Instructor:	Frank Secretain
Course:	Math 101
Date:	October 17, 2025
Assessment:	Test 2
Time allowed:	110 minutes
Devices allowed:	Pencil, pen, eraser, calculator
Notes from instructor:	Be neat. Show your work where needed. Box final answers.
Marks allocated:	3 questions worth 20 marks
Percentage of final grade:	20% of final grade

Formula Sheet

Order of Operations

$$ac + bc = c(a + b)$$

exponents

$$a^n a^m = a^{n+m}$$

$$(a^n)^m = a^{nm}$$

$$(ab)^n = a^n b^n$$

$$a^0 = 1$$

$$a^{-n} = \frac{1}{a^n}$$

radicals

$$a^{\frac{n}{m}} = \sqrt[m]{a^n}$$

Relative Velocity

$$\vec{v}_{\frac{A}{C}} = \vec{v}_{\frac{A}{B}} + \vec{v}_{\frac{B}{C}}$$

Linear equations (Cramer's rule)

$$x_i = \frac{det(A_i)}{det(A)}$$

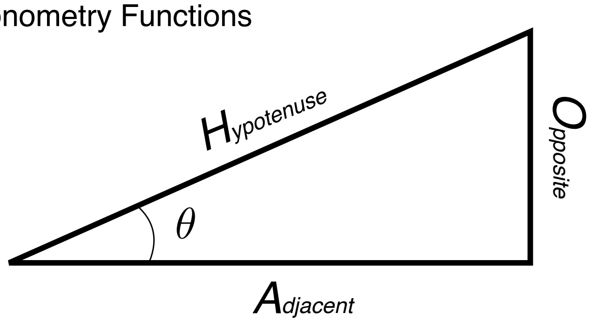
Forms of a 2nd order polynomial

$$y = ax^2 + bx + c$$

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

$$y = (x - m)(x - n)$$

Trigonometry Functions



$$sin(\theta) = \frac{O}{H} \qquad sin^{-1}\left(\frac{O}{H}\right) = \theta$$

$$cos(\theta) = \frac{A}{H} \qquad cos^{-1}\left(\frac{A}{H}\right) = \theta$$

$$tan(\theta) = \frac{O}{A} \qquad tan^{-1}\left(\frac{O}{A}\right) = \theta$$

Pythagoras Theorem

$$H^2 = O^2 + A^2$$

Unit Conversions

angles

$$2\pi = 6.28 \text{ rad} = 360^o$$

mass

$$1 \text{ kg} = 2.2 \text{ lbs.}$$

lengths

$$1 \text{ mile} = 1.6 \text{ km}$$

$$1 \text{ inch} = 2.54 \text{ cm}$$

$$1 \text{ m} = 3.3 \text{ ft}$$

volumes

$$1 \text{ gallon} = 3.78 \text{ Litres}$$

.(2 marks) Solve for x in the following equation.

$$7abx - 5 = c$$

.(3 marks each) Solve for x in the following equation.

$$\sin(\theta) + \frac{2x}{as^2} - f^n = 5$$

$$y + \frac{ax - 2}{b - 2} = \gamma + 3$$

$$\frac{a - 2}{bx - 2} + y = \Gamma + 2$$

$$5 - \Gamma^3 + \delta = \cos(3x^2 - 1)$$

$$\frac{\sin(x^2 - 1) - 4}{f^2 - 1} + y - c^2 = t$$

(3 marks) Re-write the equation as computer syntax with the minimum number of characters. Do not simplify or rearrange the equation.

$$\frac{1 - \alpha}{5b + 2} - 2b^3 + \frac{a^{n-3}}{4b} = 0$$

.(2 marks) Solve for x in the following equation.

$$7abx - 5 = c$$

+5 +5

$$\frac{7abx}{7ab} = \frac{c+5}{7ab}$$

$$x = \frac{c+5}{7ab}$$

.(3 marks each) Solve for x in the following equation.

$$\sin(\theta) + \frac{2x}{as^2} - f^n = 5$$

$-\sin(\theta)$ $+f^n$ $+f^n$ $-\sin(\theta)$

$$\frac{as^2}{2}\left(\frac{2x}{as^2}\right) = \left(5 + f^n - \sin(\theta)\right)\frac{as^2}{2}$$

$$x = \frac{as^2}{2}\left(5 + f^n - \sin(\theta)\right)$$

$$y + \frac{ax-2}{b-2} = \gamma + 3$$

$-y \quad -y$

$$(b-2)\left(\frac{ax-2}{b-2}\right) = (\gamma + 3 - y)(b-2)$$

$$ax - 2 = (\gamma + 3 - y)(b-2)$$

$+2 \quad +2$

$$\frac{ax}{a} = \frac{(\gamma + 3 - y)(b-2) + 2}{a}$$

$$\boxed{x = \frac{(\gamma + 3 - y)(b-2) + 2}{a}}$$

$$\frac{a-2}{bx-2} + y = \Gamma + 2$$

$-y \quad -y$

$$\frac{(bx-2)}{(\Gamma+2-y)}\left(\frac{a-2}{bx-2}\right) = (\Gamma + 2 - y)\frac{(bx-2)}{(\Gamma+2-y)}$$

$$\frac{a-2}{\Gamma+2-y} = bx - 2$$

$+2 \quad +2$

$$\frac{1}{b}(bx) = \left(\frac{a-2}{\Gamma+2-y} + 2\right)\frac{1}{b}$$

$$\boxed{x = \frac{1}{b}\left[\frac{a-2}{\Gamma+2-y} + 2\right]}$$

$$5 - \Gamma^3 + \delta = \cos(3x^2 - 1)$$

$$\cos^{-1}\left(\cos\left(3x^2 - 1\right)\right) = \cos^{-1}\left(5 - \Gamma^3 + \delta\right)$$

$$3x^2 - 1^{+1} = \cos^{-1}\left(5 - \Gamma^3 + \delta\right)^{+1}$$

$$\frac{3x^2}{3} = \frac{\cos^{-1}\left(5 - \Gamma^3 + \delta\right) + 1}{3}$$

$$\sqrt{x^2} = \sqrt{\frac{\cos^{-1}\left(5 - \Gamma^3 + \delta\right) + 1}{3}}$$

$$\boxed{x = \sqrt{\frac{\cos^{-1}\left(5 - \Gamma^3 + \delta\right) + 1}{3}}}$$

$$\frac{\sin(x^2-1)-4}{f^2-1}+y-c^2=t$$

$-y$ $+c^2$ $-y$ $+c^2$

$$(f^2-1)\left(\frac{\sin(x^2-1)-4}{f^2-1}\right)=(t-y+c^2)(f^2-1)$$

$$\sin(x^2-1)-4 \;{}^{+4} = (t-y+c^2)(f^2-1) \;{}^{+4}$$

$$\sin^{-1}(\sin(x^2-1)) = \sin^{-1}((t-y+c^2)(f^2-1)+4)$$

$$x^2-1 \;{}^{+1} = \sin^{-1}((t-y+c^2)(f^2-1)+4) \;{}^{+1}$$

$$\sqrt{x^2} = \sqrt{\sin^{-1}((t-y+c^2)(f^2-1)+4)+1}$$

$$\boxed{x = \sqrt{\sin((t-y+c^2)(f^2-1)+4)+1}}$$

(3 marks) Re-write the equation as computer syntax with the minimum number of characters. Do not simplify or rearrange the equation.

$$\frac{1-\alpha}{5b+2}-2b^3+\frac{a^{n-3}}{4b}=0$$

(1-α)/(5b+2) - 2*b^3 + a^(n-3)/4/b = 0