

MATH PLACEMENT

INDIANA**TECH**

Mathematics at Indiana Tech

At Indiana Tech, as with most colleges, we use a math placement exam to determine the best math course with which to begin your studies. This booklet gives you an opportunity to see and to work some typical college math problems so that you will know what to expect when you take this exam. The test you will take is called the Compass Placement Exam and is used by over one thousand colleges in the U.S. The test is taken on a computer and the questions are in multiple choice form. Your placement results are available as soon as you finish the test. The results will determine for what math course you will be registered. Please bring your calculator with you.

The following chart indicates the math courses that are required for each of our degrees. Course names and the page where sample problems can be found are on the next page.

College of Business

Accounting A.S. MA1000; MA1025; MA2025

Accounting B.S. MA1000; MA1025; MA2025

Business Administration/Finance B.S. MA1000; MA1025; MA2025

Business Administration/Human Resources B.S. MA1000; MA1025; MA2025

Business Administration/Management A.S. MA1000; MA1025; MA2025

Business Administration/Management B.S. MA1000; MA1025; MA2025

Business Administration/Marketing B.S. MA1000; MA1025; MA2025

Business Administration/Sports Management B.S. MA1000; MA1025; MA2025

College of Engineering

Biomedical Engineering B.S. MA1200; MA1210; MA2100; MA2430

Computer Engineering B.S. MA1200; MA1210; MA2100; MA2430

Electrical Engineering B.S. MA1200; MA1210; MA2100; MA2200; MA2430

Energy Engineering B.S. MA1035; MA1060; MA1100; MA1110

Industrial and Manufacturing Technology B.S. MA1035; MA1060; MA1100; MA1110

Mechanical Engineering B.S. MA1200; MA1210; MA2100; MA2200

School of Computer Sciences

Computer Science B.S. MA1200; MA1210; MA2150; MA2300; MA2430; MA3200

Computer Science B.A. MA1035; MA1060; MA1100/1200; MA1110/1210

Computer Security & Investigation B.S. MA1035; MA1060; MA2025

Digital Graphics & Design A.S. MA1025

Information Systems B.S. MA1035; MA1060; MA2025

Information Systems B.A. MA1035; MA2025

Networking B.S. MA1035; MA1060

Network Management A.S. MA1035; MA1060

Software Engineering B.S. MA1200; MA1210; MA2150; MA2300

Web Design A.S. MA1035

Web Development B.S. MA1035; MA2025

College of General Studies

Communication B.A. MA1000; MA1025; MA2025 (or equivalent)

Psychology B.S. MA1000; MA1025; MA2025 (or equivalent)

Recreation Management A.S. MA1000; MA1025

Recreation Management B.S. MA1000; MA1025; MA2025 (or equivalent)

Recreation Management/Sports Management B.S. MA1000; MA1025; MA2025 (or equivalent)

Therapeutic Recreation B.S. MA1000; MA1025; MA2025 (or equivalent)

Center for Criminal Sciences

Criminal Justice A.S. MA1000; MA1025

Criminal Justice/Administration B.S. MA1000; MA1025; MA2025 (or equivalent)

Criminal Justice/Crime Analysis B.S. MA1000; MA1025; MA2025 (or equivalent)

Criminal Justice/Rehabilitative Services B.S. MA1000; MA1025; MA2025 (or equivalent)

School of Education

Elementary Education B.S. MA1000/1010; MA1010/1035; MA2025 (or equivalent)

K-12 Physical Education B.S. MA1010; MA1035; MA2025 (or equivalent)

Course Number	Course Name	Page No.
MA1000	Foundations of College Mathematics	3
MA1010	Basic Algebra	4
MA1025	Mathematical Problem-Solving	5
MA1035	College Algebra	6
MA1040	Finite Mathematics	7
MA1060	Trigonometry	8
MA1100	Applied Calculus I	NA
MA1110	Applied Calculus II	NA
MA1200	Calculus I	NA
MA1210	Calculus II	NA
MA1300	Calculus & Numerical Methods I	NA
MA1310	Calculus & Numerical Methods II	NA
MA2025	Statistical Methods for Business	NA
MA2100	Differential Equations & Linear Algebra	NA
MA2150	Linear Algebra	NA
MA2200	Calculus III	NA
MA2300	Differential Equations	NA
MA2430	Probability & Statistics for Engineers	NA
MA3200	Graph Theory	NA
	ANSWERS	9
	SOLUTION MANUAL	10

