

2004364

Sam Cashell

ACHA3000 Exam 03/11/2020

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Simplify the following

$$i) x^4 \times x^6 \times x \times x$$

$$= x^{11}$$

$$ii) 2x^2 \times 3x^2 \times 2x$$

$$= 12x^5$$

$$iii) \frac{x^4 \times x^3 \times x^2}{x^9} = \frac{x \times x \times x \times x \times x \times x \times x}{x \times x \times x \times x \times x \times x \times x} = \frac{x^4}{x^9} = x^{-5}$$

$$iv) (3x^2)^3 = 27x^6$$

$$v) \sqrt{x} \times \sqrt{x} = \sqrt{x^2}$$

2) Solve the following linear equations for x:

$$i) 15x - 2 = 12x + 9$$

$$15x - 12x = 9 + 2$$

$$3x = 11$$

$$x = \frac{11}{3} = 3.67$$

$$ii) 3(7x - 1) = 6(x + 3)$$

$$21x - 3 = 6x + 18$$

$$21x - 6x = 18 + 3$$

$$15x = 21$$

$$x = \frac{21}{15} = \frac{7}{5} = 1.4$$

$$x = 1.4$$

$$iii) \frac{5x + 3}{4} = \frac{2x - 1}{9}$$

$$9(5x + 3) = 4(2x - 1)$$

$$45x + 27 = 8x - 4$$

$$45x - 8x = -4 - 27$$

$$37x = -31$$

$$x = \frac{-31}{37} = -0.84$$

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3) Solve the following Quadratic equations by factoring

$$\text{i) } x^2 + 10x + 21 = 0 \quad \begin{array}{l} 3 \times 7 \\ 7 \times 3 \end{array}$$

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

$$x^2 + 7x + 3x + 21 = 0$$

$$x+3=0 \quad x+7=0$$

$$\boxed{x=-3 \quad x=-7}$$

$$\text{ii) } x^2 - 3x + 2 = 0 \quad -1 \times -2$$

$$(x-1)(x-2) = 0 \quad -2 \times -1$$

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

$$x-1=0 \quad x-2=0$$

$$\boxed{x=1 \quad x=2}$$

$$\text{iii) } x^2 + 12x + 20 = 0 \quad 2 \times 10$$

$$(x+2)(x+10) = 0 \quad 10 \times 2$$

$$x^2 + 10x + 2x + 20 = 0$$

$$x+2=0 \quad x+10=0$$

$$x \neq 2$$

$$\boxed{x=-2 \quad x=-10}$$

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$$IV) x^2 - 64 = 0 \quad \sqrt[4]{64} = 8$$

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

$$x^2 - 8x + 8x - 64 = 0$$

$$x - 8 = 0 \quad x + 8 = 0$$

$$\boxed{x = +8 \quad x = -8}$$

$$V) 2x^2 + 9x + 10 = 0$$

$$1 \times 10$$

$$2 \times 5$$

$$(2x^2 + 2)(x + 5) = 0$$

$$10 \times 1$$

$$5 \times 2$$

$$2x^2 + 10x + 2x + 10 = 0 \quad \times$$

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

$$2x^2 + 4x + 5x + 10 = 0$$

$$2x+5=0$$

$$x+2=0$$

$$2x = -5$$

$$x = -2$$

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

4) use the formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ to find two P.P.

$$14x^2 + 3x = 11$$

$$14x^2 + 3x - 11 = 0$$

A B C

$$x = \frac{-3 \pm \sqrt{3^2 - 4(14)(-11)}}{2(14)}$$

$$x = \frac{-3 \pm \sqrt{9 + 616}}{28}$$

$$x = \frac{-3 \pm \sqrt{625}}{28}$$

$$x = \frac{-3 \pm 25}{28}$$

$$x = \frac{-3 + 25}{28}$$

$$x = \frac{11}{14}$$

$$x = 0.79$$

$$x = \frac{-3 - 25}{28}$$

$$x = -1.00$$

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S) Solve the following simultaneous equations

x2 $5x + 3y = 39$ ①

x3 $8x - 2y = 42$ ②

$10x + 6y = 78$ ③

$24x - 6y = 126$ ④

④ - ③

~~$14x = 48$~~
 ~~$x = 3.43$~~
 $x = 6.21$

$14x = 48$

$x = 3.43$

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6) Simplify the following as far as possible

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

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

$$10x^2 + -5y^2 + -x^4 + x^2y + -x^2y + -x^4$$

$$-x^4 - x^4 + 10x^2 - 5y^2$$

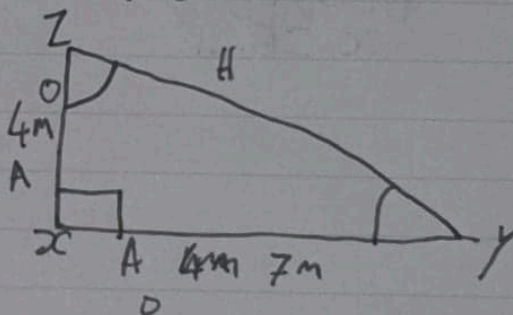
7) In the following right angled triangle if XZ is 4 meters and XY is 7 meters Calculate

i) angle Y

$$\tan y = \frac{4}{7}$$

$$y = \tan^{-1}\left(\frac{4}{7}\right)$$

$$y = 29.74^\circ$$



ii)

Angle Z

$$90 + 29.74 = 119.74$$

$$180 - 119.74 = 60.26^\circ$$

$$Z = 60.26^\circ$$

iii) Angle X

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iii) length YZ using Pythagoras Theorem

$$\cancel{(4)^2} = \cancel{4^2} + \cancel{(YZ)^2}$$
$$16 = 49 + (YZ)^2$$

$$YZ = \sqrt{xz^2 + xy^2}$$

$$YZ = \sqrt{4^2 + 7^2}$$

$$YZ = 8.06 \text{ m}$$

8) Express the following as x to a power

i) $3\sqrt{x}$

ii) 1