PRACTISE
PRECALCULUS PLACEMENT
MATHEMATICS ASSESSMENT

DOUGLAS COLLEGE

(Updated September 2012)

NOTE TO STUDENTS:

Some students may be required to write the Douglas Precalculus Placement Mathematics Assessment in order to be eligible to register for one of the precalculus courses (Math 1101, Math 1105 or Math 1110). The result of the test will help to determine the student's correct placement in these courses.

If you need to take the test, the following set of 50 multiple-choice questions will give you a sense of the level of mathematics and the style of questions that you can expect on the assessment test. The actual test consists of 34 multiple-choice questions.

The answers to these practise questions are provided at the end, so that you can check your score; simply calculate the number of your correct answers divided by 50 and then multiply by 100 to get a percentage score.

Important: NO CALCULATORS ALLOWED

1. Simplify $ab^3c^2\left(\frac{2a^2b}{c^4}\right)^{-1}$ and eliminate any negative exponents.

a) b^2c^6

b) $\frac{b^6c^2}{2a^2}$

c) $\frac{2b^2c^6}{3a}$

d) $\frac{b^2c^6}{2a}$

e) $2b^2c^6$

2. Perform the indicated operations and simplify: $(t+3)(2t-1)-3(t+2)$

a) $2t^2+6t+4$

b) $2t^2+2t-9$

c) $2t^2-2t-10$

d) $2t^2-3t-5$

e) $2t^2+5t+4$

3. Factor the expression: $2y^2x+xy+5y+10y^2$

a) $xy(2y-1)(x+5)$

b) $y^2(y+1)(5x+5)$

c) $y(2y+1)(x+5)$

d) $y(y+2)(5x+1)$

e) $(y+1)^2(x+5)$

4. Reduce to lowest terms: $\frac{x^2+x-2}{x^2+2x-3}$

a) $\frac{x+1}{x+2}$

b) $\frac{x+2}{x+3}$

c) $\frac{x-3}{x-2}$

d) $\frac{x+3}{x+2}$

e) $\frac{x-2}{2x-3}$

5. Which of the following is equivalent to $\left|t+\frac{1}{2}\right| \geq 2$?

a) $(-\infty,-2] \cup [3,\infty)$

b) $\left(-\infty,-\frac{1}{2}\right] \cup [\frac{3}{2},\infty)$

c) $\left(-\infty,-\frac{3}{2}\right] \cup [\frac{3}{2},\infty)$

d) $\left(-\infty,-\frac{5}{2}\right] \cap \left[\frac{3}{2},\infty\right)$

e) $\left(-\infty,-\frac{5}{2}\right] \cup \left[\frac{3}{2},\infty\right)$

6. Which of the equations represents a circle with center (-1,7) and radius $\sqrt{2}$?

a) $x^2+2x+y^2-28y+50=0$

b) $x^2-2x-y^2-14y-48=0$

c) $x^2+14x+48+y^2-2y=0$

d) $x^2-14x+48+y^2-2y=0$

e) $x^2+2x+y^2-14y+48=0$

7. Find an equation of the line that passes through (2,-1) and (4,1).

a) $x - 2y + 1 = 0$

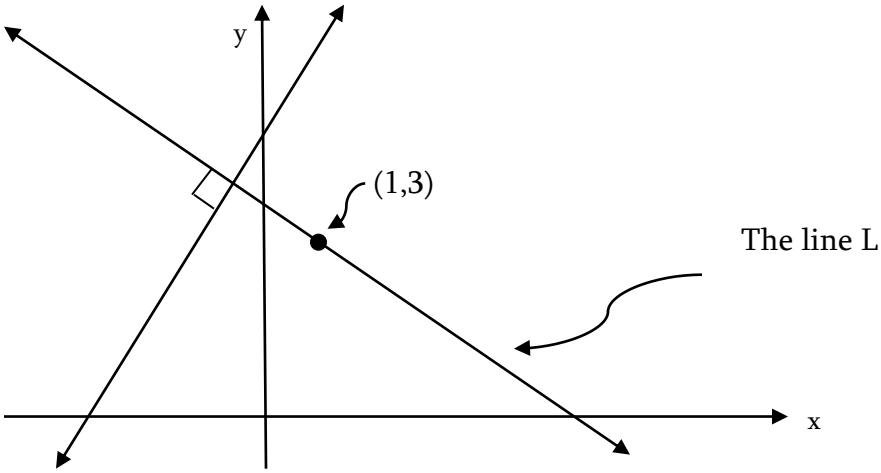
b) $y - x + 3 = 0$

c) $3x - 2y - 1 = 0$

d) $3x - 3y + 1 = 0$

e) $4x + 2y = 0$

8. Graphed below is the line $-x + \frac{1}{2}y = 3$ along with a line L.



The equation of L is given by:

