

1.1.

|                              | N | Z | Q | Q' | R   |
|------------------------------|---|---|---|----|-----|
| $\frac{\sqrt{164}}{4-4} + 9$ | N | N | N | N  | N ✓ |
| $\frac{3\sqrt{-1489}}{4}$    | N | N | N | Y  | Y ✓ |

2

1.2.

$\sqrt[3]{-125}$      $\sqrt[3]{-127}$      $\sqrt[3]{-216}$  ✓

-5     $\sqrt[3]{-127}$     -6 ✓

answers -5 -6 only 0/2 **2**

1.3.

1.  $9 - x < 0$      $R'$

$-x < -9$

$x > 9$

$\therefore \underline{10; 11; 12; \dots}$  ✓ **1**

2.  $x - 4 = 0$     UD

$x = 4$  ✓ **1**

1.4.

$100x = 156,5656 \dots$  ✓

$x = 1,5656 \dots$

$99x = 155$  ✓

$x = \frac{155}{99}$  ✓

no decimals **3**

2.1.

1.  $3a - 2(a-1)(1+a)$

$= 3a - 2(a+a^2-1-a)$

$= 3a - 2(a^2-1)$  ✓

$= 3a - 2a^2 + 2$  ✓ **2**

2.1.

2.  $(a^3 - 2)(a^6 + 4)(a^3 + 2)$

$= (a^3 - 2)(a^3 + 2)(a^6 + 4)$

$= (a^6 - 4)(a^6 + 4)$

$= a^{12} - 16$  ✓ **2**

2.1.

3.  $(\frac{2}{3}a)^2 = \frac{4}{9}a^2$

$(\frac{2}{3}a) \times (-\frac{4}{3}b) = -\frac{8}{15}ab \rightarrow +\frac{8}{15}ab$

$(-\frac{4}{3}b)^2 = +\frac{16}{25}b^2$

$\therefore \underline{\frac{8}{27}a^3 - \frac{64}{125}b^3}$  ✓ **3**

2.2.

$P = x + 2$      $Q = 3x - 1$

$(P - Q)(P + Q)$

$\cdot (x + 2 - (3x - 1))(x + 2 + (3x - 1))$

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

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

$= -8x^2 + 10x + 3$  ✓ **3**

(op)

$\cdot P^2 - Q^2$

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

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

$= x^2 + 4x + 4 - (9x^2 - 6x + 1)$

$= x^2 + 4x + 4 - 9x^2 + 6x - 1$

$= -8x^2 + 10x + 3$  ✓ **3**

$$\begin{aligned}
 3.1. \quad & 1 - 16p^{16} \\
 &= (1 - 4p^8)(1 + 4p^8) \quad \checkmark \checkmark \\
 &= \frac{(1 - 2p^4)(1 + 2p^4)(1 + 4p^8)}{\checkmark} \quad \triangleright 3
 \end{aligned}$$

$$\begin{aligned}
 3.2. \quad & 6bx - 4by - 15cx + 10cy \\
 &= 2b(3x - 2y) - 5c(3x - 2y) \\
 &= \frac{(3x - 2y)(2b - 5c)}{\triangleright}
 \end{aligned}$$

$$\begin{aligned}
 3.3. \quad & 27a^9 - 8 \\
 &= \frac{(3a^3 - 2)(9a^6 + 6a^3 + 4)}{\checkmark \checkmark} \quad \triangleright 3
 \end{aligned}$$

$$\begin{aligned}
 3.4. \quad & 4a^2 - 34a - 18 \\
 &= 2(2a^2 - 17a - 9) \quad \checkmark \\
 &= \frac{2(a - 9)(2a + 1)}{\triangleright} \quad 2
 \end{aligned}$$

$$\begin{aligned}
 3.5. \quad & 5^n + 5^{n+1} \\
 &= 5^n + 5^n \cdot 5^1 \\
 &= 5^n(1 + 5^1) \\
 &= \frac{5^n(6)}{\checkmark \checkmark} \quad \triangleright 2
 \end{aligned}$$

