Solving Quadratic Equations (Factorising)

Exam Style Questions

1. Solve $(x + 2)(x - 1) = 0$

$x = -2$

$x = 1$ …….. (1 mark)

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2. Solve $(x - 2)(x - 6) = 0$

$x = 2$

$x = 6$ …….. (1 mark)

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3. Solve $(3x - 2)(2x - 1) = 0$

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

$x = \frac{1}{2}$ …….. (1 mark)

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4. Solve $(x + 1)^2 = 0$

$x = -1$ …….. (1 mark)

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5. Solve $x^2 - 7x + 12 = 0$

$(x-4)(x-3)=0$

$x=4$

$x=3$

$x=4$

$x=3$ ..... (2 marks)

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6. Solve $x^2 - 4x - 12 = 0$

$(x-6)(x+2)=0$

$x=6, x=-2$

$x=-2$

$x=6$ ..... (2 marks)

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7. Solve $x^2 + 10x + 21 = 0$

$(x+7)(x+3)=0$

$x=-7, x=-3$

$x=-7$, $x=-3$ ..... (2 marks)

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8. Solve $x^2 - 10x + 16 = 0$

$(x-8)(x-2)=0$

$x=8, x=2$

$x=8$

$x=2$ ..... (2 marks)

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9. Solve $x^2 - 2x - 24 = 0$

$(x-6)(x+4)=0$

$x=6,\ x=-4$

$x=6$

$x=-4$ …….. (2 marks)

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10. Solve $x^2 - 5x + 6 = 0$

$(x-3)(x-2)=0$

$x=3,\ x=2$

$x=3$

$x=2$ …….. (2 marks)

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11. Solve $x^2 - 5x - 24 = 0$

$(x-8)(x+3)=0$

$x=8,\ x=-3$

$x=8$

$x=-3$ …….. (2 marks)

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12. Solve $x^2 - 9 = 0$

$(x+3)(x-3)=0$

$x=-3,\ x=3$

$x=-3,\ x=3$ …….. (2 marks)

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13. Solve $x^2 - 16 = 0$

$(x+4)(x-4)=0$

$x=-4$, $x=4$

$x=-4$

$x=4$

…….. (2 marks)

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14. Solve $x^2 - 10x + 25 = 0$

$(x-5)^2=0$

$x=5$

$x=5$

…….. (2 marks)

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15. Solve $3x^2 - 6x = 0$

$3x(x-2)=0$

$x=2$

$x=0$

$x=2$

$x=0$

…….. (2 marks)

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16. Solve $9x^2 + 12x = 0$

$3x(3x+4)=0$

$x=0$

$x=-\frac{4}{3}$

$x=0$

$x=-\frac{4}{3}$

…….. (2 marks)

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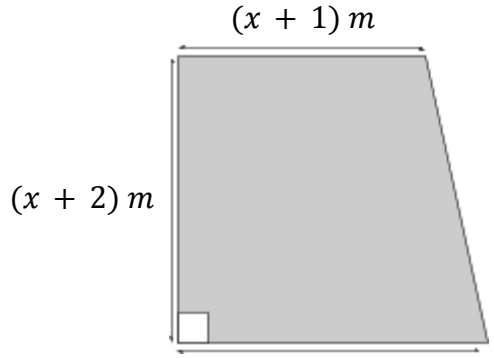
17. Sam is putting a skirting board around his room.

His room is the shape of a trapezium, and has an area of $16\ m^2$.
A pack containing $2.2\ m$ of skirting board costs £13.
How much is it going to cost Sam to cover his toom?
Give your answer to the nearest pound.



$A = \frac{1}{2}(a+b)h$

$\Rightarrow 16 = \frac{1}{2}(x+1+x+3)(x+2)$

$\Rightarrow 16 = \frac{1}{2}(2x+4)(x+2)$

$16 = (x+2)(x+2)$

$16 = x^2 + 2x + 2x + 4$

$16 = x^2 + 4x + 4$

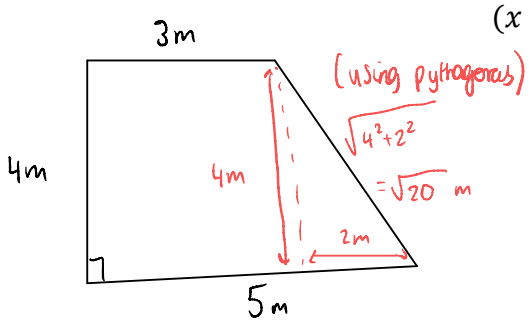
$x^2 + 4x - 12 = 0$

$(x+6)(x-2) = 0$

$x = 2, \ x = -6$

$x \neq -6$ since length

$\Rightarrow x = 2$



(using pythagoras)

$\sqrt{4^2+2^2}$

$= \sqrt{20}$ m

$P = (3+4+5+\sqrt{20})\ m$

$= 16.472$ m

$16.472 \div 2.2 = 7.487$

So 8 packs needed.

