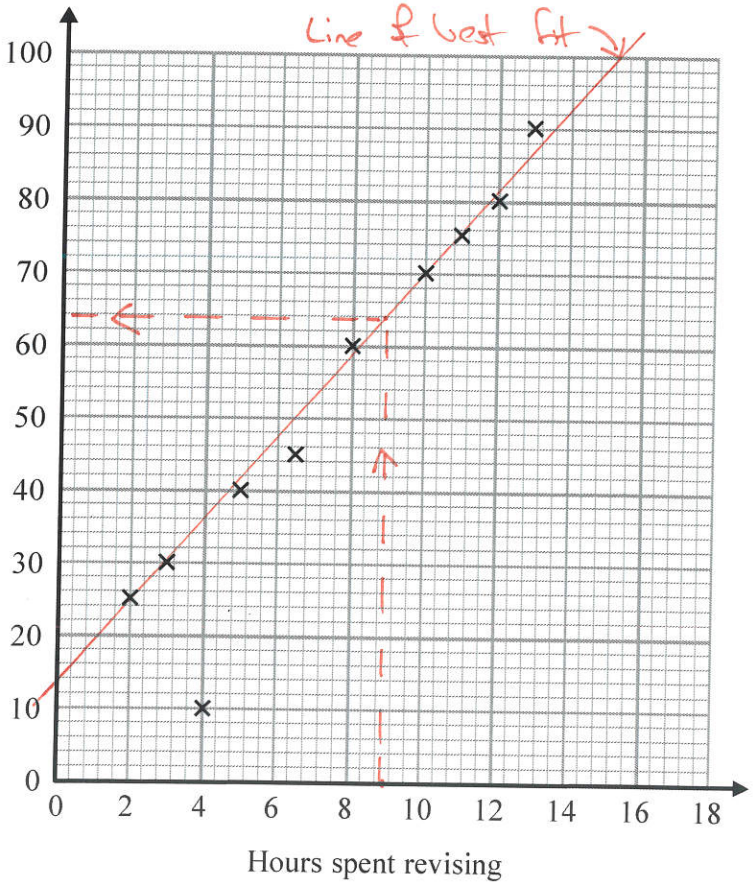
# Condensed Solutions



(1)




a/ (4, 10) (1)

c/ 64

Any estimate between 60 and 70

b/ i/ see above

ii/ positive correlation (1)

d/ We don't have any data for anyone that revised that long so her estimate is not reliable (1)

(2) $12.5$ (1) $\leqslant L <$ $13.5$ (1)

(3) $y = 2x + 1$ (1) (1)

"Read" the gradient & intercept straight off the graph

(4) a/ $\dfrac{24 \times 30 + 12 \times 34 + 8 \times 38 + 6 \times 42}{50}$ (1) $= 33.68$ (1)

24 b) About (1) half of the belts sold in May were size Small. The manager is (1) right, Jenny is ordering too many small belts

5 a) Area of wall = $\frac{1}{2}(1.8 + 2.7) \times 0.8$ (Area of a trapezium $= \frac{1}{2}(a+b)h$)

$= 1.8\,m^2$ (1)

Area of a tile = $0.15 \times 0.075$ (1) (change to m)

$= 0.01125\ m^2$ (1)

Tiles needed = $1.8 \div 0.01125 = 160$

Packs needed = $160 \div 9 = 17.7$ (1)

Karen needs to buy 18 packs (1)

b) $160 \times 1.1 = 176$ tiles (10% increase) (1)

$176 \div 9 = 19.5$ packs i.e. 20 packs to buy

10% of 18 is 1.8 i.e. 2 extra packs.

She does not need to increase the (1) number of packs by exactly 10% but by approximately 10%.

6 $x^2 + 3x - 4 = (x+4)(x-1)$ (1) (1)

7 (A) & (D) are parallel (1)

↳ $y = 2x - 4$ !

Make $y$ the subject & compare coefficients of $x$

(8)

a) Original Investment $\times 1.03^2 = 2652.25$ (1)

so original investment $= 2652.25 \div 1.03^2$ (1)

$= £2500$ (1)

b) Imagine Noah has £100

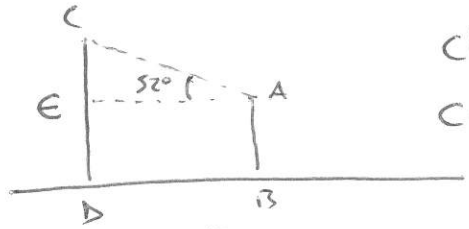
Saver account $100 \times 1.04^5 = 121.67$ (1)

Investment account $100 + 21 = 121.00$

The saver account is a little bit better (1)