a) $x + 3y = 0$

b) $3x - y = 0$

c) $y + \frac{1}{2}x - \frac{7}{2} = 0$

d) $y = -2x + 5$

e) $x - \frac{1}{2}y = -3$

9. Which of the following is true for *all* non-zero values of x and y?

a) $\sqrt{x^2 + y^2} = x + y$

b) $\frac{1}{\frac{1}{x}+\frac{1}{y}} = x + y$

c) $(x + y)^{100} = x^{100} + y^{100}$

d) $(x + y)^{-1} = x^{-1} + y^{-1}$

e) None of the above statements are true for all values of x and y.

10. Let $f(x) = |x + 2| - x^2$. Then $f(-3)$ equals:

a) -4

b) 14

c) -8

d) 10

e) 0

11. Which of the following is the y-coordinate of the solution to the system of equations:
$\begin{Bmatrix} x + 4y = -2 \\ y = 5 - 3x \end{Bmatrix}$

a) 5

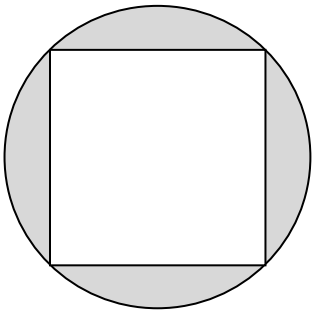
b) -8

c) $\frac{23}{11}$

d) -1

e) $-\frac{7}{4}$

12. A square is inscribed inside a circle of radius 1 cm. Find the shaded area.



a) $\pi^2 - 4\ cm^2$

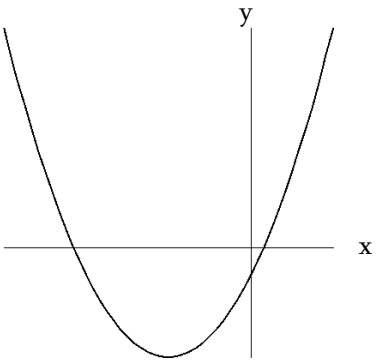
b) $\pi^2 - 1\ cm^2$

c) $4(\pi - 1)cm^2$

d) $\pi - 8\ cm^2$

e) $\pi - 2\ cm^2$

13. The sketch below could represent the solutions to which of the following equations?



a) $y - 12 = (x - 3)^2$

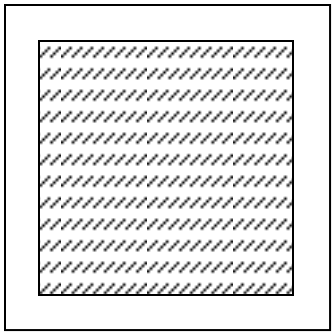
b) $y + 12 = (x + 3)^2$

c) $y + 12 = (x - 3)^2$

d) $y + 12 = -(x - 3)^2$

e) $y - 12 = -(x + 3)^2$

14. A square pool of area 144 m^2 is surrounded by a concrete deck of area 25 m^2. What is the perimeter of the outside of the deck ?