$8 \times 13 = £104$

£ 104 ..... (5 marks)

HIGHER LEVEL

18. Solve $3x^2 + 10x + 3 = 0$

$3x^2 + 9x + x + 3 = 0$

$3x(x+3) + 1(x+3) = 0$

$(3x+1)(x+3) = 0$

$x = -3$

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

$3 \times 3 = 9$

$9 \times 1 = 9$

$9 + 1 = 10$

$x = -3$

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

..... (3 marks)

HIGHER LEVEL

19. Solve $2x^2 + 3x + 1 = 0$

$2 \times 1 = 2$
$2 \times 1 = 2$
$2 + 1 = 3$

$2x^2 + 2x + x + 1 = 0$

$2x(x+1) + 1(x+1) = 0$

$(2x+1)(x+1) = 0$

$x = -1$

$x = -\frac{1}{2}$

$x = -1 \quad x = -\frac{1}{2}$ ..... (3 marks)

HIGHER LEVEL

20. Solve $6x^2 + 7x + 2 = 0$

$6 \times 2 = 12$
$4 \times 3 = 12$
$4 + 3 = 7$

$6x^2 + 4x + 3x + 2 = 0$

$2x(3x+2) + 1(3x+2) = 0$

$(2x+1)(3x+2) = 0$

$x = -\frac{1}{2}, \; x = -\frac{2}{3}$

$x = -\frac{1}{2} \quad x = -\frac{2}{3}$ ..... (3 marks)

HIGHER LEVEL

21. Solve $4x^2 - 9 = 0$

$(2x+3)(2x-3) = 0$

$x = -\frac{3}{2}, \; x = \frac{3}{2}$

$x = -\frac{3}{2} \quad x = \frac{3}{2}$ ..... (2 marks)

HIGHER LEVEL

22. Solve $16x^2 - 100 = 0$

$4(4x^2 - 25) = 0$

$4(2x+5)(2x-5) = 0$

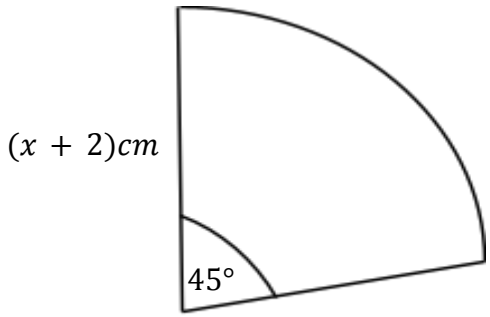
$x = -\frac{5}{2}, \; x = \frac{5}{2}$

$x = -\frac{5}{2}$

$x = \frac{5}{2}$ ..... (2 marks)

HIGHER LEVEL

23. The area of the below sector is $6.125\pi\ cm^2$. Find the arc length.



$A = \pi r^2 \times \frac{\theta}{360}$

$\Rightarrow 6.125\pi = \pi(x+2)^2 \times \frac{45}{360}$

$\Rightarrow 6.125 = \frac{1}{8}(x+2)^2$

$\Rightarrow 49 = (x+2)(x+2)$

$\Rightarrow x^2 + 4x + 4 = 49$

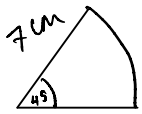
$\Rightarrow x^2 + 4x - 45 = 0$

$\Rightarrow (x+9)(x-5) = 0$

$x = -9, x = 5$

$x \neq -9$ (Since length)

$\Rightarrow x = 5$



Arc length $= \pi D \times \frac{\theta}{360}$

$= \pi \times 14 \times \frac{45}{360}$

$= \frac{14}{8}\pi = \frac{7}{4}\pi$

$\frac{7\pi}{4}$ cm ..... (5 marks)