1. Evaluate $5\frac{2}{3} + 7\frac{3}{8}$
 - a. $12\frac{5}{11}$
 - b. $12\frac{5}{24}$
 - c. $13\frac{1}{24}$
 - d. $13\frac{1}{4}$
 - e. $12\frac{1}{4}$
2. 20% of what number is 40?
 - a. 800
 - b. 2
 - c. 5
 - d. 200
 - e. 100
3. Bernie Banos bought a television priced at \$129.39. The sales tax rate was 5%. Find the amount of the tax.
 - a. \$4.70
 - b. \$6.47
 - c. \$646.95
 - d. \$2.59
 - e. \$134.39
4. Given that the radius of a circle is 10 in, in terms of π find the circumference of the circle.
 - a. 100π in
 - b. 20π in
 - c. 5π in
 - d. 20π sq in
 - e. 100π sq in
5. Find the square of the missing leg of a right triangle given that the length of one of the legs is 5.2 cm, and the length of the hypotenuse is 8.3 cm.
 - a. 41.85 sq cm
 - b. 95.93 sq cm
 - c. 9.61 sq cm
 - d. 45.56 sq cm
 - e. 13.7 sq cm
6. Given that the radius of a circle is 10 in, in terms of π find the area of the circle.
 - a. 10π in
 - b. 0.01π sq in
 - c. 100π sq in
 - d. 100π in
 - e. 10π sq in
7. Express the number 312,500,000 in standard scientific notation.
 - a. 312.5×10^6
 - b. 3.125×10^{-8}
 - c. $3,125 \times 10^5$
 - d. 312,500,000
 - e. 3.125×10^8
8. Find the mean of the following numbers: 3, 6, 2, 9, 6, 10
 - a. 2
 - b. 5.5
 - c. 9
 - d. 5
 - e. 6

1. Simplify the expression

$$5(x - 2) - 3(x - 4) + 6x$$

- a. $8x - 2$
 b. $8x - 22$
 c. $8x + 2$
 d. $8x - 6$
 e. $2x + 2$

3. Simplify
- $\left(x^{-\frac{2}{3}}\right)^{-2}$

- a. $x^{4/3}$
 b. $x^{1/3}$
 c. $x^{-4/3}$
 d. $x^{-4/9}$
 e. $x^{-1/3}$

5. Solve for x in the equation

$$3x + 5 = 7 - 2x.$$

- a. $\frac{5}{8}$
 b. $\frac{2}{5}$
 c. $\frac{2}{5}$
 d. $\frac{12}{5}$
 e. -2

7. Simplify
- $\left(\frac{x-9}{x-6}\right) + \left(\frac{x+4}{x^2-7x+6}\right)$

- a. $\frac{2x-5}{(x+6)(x^2-7x+6)}$
 b. $\frac{x^2-9x+13}{(x-6)(x-1)}$
 c. $\frac{x^2-7x-5}{(x-6)(x-1)}$
 d. $x^2-9x+13$
 e. $\frac{2x-13}{(x+6)(x^2-7x+6)}$

- 2.
- Form an equation
- which represents the following statement:

If x represents John's current age, how old is Ann now, if she is twice as old as John will be in two years?

- a. $y = 2x$
 b. $y = x + 2$
 c. $y = 2x + 2$
 d. $y = 2x + 4$
 e. $y = 2x - 2$

4. Simplify
- $\sqrt{32a^5b^4}$

- a. $b^2\sqrt{32a^5}$
 b. $4a^2b^2\sqrt{2a}$
 c. $4a^2b^2\sqrt{2}$
 d. $16b^2\sqrt{2a}$
 e. $a^2b^2\sqrt{32a}$

6. Completely factor

$$6x^2 - 11x - 10$$

- a. $(3x + 2)(2x - 5)$
 b. $(3x - 2)(2x + 5)$
 c. $(3x - 2)(2x - 5)$
 d. $(3x + 2)(2x + 5)$
 e. $(3x + 2)(2 - 5x)$