a) 68 m

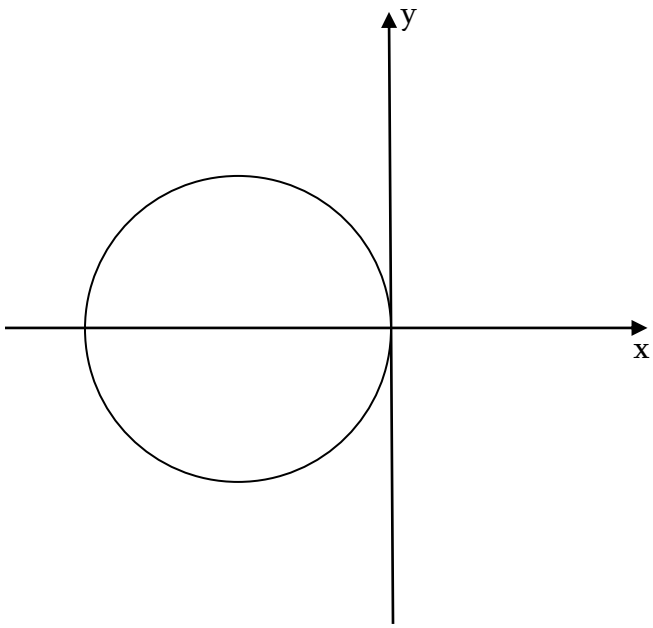
b) $68\sqrt{2}$ m

c) 52 m

d) 17 m

e) $64\sqrt{2}$ m

15. The sketch below could represent the graph of which of the following equations?



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

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

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

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

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

16. Solve for x: $3x = a(2 - x)$

a) $x = \frac{2a}{3}$

b) $x = \frac{3+a}{2a}$

c) $x = \frac{2a}{3+a}$

d) $x = \frac{a}{2}$

e) $x = \frac{2a-x}{3}$

17. Find the slope of the line through $P(5,1)\ and\ Q(7,6)$.

a) $\frac{1}{2}$

b) $\frac{5}{2}$

c) $\frac{2}{5}$

d) $-\frac{5}{2}$

e) $-\frac{2}{5}$

18. One solution of the equation $x^{\frac{2}{3}} = 4$ is given by:

a) $x = -64$

b) $x = 2$

c) $x = -8$

d) $x = 16$

e) $x = \sqrt[3]{\frac{1}{2}}$

19. The expression $\sqrt{\frac{2}{3}}$ is equivalent to:

a) $\frac{2}{3}$

b) $\frac{\sqrt{6}}{3}$

c) $\frac{2\sqrt{2}}{3\sqrt{3}}$

d) $\frac{9}{4}$

e) $\frac{3}{2}$

20. The expression $\frac{a}{a+\sqrt{b}}$ is equivalent to:

a) $\frac{a^2}{a^2+b}$

b) $\frac{1}{1+\sqrt{b}}$

c) $\frac{a^2-a\sqrt{b}}{a^2-b}$

d) $\frac{a^2+a\sqrt{b}}{a^2-b}$

e) $\frac{a^2+a\sqrt{b}}{a^2+b}$

21. Solve the equation: $x(x-6)-15=(x-1)^2$

a) $x=3$

b) $x=-13$

c) $x=-4$

d) $x=1$

e) $x=6$

22. For which value of t will the line through the points $(-1,4)$ and $(3,-4)$ be *parallel* to the line through the points $(2,t)$ and $(1,3)$?

a) $t = \frac{1}{2}$

b) $t = 1$

c) $t = \frac{7}{2}$

d) $t = -1$

e) $t = \frac{2}{3}$

23. The domain of $f(x) = \sqrt{2x+3}$ is:

a) $[0, \infty)$

b) $(-\infty, -\frac{3}{2}]$

c) $[\frac{3}{2}, \infty)$

d) $[-\frac{3}{2}, \infty)$

e) $\left[0, \frac{3}{2}\right]$

24. Long distance plan A charges a fixed fee of $5 per month plus 10 cents per minute of long distance calling. Long distance plan B has no fixed monthly fee, but charges 30 cents for each minute of long distance calling. Plan B will be less expensive than plan A for long distance calling times

a) Over 25 minutes

b) Over 2.5 minutes

c) Less than 25 minutes

d) Less than 2.5 minutes

e) No matter how many minutes

25. A cyclist rides from Albertville to Bakersville, a distance of 120 km. His return trip takes 1 hour longer, because his speed decreases by 10 km/hr. How fast does he ride each way?

a) 35 km/hr going and 25 km/hr returning

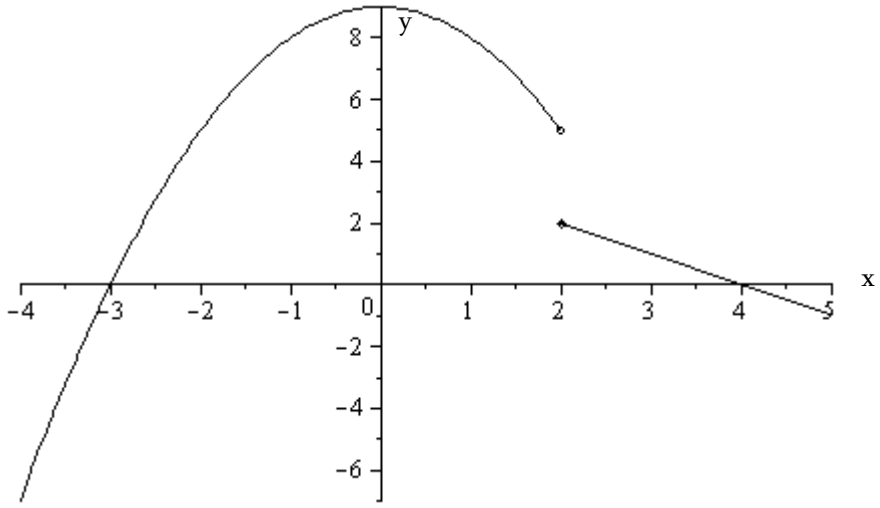
b) 30 km/hr going and 20 km/hr returning