$$\begin{aligned}
 3.6. \quad & -5x^{\frac{1}{4}} + x^{\frac{1}{2}} - 6 \\
 &= x^{\frac{1}{4}} - 5x^{\frac{1}{4}} - 6 \\
 & \quad k = x^{\frac{1}{4}} \\
 & \quad k^2 = (x^{\frac{1}{4}})^2 \\
 & \quad = x^{\frac{1}{2}} \\
 &= k^2 - 5k - 6 \\
 &= (k + 1)(k - 6)
 \end{aligned}$$

$$= \frac{(x^{\frac{1}{4}} + 1)(x^{\frac{1}{4}} - 6)}{\text{variable } \checkmark \quad \text{coef } \checkmark} \quad \triangleright 2$$

$$\begin{aligned}
 3.7. \quad & 6 \cdot 3^{2x} - 17 \cdot 3^x + 5 \\
 & \quad k = 3^x \\
 & \quad k^2 = (3^x)^2 \\
 & \quad = 3^{2x}
 \end{aligned}$$

$$\begin{aligned}
 & 6k^2 - 17k + 5 \\
 &= (2k - 5)(3k - 1) \\
 &= \frac{(2 \cdot 3^x - 5)(3 \cdot 3^x - 1)}{\text{variable } \checkmark \quad \text{coef } \checkmark} \quad \triangleright 2
 \end{aligned}$$

$$\begin{aligned}
 4.1. \quad & 12 = 2^2 \cdot 3 \quad 4 = 2^2 \\
 & 9 = 3^2 \quad 27 = 3^3
 \end{aligned}$$

$$\therefore \frac{(2^2 \cdot 3)^x \cdot (3^2)^{x+1}}{(2^2)^{x-2} \cdot (3^3)^x} \quad \checkmark$$

$$= \frac{2^{2x} \cdot 3^x \cdot 3^{2x+2}}{2^{2x-4} \cdot 3^{3x}} \quad \checkmark$$

$$= \frac{2^{2x} \cdot 3^{x+2x+2}}{2^{2x-4} \cdot 3^{3x}}$$

$$= \frac{2^{2x} \cdot 3^{3x+2}}{2^{2x-4} \cdot 3^{3x}}$$

$$= \frac{2^{2x - (2x-4)} \cdot 3^{3x+2-3x}}{2 \cdot 3}$$

$$= \frac{2^{2x-2x+4} \cdot 3^2}{2 \cdot 3}$$

$$= \frac{2^4 \cdot 3^2}{2 \cdot 3}$$

$$= 16 \cdot 9$$

$$= \frac{144}{\triangleright} \quad 5$$

4.2.  $\frac{2x^2 - 5x - 12}{16 - x^2} \times \frac{1}{2x+3}$

$\frac{(x-4)(2x+3)}{(4-x)(4+x)} \times \frac{1}{2x+3}$

$\frac{x-4}{-(x-4)(4+x)}$  war

$= -\frac{1}{x+4}$  4

4.3.  $\frac{\frac{1}{x} + \frac{1}{y}}{\frac{y}{x} - \frac{x}{y}}$

$= \frac{\frac{y+x}{xy}}{\frac{y^2-x^2}{xy}}$

$= \frac{y+x}{xy} \times \frac{xy}{(y-x)(y+x)}$

$= \frac{1}{y-x}$  5

5.1.  $\frac{2}{x^2-2x-8} - \frac{4}{4-x} = \frac{3}{2+x}$

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

LCD =  $(x-4)(x+2)$

(∴  $x \neq 4; -2$ )