8. How many minutes will it take to travel 200 yards at a speed of 10 ft/sec?

- a. $3\frac{1}{3}$ min
 b. 10 min
 c. 20 min
 d. 1 min
 e. $\frac{1}{3}$ min

1. Solve for (x, y)
 $7x + 2y = 3$
 $4x + 4y = -6$
- $(\frac{6}{5}, \frac{-27}{10})$
 - $(0, \frac{-3}{2})$
 - $(0, \frac{3}{2})$
 - $(-6, 3)$
 - $(3, -6)$
3. Simplify $\sqrt{50x^3y}$
- $50xy$
 - $50x^3\sqrt{y}$
 - $5x^2\sqrt{y}$
 - $5x\sqrt{2xy}$
 - $\sqrt{50x^3y}$
5. Solve $m^2 + 4m - 5 = 0$ by the quadratic formula.
- $(-5, -1)$
 - $(-5, 1)$
 - $(5, -1)$
 - $(5, 1)$
 - $(-4, 5)$
7. Find the equation of the line in slope-intercept form going through the points $(-2, 4)$ and $(-5, -5)$.
- $y = -3x - 2$
 - $y = 2x$
 - $y = 3x + 10$
 - $y = -\frac{9}{7}x + \frac{10}{7}$
 - $y = \frac{9}{7}x + \frac{46}{7}$
2. Solve for (x, y, z)
 $2x + 5y + 2z = 9$
 $4x - 7y - 3z = 7$
 $3x - 8y - 2z = 9$
- $(\frac{9}{2}, -1, \frac{-9}{2})$
 - $(\frac{123}{47}, \frac{205}{47}, \frac{-424}{47})$
 - $(1, 1, 1)$
 - $(3, -1, 4)$
 - No Solution
4. Solve $42y^2 + 10y + 12 = 0$ by the quadratic formula:
- $(\frac{2}{7}, \frac{-1}{2})$
 - $(-.515, .277)$
 - $(.515, -.277)$
 - $(.429, -.667)$
 - No Real Solution
6. A number decreased by 3.5% is 274.3495. Find the number.
- 264.7473
 - 274.3145
 - 284.3
 - 283.9517
 - 274.3495
8. How much is in an account today if \$500 was invested 5 years ago into an account earning 6% interest compounded quarterly.
- \$650
 - \$668.49
 - \$630
 - \$673.43
 - \$716.29

1. Solve for (x, y)
 $7x + 2y = 3$
 $4x + 4y = -6$
- $(\frac{6}{5}, \frac{-27}{10})$
 - $(0, \frac{-3}{2})$
 - $(0, \frac{3}{2})$
 - $(-6, 3)$
 - $(3, -6)$
2. Solve for (x, y, z)
 $2x + 5y + 2z = 9$
 $4x - 7y - 3z = 7$
 $3x - 8y - 2z = 9$
- $(\frac{9}{2}, -1, \frac{-9}{2})$
 - $(\frac{123}{47}, \frac{205}{47}, \frac{-424}{47})$
 - $(1, 1, 1)$
 - $(3, -1, 4)$
 - No Solution
3. Solve for x : $\log_3 x = 2$
- 6
 - 9
 - $\frac{3}{2}$
 - $\frac{2}{3}$
 - 8
4. Solve $42y^2 + 10y + 12 = 0$ by the quadratic formula:
- $(\frac{2}{7}, \frac{-1}{2})$
 - $(-.515, .277)$
 - $(.515, -.277)$
 - $(.429, -.667)$
 - No Real Solution
5. Solve $m^2 + 4m - 5 = 0$ by factoring.
- $(-5, -1)$
 - $(-5, 1)$
 - $(5, -1)$
 - $(5, 1)$
 - $(-4, 5)$
6. Solve for x : $\log_2(x^2 - 6) = \log_2(-x)$
- 2
 - 3
 - 2
 - 3
 - $(-3, 2)$
7. Find the equation of the line in slope-intercept form going through the points $(-2, 4)$ and $(-5, -5)$.
- $y = -3x - 2$
 - $y = 2x$
 - $y = 3x + 10$
 - $y = -\frac{9}{7}x + \frac{10}{7}$
 - $y = \frac{9}{7}x + \frac{46}{7}$
8. Find the slope of the line perpendicular to the line $3x + 4y = 1$.
- $\frac{3}{4}$
 - $-\frac{4}{3}$
 - $-\frac{3}{4}$
 - 3
 - $\frac{4}{3}$