c) 30 km/hr going and 40 km/hr returning

d) 40 km/hr going and 30 km/hr returning

e) 60 km/hr going and 50 km/hr returning

26. A formula for the piece-wise defined function $f(x)$ graphed below is given by



a) $f(x) = \begin{cases} x^2 - 9 \text{ if } x < 2 \\ 4 - x \text{ if } x \geq 2 \end{cases}$

b) $f(x) = \begin{cases} 9 - x^2 \text{if } x < 2 \\ 4 - x \text{ if } x \geq 2 \end{cases}$

c) $f(x) = \begin{cases} 9 - x^2 \text{if } x \leq 2 \\ 4 - x \text{ if } x > 2 \end{cases}$

d) $f(x) = \begin{cases} x^2 - 9 \text{ if } x \geq 2 \\ 2 + x \text{ if } x < 2 \end{cases}$

e) $f(x) = \begin{cases} x^2 + 9 \text{ if } x \leq 2 \\ 4 - x \text{ if } x > 2 \end{cases}$

27. Find all real solutions of the equation: $\sqrt{x+7} = 5 - x$

a) $x = 2$

b) $x = 5$

c) $x = \frac{-1 \pm \sqrt{73}}{2}$

d) $x = 7$

e) There are no real solutions

28. Solve: $\frac{8}{x-1} \leq 2$

a) $(-\infty, 5]$

b) $(-\infty, 1) \cup [5, \infty)$

c) $(-\infty, 1] \cup [5, \infty)$

d) $(1,5]$

e) $(-\infty, 5]$

29. Quarters weigh 6 grams while dimes weigh 2 grams. Tiffany has $5.35 worth of quarters and dimes in her pocket weighing a total of 124 grams. How many quarters does Tiffany have?

a) 13

b) 17

c) 18

d) 19

e) 21

30. One factor of the factored form of $2x^3y + 6x^3 - x^2y - 3x^2$ is:

a) $2y - 1$

b) $2x + 3$

c) $2x + 1$

d) $y - 3$

e) $y + 3$

31. Simplify the expression: $\frac{1}{a} - \frac{2}{a^2b} + \frac{1}{b^2}$

a) $\frac{b^2-3ab+4a^2}{2a^2b^2}$

b) $\frac{b-3ab+2a}{2ab}$

c) $\frac{b^2-3ab+6b^2}{3a^2b^2}$

d) $\frac{ab^2-2b+a^2}{a^2b^2}$

e) $\frac{ab^2-3ab+2a^2b}{a^3b^3}$

32. If $f(x) = x^2$ and $g(x) = 3x + 1$ then the function composition $(f \circ g)(x)$ equals:

a) $x^2(3x + 1)$

b) $x^2(3x + 1)(x)$

c) $3x^2 + 1$

d) $(3x + 1)^2$

e) $x(3x + 1)^2$

33. The vertex of the parabola $y = 16x^2 + 40x + 32$ is located at the point:

a) $(-\frac{5}{4}, 32)$

b) $(\frac{5}{4}, 7)$

c) $(-\frac{5}{4}, 25)$

d) $(-\frac{5}{4}, 7)$

e) $\left(\frac{5}{4}, -25\right)$

34. The set of all solutions of the equation $x^4 = 4x^2$ is given by:

a) $\{2, -2\}$

b) $\{2,0\}$

c) $\{-2,2,0\}$

d) $\{\ \}$

e) $(-\infty, \infty)$

35. Evaluate: $64 - 8 \cdot 6 \div 12 \cdot 14 - 3^2$

a) 383

b) -1

c) $\frac{16}{159}$

d) 0

e) 50

36. The distance between the points $P(-4,7)$ and $Q(8,2)$ is given by:

a) $\sqrt{41}$

b) 12

c) 15

d) 13

e) $\sqrt{119}$

37. For which value of t will the line through the points $(3,-1)$ and $(t,5)$ be perpendicular to the line $3y+5=-4$

a) 5

b) -1

c) 3

d) 0

e) ∞

38. Solve for x: $\frac{1}{x-1}=\frac{1}{x}$

a) No solution

b) $x=1$

c) $x=0$

d) $x=0$ *or* 1

e) $x=\frac{1+\sqrt{5}}{2}$

39. Bill needs to make a large number of photocopies. Copier 1 alone can make the copies in 4 hours while copier 2 alone can complete the job in 3 hours. If Bill runs the two photocopiers at once, how long will it take to complete the photocopying job?

