2 (c) 64
- Q23 $3x^6y^4$
- Q24 (a) x^6 (b) $x^2/3$
- Q25 $3x^4$

Exercise - 2

Answers

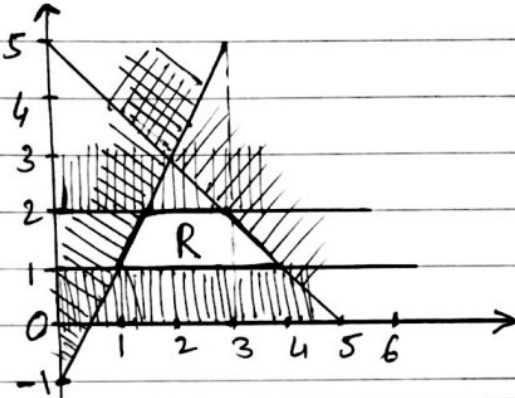
Q26 (a) $5/4$ (b) $4y^6$

Q27 (a) 89^{-1} or $8/9$ (b) $1/5$ or 0.2

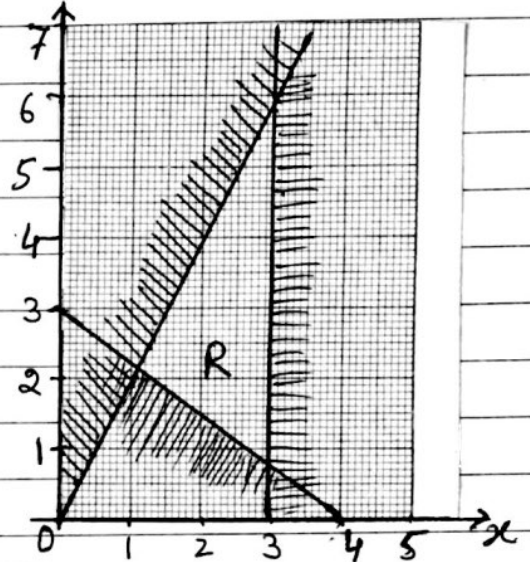
Q4 $y < 2$ and $x \geq -2$,
 $y \geq \frac{1}{2}x + 1$ and $y \leq -x + 3$

Exercise-3/(Graph of Inequalities)

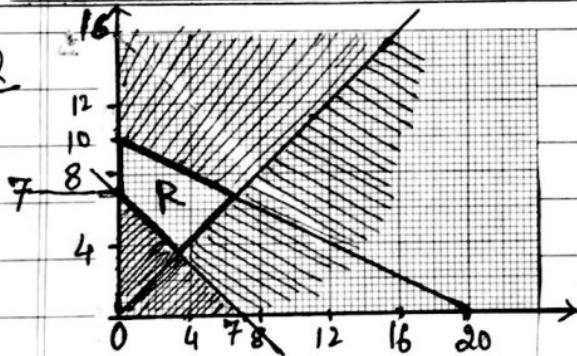
Q1



Q5



Q2



Q6 $y < 4$; $y \geq 3$, $x \geq 2$, $y > x$

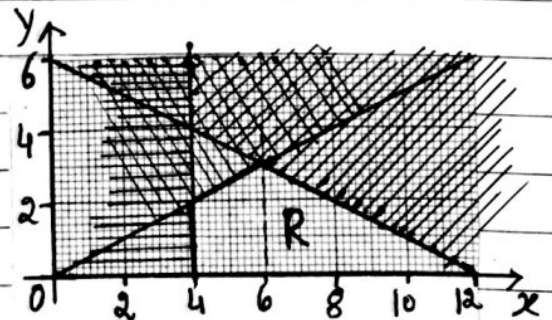
Q7 $y \geq 0$, $x \geq 1$ and $x + y \leq 4$

Q8 $y \leq -3/5x + 6$; $x \geq 2$ and $y > x$

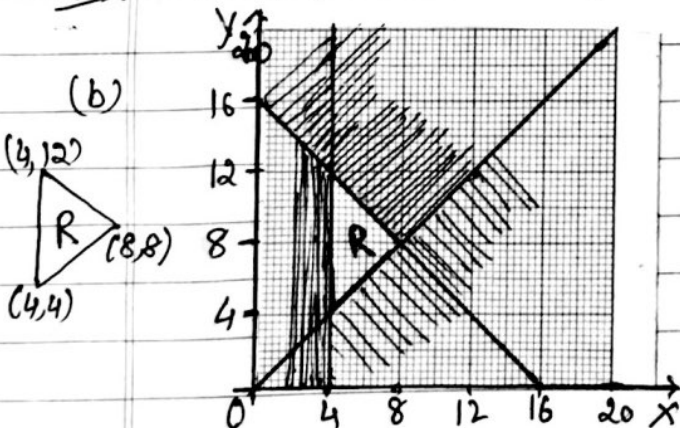
Q9 $y < 8$; $y \geq 6 - x$ and $y \geq x + 2$

Q3 (a) $x + y \leq 16$ and $x \geq 4$

Q10



(b)