1. Given $A = \begin{vmatrix} -2 & 0 \\ 1 & 8 \end{vmatrix}$ and $B = \begin{vmatrix} 1 & 3 \\ 2 & 7 \end{vmatrix}$,

Find AB .

a. $\begin{vmatrix} -2 & -6 \\ 17 & 59 \end{vmatrix}$

b. $\begin{vmatrix} -16 & 6 \\ 0 & 7 \end{vmatrix}$

c. $\begin{vmatrix} -14 & 0 \\ 3 & 8 \end{vmatrix}$

d. $\begin{vmatrix} 5 & 2 \\ -1 & 6 \end{vmatrix}$

e. $\begin{vmatrix} -2 & 0 \\ 2 & 56 \end{vmatrix}$

3. A reviewer has 5 different books to review, and he reviews them 1 at a time. In how many different ways can he organize his work?

- a. 1
b. 0
c. 5
d. 120
e. 21

5. A coach has 6 stop watches, 3 of which are accurate, 1 is fast, and 2 are equally slow. The coach makes a random selection of two watches to be used to time the first-placed finisher in a race. What is the probability that the first place-finisher is timed accurately by at least one watch?

- a. 0.5
b. 0.6
c. 0.8
d. 0.2
e. 1.0

2. Given $B = \begin{vmatrix} 1 & 3 \\ 2 & 7 \end{vmatrix}$, find B^{-1} .

a. $\begin{vmatrix} 1 & 2 \\ 3 & 7 \end{vmatrix}$

b. $\begin{vmatrix} 1 & \frac{1}{3} \\ \frac{1}{2} & \frac{1}{7} \end{vmatrix}$

c. $\begin{vmatrix} 7 & -3 \\ -2 & 1 \end{vmatrix}$

d. $\begin{vmatrix} 2 & 7 \\ 1 & 3 \end{vmatrix}$

e. $\begin{vmatrix} 7 & 2 \\ 3 & 1 \end{vmatrix}$

4. A license plate consists of a 2-digit number followed by a letter, and a 3-digit number, for example, 35-D-621. How many different license plates can be formed?

- a. 156
b. 2,600,000
c. 3,120
d. 34
e. 2,106

6. If the probability of you hitting a target is 0.62, what is the probability of you not hitting the target?

- a. -0.38
b. -0.62
c. 0.38
d. 1.0
e. 0.0

1. Given triangle ABC, $\angle B = 90^\circ$, side $a = 10$, and side $b = 23$, find $\angle A$.
 - a. 25.77°
 - b. 66.50°
 - c. 23.50°
 - d. 64.23°
 - e. 57.00°
2. Given triangle ABC, $\angle A = 28^\circ$, $\angle B = 36^\circ$, and side $a = 15$, find side b .
 - a. 13.74
 - b. 26.00
 - c. 18.78
 - d. 20.50
 - e. 116
3. Given triangle ABC, side $a = 42$, side $b = 25$, and side $c = 36$, find $\angle B$.
 - a. 58.63°
 - b. 36.37°
 - c. 85°
 - d. 53.63°
 - e. No Solution
4. Solve for x where $0^\circ \leq x < 360^\circ$,

$$2 \sec^2 x + \tan^2 x - 3 = 0$$
 - a. $30^\circ, 210^\circ$
 - b. $60^\circ, 120^\circ, 240^\circ, 300^\circ$
 - c. $30^\circ, 150^\circ, 210^\circ, 330^\circ$
 - d. $60^\circ, 240^\circ$
 - e. $150^\circ, 300^\circ$
5. Find all roots in polar form of the equation: $x^4 - (1 - i\sqrt{3}) = 0$
 - a. $1.19 \text{ cis } 300$
 - b. $2 \text{ cis } 300$
 - c. $2 \text{ cis } 75, 2 \text{ cis } 165, 2 \text{ cis } 255, 2 \text{ cis } 345$
 - d. $1.19 \text{ cis } 75, 1.19 \text{ cis } 165, 1.19 \text{ cis } 255, 1.19 \text{ cis } 345$
 - e. No Solution
6. If $\sin A = r$ and the $\cos A = s$, find the $\sin 2A$.
 - a. $r + s$
 - b. $2r$
 - c. $2rs$
 - d. $2r + 2s$
 - e. rs
7. If the \sin of an angle in quadrant 3 is -0.5 , what is the \csc of the angle?
 - a. 2.0
 - b. 1.0
 - c. 0.5
 - d. -2.0
 - e. -1.0
8. If the $\sin A = -3/5$ and the $\tan A = -3/4$, find the $\sec A$.
 - a. $-5/4$
 - b. $5/3$
 - c. $-5/3$
 - d. $-4/3$
 - e. $5/4$