x km

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

$2 + 4x + 8 = 3x - 12$

$x = -22$  4

5.2.  $(x-7)(x+3) = 24$

$x^2 - 4x - 21 = 24$

$x^2 - 4x - 45 = 0$

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

∴  $x = 9$  or  $-5$  4

5.3.  $2 \cdot 3^x - 5 = 0$

$3^x = \frac{5}{2}$

$x = \frac{\log(5/2)}{\log 3}$

$x = 0,83$  3

5.4.  $2xb - b^2 = 2xa - a^2$

$a^2 - b^2 = 2xa - 2xb$

$(a-b)(a+b) = 2x(a-b)$

$\frac{(a-b)(a+b)}{2(a-b)} = x$

$\frac{a+b}{2} = x$  4

6.1.  $-2 < -3x+4 \leq 7$

6.1. 1.  $-4: -6 < -3x \leq 3$  ✓

$\div -3: 2 > x \geq -1$  ✓

2

6.1. 2.  ✓ 1

6.1. 3.  $x \in [-1; 2)$  ✓ 1

$$6.2. \quad 2x - y = 1 \quad \dots 1$$

$$-2 + 3y = -5x \quad \dots 2$$

from (1):  $2x - 1 = y$  ✓

Into (2):

$$-2 + 3(2x - 1) = -5x \quad \checkmark$$

$$-2 + 6x - 3 = -5x$$

$$11x = 5$$

$$x = \frac{5}{11} \quad \checkmark$$

$$\therefore y = 2\left(\frac{5}{11}\right) - 1$$

$$= -\frac{1}{11} \quad \checkmark$$

4

(OR)

$$2x - y = 1 \quad \dots 1$$

$$5x + 3y = 2 \quad \dots 2$$

$$(1) \times 3: \quad 6x - 3y = 3 \quad \checkmark$$

$$(2) \quad : \quad 5x + 3y = 2$$

$$11x = 5 \quad \checkmark$$

$$x = \frac{5}{11} \quad \checkmark$$

$$2\left(\frac{5}{11}\right) - y = 1$$

$$-\frac{1}{11} = y \quad \checkmark$$

4

$$7.1. \quad 1; -2; -5; \dots; -62$$

$$7.1. 1. \quad a = 1 \quad d = -3$$

$$T_n = a + (n-1)d$$

$$= 1 + (n-1)(-3) \quad \checkmark \quad f+5$$

$$= 1 + (-3n + 3)$$

$$= 1 - 3n + 3$$

$$= \underline{4 - 3n} \quad \checkmark \quad 2$$

$$7.1. 2. \quad T_n = 4 - 3n$$

$$-62 = 4 - 3n \quad \checkmark$$

$$3n = 66$$

$$n = \underline{22} \quad \checkmark \quad 2$$

$$7.2. \quad 3x - 6; 5x + 8; 4x - 11$$

$$5x + 8 - (3x - 6) = 4x - 11 - (5x + 8) \quad \checkmark$$

$$5x + 8 - 3x + 6 = 4x - 11 - 5x - 8$$

$$2x + 14 = -x - 19$$

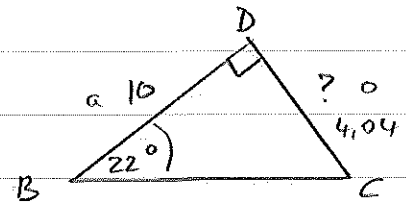
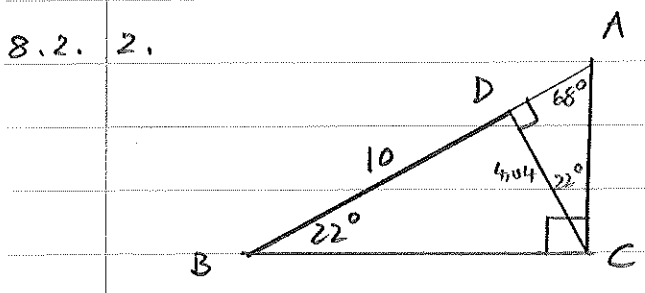
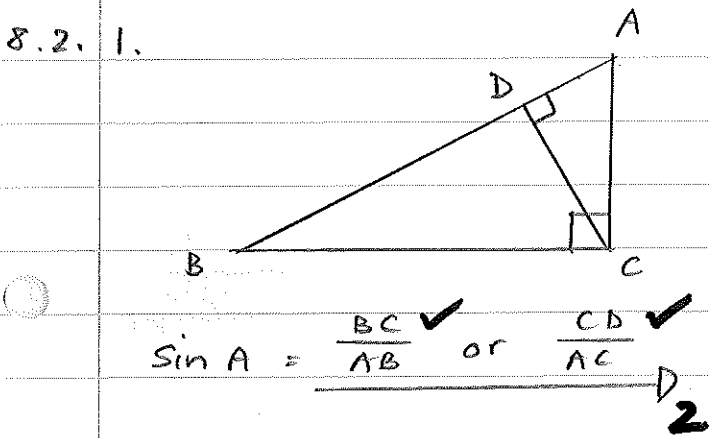
$$3x = -33$$

