

ex 108  
more of 10.3

$$\sqrt[3]{5} \cdot \sqrt{6}$$

$$5^{\frac{1}{3}} \cdot 6^{\frac{1}{2}}$$

$$5^{\frac{2}{6}} \cdot 6^{\frac{3}{6}}$$

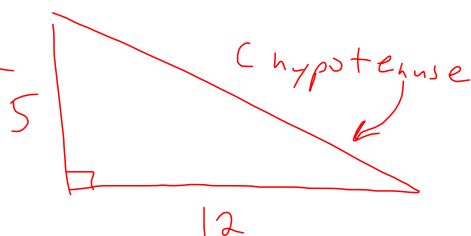
$$\sqrt[6]{5^2} \cdot \sqrt[6]{6^3}$$

$$\sqrt[6]{25} \cdot \sqrt[6]{216}$$

$$\sqrt[6]{5400}$$

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ex 114



$$a^2 + b^2 = c^2$$

$$5^2 + 12^2 = c^2$$

$$25 + 144 = c^2$$

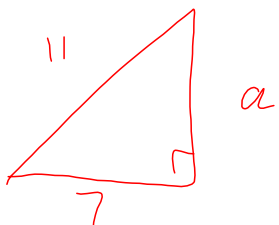
$$169 = c^2$$

$$\sqrt{169} = c$$

$$13 = c$$

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ex 118



$$a^2 + 7^2 = 11^2$$

$$a^2 + 49 = 121$$

$$a^2 = 72$$

$$a = \sqrt{72} \quad 8.4$$

$$= \sqrt{36} \sqrt{2}$$

$$= 6\sqrt{2}$$

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ex 122  $(-1, 5), (-7, 7)$

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

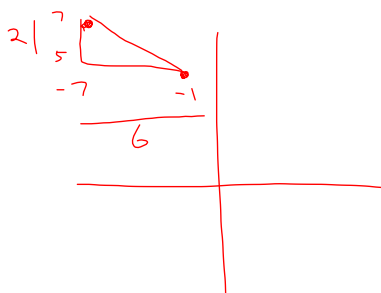
$$= \sqrt{(-1 - (-7))^2 + (5 - 7)^2}$$

$$= \sqrt{6^2 + (-2)^2}$$

$$= \sqrt{36 + 4}$$

$$= \sqrt{40}$$

$$= \sqrt{4} \sqrt{10}$$

$$= 2\sqrt{10}$$


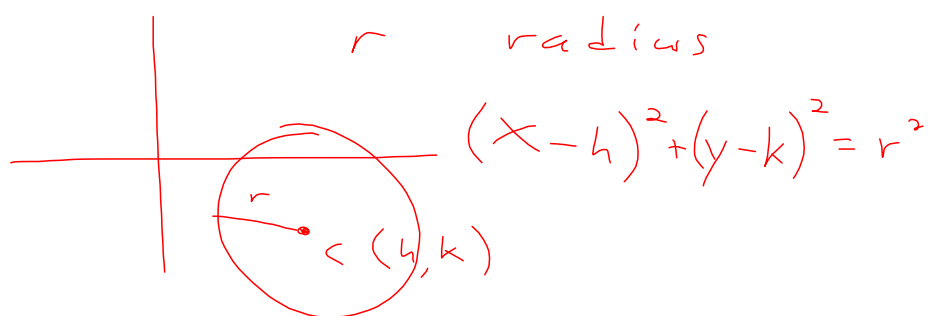
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ex 126  $(-2.9, 18.2)$   $(2.1, 6.2)$

$$\begin{aligned}d &= \sqrt{(-2.9 - 2.1)^2 + (18.2 - 6.2)^2} \\&= \sqrt{(-5)^2 + 12^2} \\&= \sqrt{25 + 144} \\&= \sqrt{169} = 13\end{aligned}$$