ANSWERS

MA 1000

1. c
2. d
3. b
4. b
5. a
6. c
7. e
8. e

MA 1010

1. c
2. d
3. a
4. b
5. c
6. a
7. b
8. d

MA 1025

1. a
2. d
3. d
4. e
5. b
6. c
7. c
8. d

MA 1035

1. a
2. d
3. b
4. e
5. b
6. d
7. c
8. e

MA 1040

1. a
2. c
3. d
4. b
5. c
6. c

MA 1060

1. a
2. c
3. b
4. c
5. d
6. c
7. d
8. e

SOLUTION MANUAL

MA1000 from page 3

- $5\frac{2}{3} + 7\frac{3}{8} = 5\frac{16}{24} + 7\frac{9}{24} = 12\frac{25}{24} = 13\frac{1}{24}$ (c)
- $0.20x = 40$
 $x = \frac{40}{.20} = 200$ (d)
- $.05 \times \$129.39 = \6.47 (b)
- $C = 2\pi r = 2\pi(10) = 20\pi$ in (b)
- $x^2 + 5.2^2 = 8.3^2$
 $x^2 + 27.04 = 68.89$
 $x^2 = 68.89 - 27.04$
 $x^2 = 41.85$ sq cm (a)
- $A = \pi r^2 = \pi(10)^2 = \pi(100) = 100\pi$ sq in (c)
- $312,500,000 = 3.125 \times 10^8$ (e)
- $\text{Mean} = \frac{3+6+2+9+6+10}{6} = \frac{36}{6} = 6$ (e)

MA1010 from page 4

- $5(x-2) - 3(x-4) + 6x = 5x - 10 - 3x + 12 + 6x = 8x + 2$ (c)
- $y = 2(x+2)$
 $y = 2x + 4$ (d)
- $(x^{\frac{-2}{3}})^{-2} = x^{(-2/3) \times (-2)} = x^{4/3}$ (a)
- $\sqrt{32a^5b^4} = \sqrt{(16)(2)(a^4)(a)(b^4)} = 4a^2b^2\sqrt{2a}$ (b)
- $3x + 5 = 7 - 2x$
 $5x = 2$
 $x = \frac{2}{5}$ (c)
- $6x^2 - 11x - 10 = (3x + 2)(2x - 5)$ (a)
- $\left(\frac{x-9}{x-6}\right) + \left(\frac{x+4}{x^2-7x+6}\right) = \frac{x-9}{x-6} + \frac{x+4}{(x-6)(x-1)} = \frac{(x-9)(x-1) + x+4}{(x-6)(x-1)}$
 $= \frac{x^2 - 10x + 9 + x + 4}{(x-6)(x-1)} = \frac{x^2 - 9x + 13}{(x-6)(x-1)}$ (b)
- $\text{time} = \frac{\text{distance}}{\text{speed}} = \frac{200\text{yd}}{10\text{ft/sec}} = \frac{200\text{yd sec}}{10\text{ft}} \cdot \frac{3\text{ft}}{1\text{yd}} \cdot \frac{1\text{min}}{60\text{sec}} = 1 \text{ minute}$ (d)

MA1025 from page 5

1. $7x + 2y = 3$
 $4x + 4y = -6$
 $7x + 2y = 3 \quad y = \frac{3-7x}{2}$
 $4x + 4y = 4x + 4\left(\frac{3-7x}{2}\right) = -6$
 $8x + 12 - 28x = -12 \quad x = \frac{-24}{-20} = \frac{6}{5}$
 $y = \frac{3-7x}{2} = \frac{3-7\left(\frac{6}{5}\right)}{2} = \frac{-27}{10} \quad \left(\frac{6}{5}, \frac{-27}{10}\right) \text{ (a)}$