a) 5 hours

b) $\frac{7}{2}$ hours

c) $\frac{12}{7}$ hours

d) 7 hours

e) None of the above

40. A lab worker needs 5 litres of 20% alcohol solution. A 10% solution is mixed with a 60% solution. How many litres of the 60% solution will be required?

a) 1 litre

b) 2 litres

c) 3 litres

d) $\frac{6}{5}$ litres

e) 4 litres

41. Simplify: $\frac{1}{x^2-1} \div \frac{1}{x^2-2x+1}$

a) $\frac{1}{(x^2-1)(x^2-2x+1)}$

b) $\frac{x-1}{x+1}$

c) $\frac{x^2-2x+1}{x^2-1}$

d) $(x^2-1)(x^2-2x+1)$

e) $\frac{x+1}{(x-1)^2}$

42. Simplify: $(27x^3y^6)^{\frac{2}{3}}$

a) $9xy^2$

b) $27x^2y^4$

c) $3xy^2$

d) $9x^2y^4$

e) $\frac{9}{x^2y^4}$

43. Write the expression $|1-\pi|$ without absolute values:

a) $\pi + 1$

b) $1 - \frac{1}{\pi}$

c) $\pi - 1$

d) $1 - \pi$

e) None of the above

44. The equation $|x| = x$ has exactly:

a) No solutions

b) One solution

c) Two solutions

d) Undefined solution

e) An infinite number of solutions

45. Given the equations

A) $y = x^2 + 3$ B) $x^2 + y^2 = 25$ C) $y = 2x$

D) $x = y^2$ E) $2x - 3y = 6$

Which statement is true?

a) In C and E only, y is a function of x

b) In A, C, and E only, y is a function of x

c) In C and D only, y is a function of x

d) y is a function of x in all the given equations

e) y is not a function of x in any of the given equations

46. If $f(x) = \frac{x}{x+2}$, then $f(0)$ equals:

a) Undefined

b) $\emptyset$

c) 0

d) $\frac{1}{2}$

e) 1

47. If the three points (2,5), (5,11) and (13,k) all lie along the same line, then k equals:

a) 17

b) 22

c) 27

d) 30

e) 33

48. When $x^4 - 2x^2 + 3x + 5$ is divided by $x + 2$ the remainder will equal:

a) 5

b) $\frac{22}{7}$

c) 0

d) 7

e) -3

49. The largest subset of $\left\{-3, -2.5, 0, 1, \sqrt{2}, 1.\overline{3}, \frac{37}{7}\right\}$ consisting of rational numbers is:

a) $\left\{-3, -2.5, 0, 1, \sqrt{2}, 1.\overline{3}, \frac{37}{7}\right\}$

b) $\left\{-3, -2.5, 0, 1, 1.\overline{3}, \frac{37}{7}\right\}$

c) $\left\{-3, -2.5, 0, 1, \frac{37}{7}\right\}$

d) $\{-3, -2.5, 0, 1\}$

e) $\left\{-3, -2.5, 0, 1, \sqrt{2}, \frac{37}{7}\right\}$

50. A rectangular photograph is twice as tall as it is wide. When a 4 cm wide frame is placed around the photo, the area of the frame and photo equals three times that of the photo alone. The original width of the photograph alone is:

a) 4 cm

b) 6 cm

c) 8 cm

d) 10 cm

e) 12 cm

ANSWERS TO PRACTISE TEST:

1	d	11	d	21	c	31	d	41	b
2	b	12	e	22	b	32	d	42	d
3	c	13	b	23	d	33	d	43	c
4	b	14	c	24	c	34	c	44	e
5	e	15	a	25	d	35	b	45	b
6	e	16	c	26	b	36	d	46	c
7	b	17	b	27	a	37	c	47	c
8	c	18	c	28	b	38	a	48	d
9	e	19	b	29	b	39	c	49	b
10	c	20	c	30	e	40	a	50	c