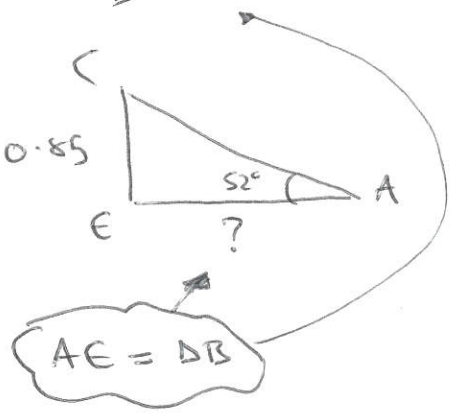
You could use another amount or even an "x"

(9)




$CD = 1.5 \times 1.7 = 2.55$

$CE = 2.55 - 1.7 = 0.85$ (1)




AE = DB

$\tan 52 = \frac{0.85}{AE}$ (1)

$AE = \frac{0.85}{\tan 52}$ (1)

$= 0.664\text{ m}$ (1)

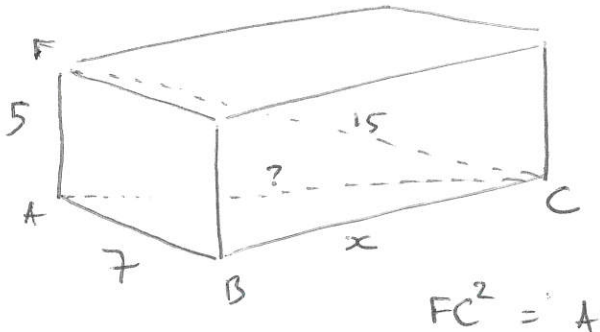
(10) see end

(11) $x^2 + 2x - 8 = (x+1)^2 - 1 - 8$

$= (x+1)^2 - 9$

(1) (1)

(12)




$FC^2 = AC^2 + AF^2$

$15^2 = ?^2 + 5^2$ (1)

$? = \sqrt{15^2 - 5^2} = \underline{10\sqrt{2}}$ (1)

$AC^2 = AB^2 + BC^2$

$(10\sqrt{2})^2 = 7^2 + x^2$

$x = \sqrt{200 - 49} = \sqrt{151}$ (1)

Volume $= 5 \times 7 \times \sqrt{151}$

$= \underline{430\ cm^3}$ (1)

(13) $14 \times 12 = 168$ (1) (1)

(14) $4 - \left[(x+3) \div \frac{x^2+5x+6}{x-2}\right] = 4 - \left[(x+3) \times \frac{x-2}{x^2+5x+6}\right]$ (1)

$= 4 - \left[\frac{(x+3)}{1} \times \frac{x-2}{(x+3)(x+2)}\right]$ (1)

$= 4 - \frac{x-2}{x+2}$

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

$= \frac{4x + 8 - x + 2}{x+2}$

$= \underline{\frac{3x+10}{x+2}}$ (1)

15 a) errors = $10^6 \times 2^{-8}$ = 3906 (1) (1)

b) No (1) because this is an exponential function $2^{-t} \neq 0$ for any value of $t$. (1)

If you don't give a reason you can't get any marks even if you do say "No"

16 (6, −1)

17 ~~$L^2 = (24x)^2$~~

$L^2 = (12x)^2 + (16x)^2$

$= 400x^2$

$L = 20x$ (1)

$2160\pi = \pi \times 12x \times 20x$ (1)

$9 = x^2$

$3 = x$ (1)

$V_{ol} = \frac{\pi r^2 h}{3} = \frac{\pi \times (12x)^2 \times 16x}{3}$ (1)

$= \pi \times 2736$

i.e. ~~$V = 2736$~~ 2736 = V (1)

18 p(Heads twice) = $p(H)^2 = 0.09$

so $p(H) = \sqrt{0.09}$ (1)

$= 0.3$

$p(T) = 0.7$ (1)

p(Tails twice) $= 0.7^2 = 0.49$ (1)

19 a) $0.000423 = 4.23 \times 10^{-4}$ (1)

b) $4.5 \times 10^4 = 45000$ (1)

(20) Area scale factor $= 253.5 \div 6 = \frac{169}{4}$

Linear scale factor $= \sqrt{\frac{169}{4}} = \frac{13}{2}$ (1)

Volume scale factor $= \left(\frac{13}{2}\right)^3 = \frac{2197}{8}$

Clay needed $= 2 \times \frac{2197}{8} = \frac{2197}{4}$ (1)

Bags needed $= \frac{2197}{4} \div 10 = \underline{55 \text{ bags}}$ (1)

(21) a) $3x^2 - x^3 + 3 = 0 \iff x^3 = 3x^2 + 3$ (1)

$\iff x = \frac{3x^2 + 3}{x^2}$ (1)

$\iff x = 3 + \frac{3}{x^2}$ □

b) $x_0 = 3.2$

$x_1 = 3.292968\,75$ (1)