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Circle  $(h, k)$  center



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ex 134    C (0, 0)    r = 9  
                   h    k

$$(x-h)^2 + (y-k)^2 = r^2$$

$$(x-0)^2 + (y-0)^2 = 9^2$$

$$x^2 + y^2 = 81$$

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ex 136    C (5, -2)    r = 4

$$(x-5)^2 + (y-(-2))^2 = 4^2$$

$$(x-5)^2 + (y+2)^2 = 16$$

$$x^2 - 10x + 25 + y^2 + 4y + 4 = 16 - 25 - 4$$

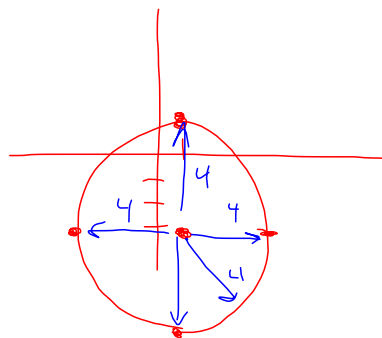
$$x^2 - 10x + y^2 + 4y = -13$$

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ex 138  $((-12, 13) \quad r = \sqrt{7}$   
 $(x + 12)^2 + (y - 13)^2 = 7$   
 $\swarrow (\sqrt{7})^2$   
 $\sqrt{49}$

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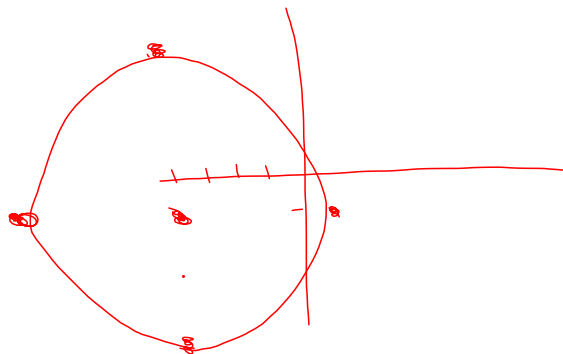
ex 144  $(x - 1)^2 + (y + 3)^2 = 16$   
 $(1, -3) \quad r = \sqrt{16} = 4$



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ex 146  $(x+4)^2 + (y+1)^2 = 25$

$C(-4, -1) \quad r = \sqrt{25} = 5$

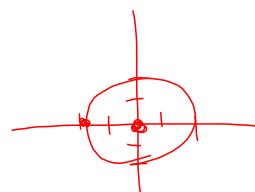


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ex 140

$$x^2 + y^2 = 4$$

$$(x-0)^2 + (y-0)^2 = 4$$



$C(0, 0) \quad r = \sqrt{4} = 2$

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ex 11 (paper)

$$x^2 + y^2 + 4x + 6y + 9 = 0 \quad -9$$

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

$$(x+2)^2 + (y+3)^2 = 4$$

$$(x+2)^2 + (y+3)^2 = 4$$

$$C(-2, -3) \quad r = \sqrt{4} = 2$$

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ex 15

$$3x^2 + 3y^2 - 12x - 24y + 12 = 0$$

÷ everything by 3.

$$x^2 + y^2 - 4x - 8y + 4 = 0$$

$$x^2 - 4x + 4 + y^2 - 8y + 16 = -4 + 4 + 16$$

$$(x-2)^2 + (y-4)^2 = 16$$

$$C(2, 4) \quad r = \sqrt{16} = 4$$

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ex 25

$$x^2 + 6x + 9 + y^2 - 6y + 9 = -9 + 9 + 9$$

$$(x + 3)^2 + (y - 3)^2 = 9$$

$$C(-3, 3) \quad r = \sqrt{9} = 3$$

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10.4 685  
p.