$$x = \underline{-11} \quad \checkmark \quad 2$$

8.1.  $\theta = 20^\circ$

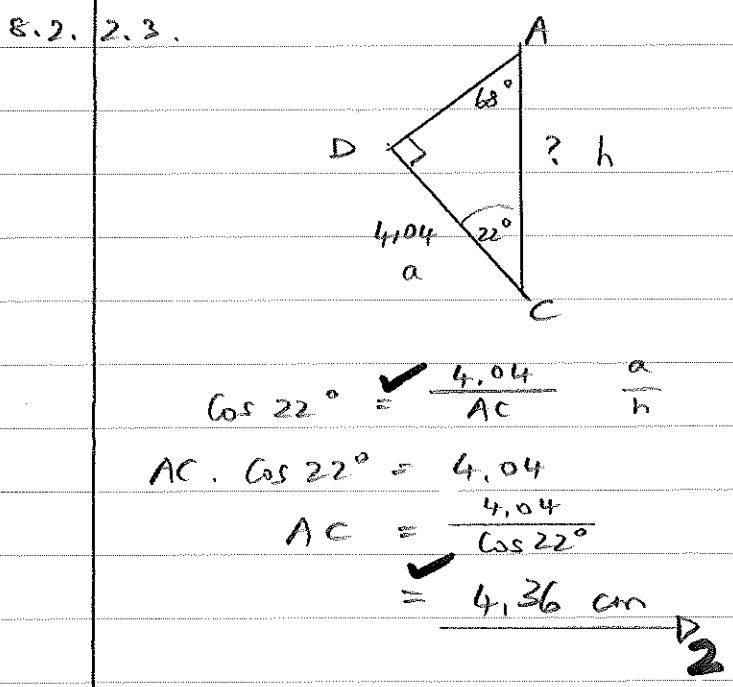
8.1. 1.  $\cos^2 \theta + 20$   
 $= \cos^2 20^\circ + 20$   
 $= (\cos 20^\circ)^2 + 20$   
 $= 20,88$  ✓

8.1. 2.  $\cos^2 (\theta + 20^\circ)$   
 $= \cos^2 (20^\circ + 20^\circ)$   
 $= \cos^2 40^\circ$   
 $= (\cos 40^\circ)^2$   
 $= 0,59$  ✓



$\tan 22^\circ = \frac{DC}{10}$  ✓  $\frac{a}{10}$   
 $10 \cdot \tan 22^\circ = DC$  ✓  
 $4,04 \text{ cm} = DC$  ✓

8.2. 2.2.  $\hat{A} = 68^\circ$  's  $\Delta = 180^\circ$   
 $\therefore \hat{DCA} = 22^\circ$  's  $\Delta = 180^\circ$



8.2. 1.  $\sin x = \cos 15^\circ$   
 $= 0,965 \dots$  ✓  
 $x = \sin^{-1}(0,965 \dots)$   
 $= 75^\circ$  ✓