$x_2 = 3.276\,599\,786$ (1)

$x_3 = 3.279\,420\,685$ (1)

c) Estimates for the solution of $3x^2 - x^3 + 3 = 0$ (1)

(22) nth term of sequence $= 6n + 1$ (1)

Diff between □s of successive terms $= (6(n+1)+1)^2 - (6n+1)^2$ (1)

$= (6n+7)^2 - (6n+1)^2$ (1)

(1) $= 36n^2 + 84n + 49 - 36n^2 - 12n - 1$

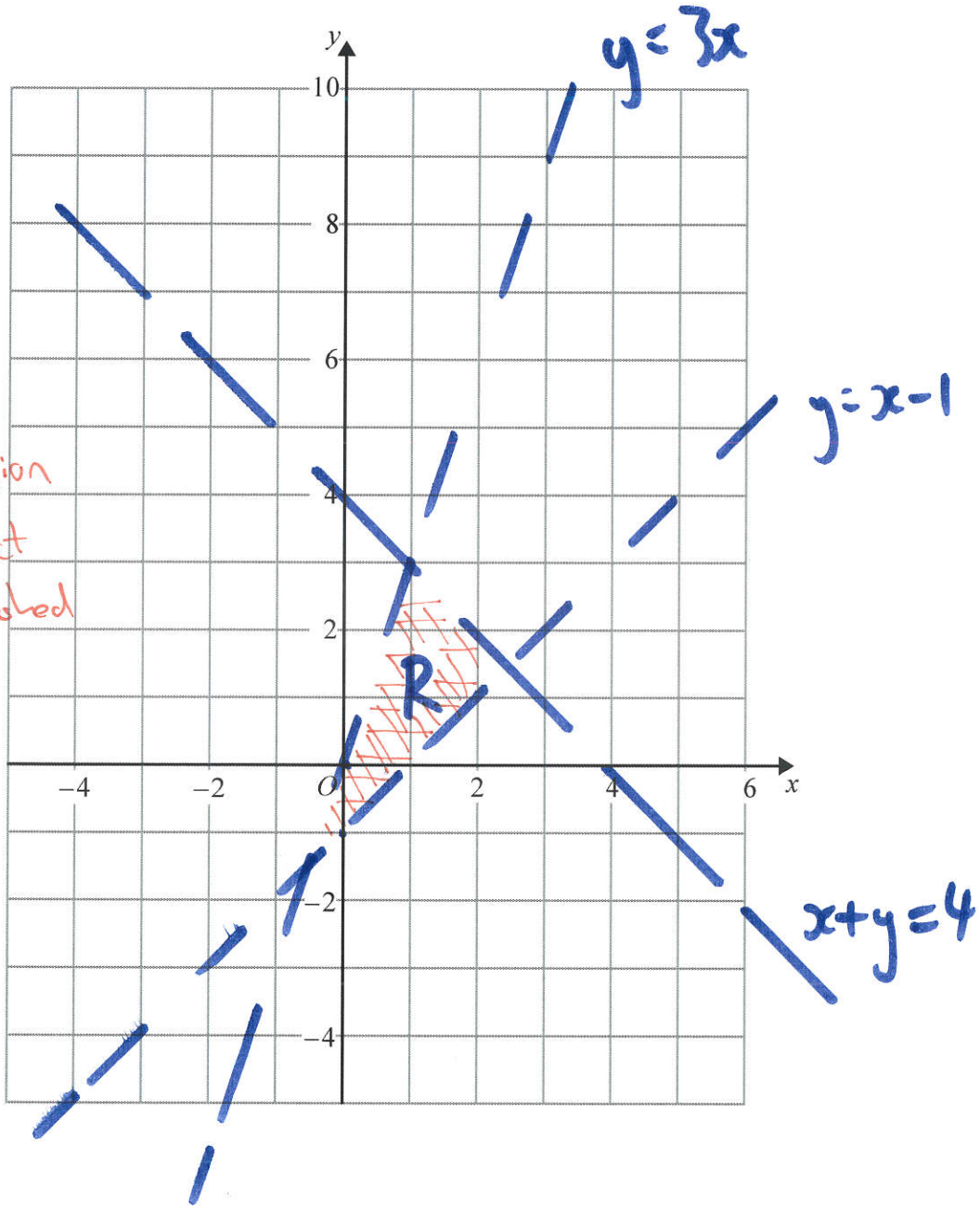
(1) $= 72n + 48$

(1) $= 24(3n + 2)$ i.e. a multiple of 24.

**10** On the grid, shade the region that satisfies all these inequalities.

$$x + y < 4 \qquad y > x - 1 \qquad y < 3x$$

Label the region **R**.




① one line
① two lines
① correct region
① fully correct (including dashed lines)

**(Total for Question 10 is 4 marks)**