ex 6

$$\sqrt{25} - \sqrt{81}$$

$$5 - 9$$

$$-4$$

$$16x - 4x$$

$$12x$$

ex 8

$$4\sqrt{32} - 2\sqrt{8}$$

$$4\sqrt{16}\sqrt{2} - 2\sqrt{4}\sqrt{2}$$

$$4 \cdot 4\sqrt{2} - 2 \cdot 2\sqrt{2}$$

$$16\sqrt{2} - 4\sqrt{2}$$

$$12\sqrt{2}$$

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ex 10

$$3 \sqrt[3]{24} - 2 \sqrt[3]{192}$$

$$3 \sqrt[3]{8} \sqrt[3]{3} - 2 \sqrt[3]{64} \sqrt[3]{3}$$

$$3 \cdot 2 \sqrt[3]{3} - 2 \cdot 4 \sqrt[3]{3}$$

$$6 \sqrt[3]{3} - 8 \sqrt[3]{3}$$

$$-2 \sqrt[3]{3}$$

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ex 12

$$\sqrt[4]{405} - 2 \sqrt[4]{5}$$

$$\sqrt[4]{81} \sqrt[4]{5} \quad \downarrow$$

$$3 \sqrt[4]{5} - 2 \sqrt[4]{5}$$

$$\sqrt[4]{5}$$

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ex 22

$$\begin{aligned}
& 9\sqrt{27p^2} - 14\sqrt{108p^2} + 2\sqrt{48p^2} \\
& 9\sqrt{9p^2}\sqrt{3} - 14\sqrt{36p^2}\sqrt{3} + 2\sqrt{16p^2}\sqrt{3} \\
& 9 \cdot 3p\sqrt{3} - 14 \cdot 6p\sqrt{3} + 2 \cdot 4p\sqrt{3} \\
& 27p\sqrt{3} - 84p\sqrt{3} + 8p\sqrt{3} \\
& \qquad \qquad \qquad - 49p\sqrt{3}
\end{aligned}$$

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ex 26

$$\begin{aligned}
& 6\sqrt[3]{128m} - 3\sqrt[3]{16m} \\
& 6\sqrt[3]{64}\sqrt[3]{2m} - 3\sqrt[3]{8}\sqrt[3]{2m} \\
& 6 \cdot 4\sqrt[3]{2m} - 3 \cdot 2\sqrt[3]{2m} \\
& 24\sqrt[3]{2m} - 6\sqrt[3]{2m} \\
& 18\sqrt[3]{2m}
\end{aligned}$$

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ex 30

$$\begin{aligned}
 & 6q^2 \sqrt[3]{5q} - 2q \sqrt[3]{40q^4} \\
 & \quad \quad \quad - 2q \sqrt[3]{8q^3} \sqrt[3]{5q} \\
 & \quad \quad \quad - 2q \cdot 2q \sqrt[3]{5q} \\
 & \downarrow \\
 & 6q^2 \sqrt[3]{5q} - 4q^2 \sqrt[3]{5q} \\
 & \quad \quad \quad 2q^2 \sqrt[3]{5q}
 \end{aligned}$$

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ex 38

$$\begin{aligned}
 & \sqrt[4]{625s^3t} + \sqrt[4]{81s^7t^5} \\
 & \sqrt[4]{625} \sqrt[4]{s^3t} + \sqrt[4]{81s^4t^4} \sqrt[4]{s^3t} \\
 & 5 \sqrt[4]{s^3t} + 3st \sqrt[4]{s^3t} \\
 & \quad \quad \quad \swarrow \text{no st here so stop.} \quad \quad \quad \downarrow \\
 & \quad \quad \quad \quad \quad \quad \quad \quad \sqrt[4]{s^3t} (5 + 3st)
 \end{aligned}$$

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ex 40

$$\sqrt{125a^5b^5} + \sqrt[3]{125a^4b^4}$$

$$\sqrt{25a^4b^4} \sqrt{5ab} + \sqrt[3]{125a^3b^3} \sqrt[3]{ab}$$

$$5a^2b^2 \sqrt{5ab} + 5ab \sqrt[3]{ab}$$

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ex 46

$$\frac{3 \cdot 4\sqrt{3}}{3 \cdot 3} + \frac{2\sqrt{3}}{9}$$

$$\frac{12\sqrt{3}}{9} + \frac{2\sqrt{3}}{9} = \frac{14\sqrt{3}}{9}$$

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ex 48

$$\sqrt{\frac{12}{16}} + \sqrt{\frac{48}{64}} = \frac{\sqrt{12}}{\sqrt{16}} + \frac{\sqrt{48}}{\sqrt{64}}$$

$$= \frac{\sqrt{4}\sqrt{3}}{4} + \frac{\sqrt{16}\sqrt{3}}{8} = \frac{2\sqrt{3}}{4} + \frac{4\sqrt{3}}{8}$$

$$= \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} = \frac{2\sqrt{3}}{2} = \sqrt{3}$$

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ex 56

$$2a\sqrt[4]{\frac{a}{16}} - 5a\sqrt[4]{\frac{a}{81}}$$

$$\frac{2a\sqrt[4]{a}}{\sqrt[4]{16}} - \frac{5a\sqrt[4]{a}}{\sqrt[4]{81}}$$

$$\frac{3 \cdot 2a\sqrt[4]{a}}{3 \cdot 2} - \frac{2 \cdot 5a\sqrt[4]{a}}{2 \cdot 3}$$

$$\frac{6a\sqrt[4]{a}}{6} - \frac{10a\sqrt[4]{a}}{6} = \frac{-4a\sqrt[4]{a}}{6} = \frac{-2a\sqrt[4]{a}}{3}$$

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