8.3. 2.  $4 \cos(2x + 20^\circ) = 3$

$A = 2x + 20^\circ$

$4 \cos A = 3$

$\cos A = \frac{3}{4}$  ✓

$A = \cos^{-1}\left(\frac{3}{4}\right)$

$2x + 20^\circ = 41, 40 \dots^\circ$

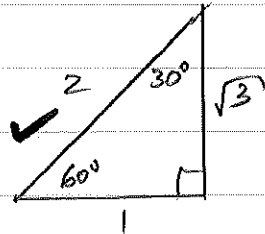
$2x = 21, 49 \dots^\circ$

$x = 10, 70 \dots^\circ$

3

8.4. 1.  $\sin 60^\circ$

no spec  $\Delta$   
o/2

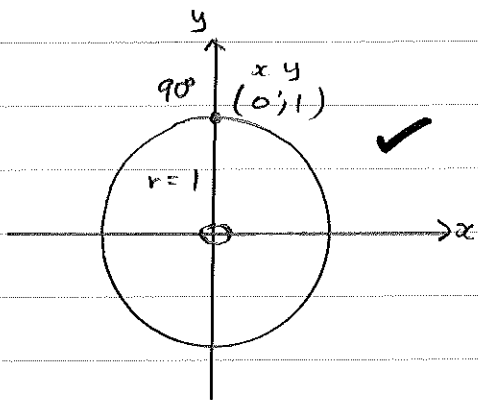


$= \frac{\sqrt{3}}{2}$  ✓

$\frac{o}{h}$

2

8.4. 2.  $\sin 90^\circ$



$= \frac{1}{1}$

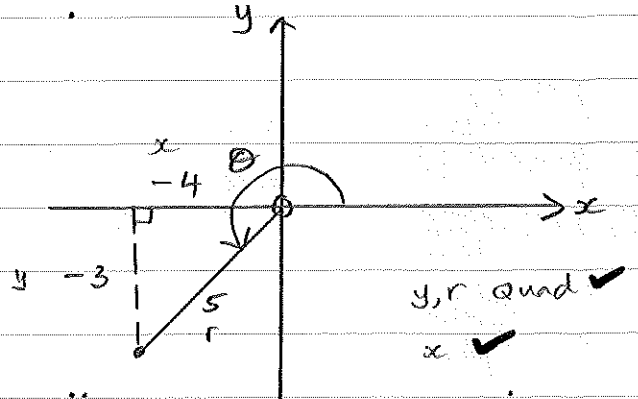
$\frac{o}{h}$

$= 1$  ✓

2

no spec diag  
o/2

8.5.  $\sin \theta = -\frac{3}{5}$   $\frac{o}{h}$   $\frac{-3}{5}$



$x^2 + y^2 = r^2$

$x^2 + (-3)^2 = (5)^2$

$x^2 + 9 = 25$

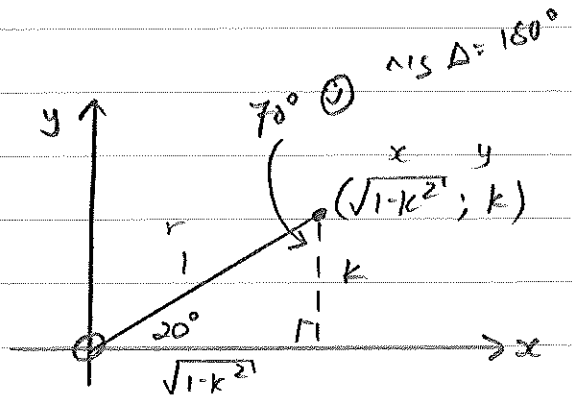
$x^2 = 16$

$x = \pm 4$

$\therefore x = -4$

$\cos \theta = \frac{-4}{5}$  ✓  $\frac{x}{r}$  3

8.6.



8.6. 1.  $\cos 20^\circ = \frac{\sqrt{1-k^2}}{1}$   $\frac{x}{r}$   
 $= \sqrt{1-k^2}$  1

8.6. 2.  $\tan 70^\circ = \frac{\sqrt{1-k^2}}{k}$   $\frac{o}{a}$  2