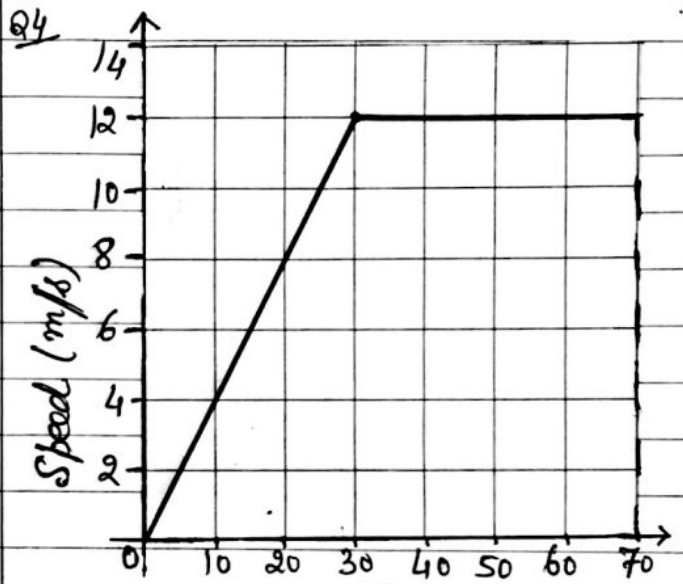


(c) Amount = $10x + 8y$
is Max at $(8,8) = 10 \times 8 + 8 \times 8$
 $= \$144$ ✓

Exercise-4 (Variation) / Answers / Exercise-5 (Travel Graph)

- Q1. 4
- Q2. 7.65
- Q3. 1.5 or $\frac{3}{2}$ or $1\frac{1}{2}$
- Q4. $32x^2$ or $32x^{-2}$
- Q5. (a) $y = \frac{72}{(x+1)^2}$ (b) 32
- Q6. 2
- Q7. 90
- Q8. $6\frac{2}{3}$
- Q9. 1.25
- Q10. 12
- Q11. 18
- Q12. 81
- Q13. 175
- Q14. $\frac{18}{(x+2)^2}$
- Q15. 1.6
- Q16. 3.5
- Q17. ± 8
- Q18. 97.2
- Q19. 4
- Q20. $\frac{6}{7}$ or 0.857
- Q21. 0.625
- Q22. 2500
- Q23. 120
- Q24. 1.6

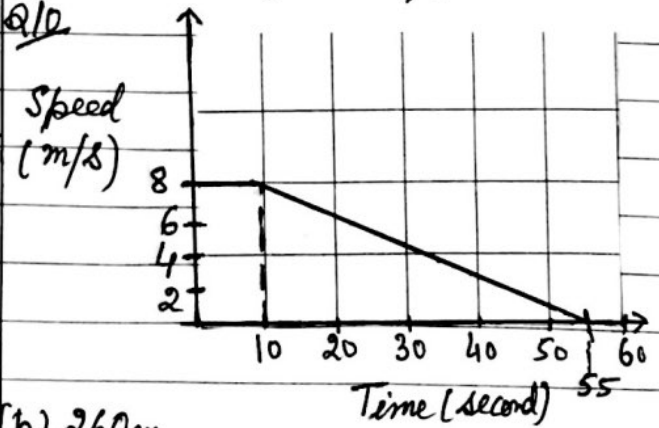
- Q1 (a) 0.25 or $\frac{1}{4}$ (b) 0.45
- Q2. (a) 0.8 or $\frac{4}{5}$ (b) 1180
- Q3. 3000



Speed at $t=30$
 $= 0.4 \times 30 = 12 \text{ m/s}$

- Q5. 132 m
- Q6. (a) A (b) line joining (65,23) to (80,28)

- Q7. 2520 m
- Q8. (a) 0.4 or $\frac{2}{5}$ (b) 1430 (c) 11.9
- Q9. (a) 5 s (b) 2 m/s^2



(b) 260m.

Exercise-5 (Travel Graphs)

Answers

Exercise-7 (Functions and Graphs)

Q11 (a) 12.5 (b) 1.25 (c) 312.5

Q12 (a) 2.8 m/s^2 (b) 700 m.

Q13 15 km.

Exercise-6 (Sequences)

Q1. (a) -1 (b) $-6n+29$

Q2. (a) 1, -4 and -9
(b) Yes, because it is 13th term.

Q3. (a) $9a+3b$ (b) $a=3, b=-2$

Q4. (a) -3 (b) $9-2n$

Q5. (a) $3n+13$ (b) 3^{n-1}

Q6. (a) $6n+1$ (b) $(n+2)^2$

Q7. $18-5n$

Q8. (a) $4n$ (b) $3n^2+8$

Q9. $2n^2+3$

Q10 (a) -3, (b) $39-7n$ (c) 53

Q11 (a) 608400 (b) $2n^2(n+1)^2$

Q12 $17-4n$

Q13 (a) $\frac{n}{n+2}$ (b) n^2-1

Q1(a) 10; (b) $\frac{x+7}{6}$ (c) -2

Q2 (a) $3+12x$ (b) $24x+31$

Q3. $25x^2-8$

Q4. (a) 25; (b) $\frac{x^2-3}{2}$ (c) $2x+3$

Q5 (a) $2.1 \leq \text{grad} \leq 3.9$
(b) (-2, 8)

Q6 (a) 17; (b) $\begin{cases} 25x^2-30x+9 \\ \text{or } (5x-3)^2 \end{cases}$
(c) $\frac{x+3}{5}$

Q7 (a) -13 (b) $-3x-1$ or $5-3(x+2)$
(c) $9x-10$; (d) $\frac{5-x}{5}$

Q8 (a) $9x^2$ (b) $\frac{x-3}{3}$ (c) $9x+20$

Q9 (a) $5/2$ (b) $6x-2$ (c) $\frac{1}{2}(x-1)$

Q10 (a) 0.4 (b) -0.8 (c) $3x-6$

Q11 (a) 64 (b) $4x+1$
(c) $\frac{x^3-1}{4}$ (d) 3

Q12 (a) 4.5 (b) x
(c) $\frac{x-4}{5}$ (d) -3

Q13 (a) 1.5 (b) $2(x+5)$

Q14 (a) 75 (b) 3.5; -6.5
(c) $\frac{x-3}{2}$ (d) 5.