2. $2x + 5y + 2z = 9$
 $4x - 7y - 3z = 7$
 $3x - 8y - 2z = 9$

$$\begin{array}{r} 6x + 15y + 6z = 27 \\ 8x - 14y - 6z = 14 \\ \hline 14x + y = 41 \end{array} \quad \begin{array}{r} 2x + 5y + 2z = 9 \\ 3x - 8y - 2z = 9 \\ \hline 5x - 3y = 18 \end{array}$$

$$\begin{array}{r} 42x + 3y = 123 \\ 5x - 3y = 18 \\ \hline 47x = 141 \\ x = 3 \end{array} \quad \begin{array}{r} 14(3) + y = 41 \\ y = -1 \end{array} \quad \begin{array}{r} 2(3) + 5(-1) + 2z = 9 \\ z = 4 \end{array}$$

 $(3, -1, 4) \text{ (d)}$

3. $\sqrt{50x^2y} = \sqrt{(25)(2)(x^2)(x)(y)} = 5x\sqrt{2xy} \text{ (d)}$

4. $42y^2 + 10y + 12 = 0$
 $y = \frac{-10 \pm \sqrt{(10)^2 - 4(42)(12)}}{2(42)} \text{ No Real Solution (e) } (\sqrt{\quad} < 0)$

5. $m^2 + 4m - 5 = 0$
 $m = \frac{-4 \pm \sqrt{(4)^2 - 4(1)(-5)}}{2(1)} = (-5, 1) \text{ (b)}$

6. 96.5% of x is 274.3495
 $x = 274.3495 / .965 = 284.3 \text{ ©}$

7. $y - 4 = \frac{-5-4}{-5+2}(x+2) = 3(x+2) = 3x + 6$
 $y = 3x + 10 \text{ (c)}$

8. $A = P\left(1 + \frac{r}{m}\right)^{mt} = 500\left(1 + \frac{.06}{4}\right)^{(4)(5)} = \673.43 (d)

MA1035 from page 6

1. $7x + 2y = 3$
 $4x + 4y = -6$

$$7x + 2y = 3 \quad y = \frac{3-7x}{2}$$

$$4x + 4y = 4x + 4\left(\frac{3-7x}{2}\right) = -6$$

$$8x + 12 - 28x = -12 \quad x = \frac{-24}{-20} = \frac{6}{5}$$

$$y = \frac{3-7x}{2} = \frac{3-7\left(\frac{6}{5}\right)}{2} = \frac{-27}{10} \quad \left(\frac{6}{5}, \frac{-27}{10}\right) \text{ (a)}$$

2. $2x + 5y + 2z = 9$
 $4x - 7y - 3z = 7$
 $3x - 8y - 2z = 9$

$$\begin{array}{r} 6x + 15y + 6z = 27 \\ \underline{8x - 14y - 6z = 14} \\ 14x + y = 41 \end{array}$$

$$\begin{array}{r} 2x + 5y + 2z = 9 \\ \underline{3x - 8y - 2z = 9} \\ 5x - 3y = 18 \end{array}$$

$$\begin{array}{r} 42x + 3y = 123 \\ \underline{5x - 3y = 18} \\ 47x = 141 \\ x = 3 \end{array}$$

$$\begin{array}{r} 14(3) + y = 41 \\ y = -1 \end{array} \quad \begin{array}{r} 2(3) + 5(-1) + 2z = 9 \\ z = 4 \end{array}$$

$(3, -1, 4)$ (d)

3. $\log_3 x = 2$

$$x = 3^2 = 9 \text{ (b)}$$

4. $42y^2 + 10y - 12 = 0$

$$y = \frac{-10 \pm \sqrt{(10)^2 - 4(42)(-12)}}{2(42)} = (.429, -.667) \text{ (d)}$$

5. $m^2 + 4m - 5 = 0$

$$(m + 5)(m - 1) = 0$$

$$m = (-5, 1) \text{ (b)}$$

6. $\log_2(x^2 - 6) = \log_2(-x)$

$$x^2 - 6 = -x \quad x^2 + x - 6 = (x + 3)(x - 2) = 0 \quad x = -3, 2 \quad (x \neq 2) \quad x = -3 \text{ (d)}$$

7. $y - 4 = \frac{-5-4}{-5+2}(x+2) = 3(x+2) = 3x + 6$

$$y = 3x + 10 \text{ (c)}$$

8. $3x + 4y = 1$

$$y = -\frac{3}{4}x + \frac{1}{4} \quad m = -\frac{3}{4} \text{ (Because of } y = mx + b)$$

$$\text{Slope of perpendicular} = -\frac{1}{-3/4} = \frac{4}{3} \text{ (e)}$$

MA1040 from page 7

$$1. \quad AB = \begin{vmatrix} -2 & 0 \\ 1 & 8 \end{vmatrix} \times \begin{vmatrix} 1 & 3 \\ 2 & 7 \end{vmatrix} = \begin{vmatrix} -2+0 & -6+0 \\ 1+16 & 3+56 \end{vmatrix} = \begin{vmatrix} -2 & -6 \\ 17 & 59 \end{vmatrix} \quad (\text{a})$$

$$2. \quad \begin{vmatrix} 1 & 3 \\ 2 & 7 \end{vmatrix} \begin{vmatrix} 1 & 0 \\ 0 & 1 \end{vmatrix} = \begin{vmatrix} 1 & 3 \\ 0 & 1 \end{vmatrix} \begin{vmatrix} 1 & 0 \\ -2 & 1 \end{vmatrix} = \begin{vmatrix} 1 & 0 & 7 & -3 \\ 0 & 1 & -2 & 1 \end{vmatrix} \quad B^{-1} = \begin{vmatrix} 7 & -3 \\ -2 & 1 \end{vmatrix} \quad (\text{c})$$

$$3. \quad {}_5P_5 = 5! = 120 \quad (\text{d})$$

$$4. \quad 10 \times 10 \times 26 \times 10 \times 10 \times 10 = 26 \times 10^5 = 2,600,000 \quad (\text{b})$$

$$5. \quad \frac{{}_3C_2 + {}_3C_1 {}_3C_1}{{}_6C_2} = 0.8 \quad (\text{c})$$

$$6. \quad 1 - 0.62 = 0.38 \quad (\text{c})$$

MA1060 from page 8

$$1. \quad \sin A = \frac{10}{23} \quad A = 25.77^\circ \quad (\text{a})$$

$$2. \quad \frac{\sin 28}{15} = \frac{\sin 36}{b} \quad (\text{Law of Sines}) \quad b = 18.78 \quad (\text{c})$$

$$3. \quad 25^2 = 36^2 + 42^2 - 2(36)(42)\cos B \quad (\text{Law of Cosines}) \quad B = 36.37^\circ \quad (\text{b})$$

$$4. \quad 2 \sec^2 x + \tan^2 x - 3 = 0 \quad 2(1 + \tan^2 x) + \tan^2 x - 3 = 0$$

$$\tan x = \pm \frac{1}{\sqrt{3}} \quad x = 30^\circ, 150^\circ, 210^\circ, 330^\circ \quad (\text{c})$$

$$5. \quad x^4 - (1 - i\sqrt{3}) = 0 \quad x^4 = (1 - i\sqrt{3}) = 2\text{cis}300$$

$$x = 2^{\frac{1}{4}} \text{cis} \frac{300}{4} \quad x = 1.19\text{cis} 75, 1.19\text{cis} 165, 1.19\text{cis} 255, 1.19 \text{cis} 345 \quad (\text{d})$$

$$6. \quad \sin 2A = 2 \sin A \cos A = 2rs \quad (\text{c})$$

$$7. \quad \csc A = \frac{1}{\sin A} = \frac{1}{-.05} = -2.0 \quad (\text{d})$$

$$8. \quad \cos a \frac{\sin A}{\tan A} = \frac{-3/5}{-3/4} = \frac{4}{5} \quad \sec A = \frac{1}{\cos A} = \frac{1}{4/5} = \frac{5}{4} \quad (\text{e})$$