Final examinations
from previous terms

CEGEP
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INTRODUCTION TO ALGEBRA

(MATHEMATICS 201-007/∞)

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PART A

Answer all questions to 4 decimal places (except where this is obviously an insane request).

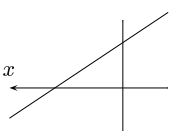
1. Find the value of the expression: $\dfrac{6-(2+1)}{3(8-6)}$.
2. Find the value of: $(3-4\times 5+3)^0$.
3. Do $x=2$ and $y=-3$ satisfy $4x-y=11$? Why? (Show your work.)
4. What is the slope of the line $2x+y=5$?
5. What is the slope of the line $x=3$?
6. What is the equation of the line that passes through the point $(2,-1)$ and $(-1,-1)$?
7. Solve for B: $h=\dfrac{2A}{B+b}$.
8. Solve by factoring: $3x^2+5x=2$.
9. Rationalize the denominator:
   (a) $\dfrac{3}{\sqrt{2}}$ (b) $\dfrac{2}{2-\sqrt{5}}$
10. Find the values of x for which the rational expression is undefined: $\dfrac{2x-3}{x^2+x-6}$.
11. Combine and simplify.
    (a) $\dfrac{12x^3}{3x^2}$ (b) $(5x-3)-(x^2-2x)$
    (c) $2x^2\cdot 5x^3\cdot x$ (d) $\left(2x^{-1}\right)^{-2}$ (e) $(x+7)(x-2)$
    (f) $\sqrt{6x}\cdot\sqrt{2x^3}\cdot\sqrt{3x^4}$ (g) $\sqrt{28}-\sqrt{63}$
    (h) $\dfrac{12x^4-9x}{3x}$ (i) $(5x^2)(3x^4-7x^2)$
    (j) $\sqrt{7}\,(\sqrt{7}+3)$ (k) $(\sqrt{3}-2)(\sqrt{3}+2)$
12. Factor completely:
    (a) $x^2-11xy+30y^2$ (b) $4x^5-12x^4-40x^3$
    (c) $x^2-2x+5x-10$
13. Solve for x: $3(3x-5)=4(3x-1)-17$.

PART B

14. Divide and write in the answer in the form $Q(x)+\dfrac{R(x)}{d(x)}$.
    (a) $\dfrac{x^4+2x^3+2x^2-x-1}{x^2+1}$ (b) $\dfrac{4x^3-10x^2+5x-2}{x-2}$
15. Simplify by factoring and cancelling common factors:
$$\frac{2x^2-5x-12}{x^2+x-20}\div\frac{4x^2-9}{x^2+4x-5}$$
16. Subtract and write the answer in lowest terms:
$$\frac{1}{x^2-1}-\frac{1}{x^2+3x+2}$$
17. Solve the equation and check your answer:
$$\frac{6}{5x+10}-\frac{1}{x-5}=\frac{2}{x^2-3x-10}$$
18. Graph $2x-3y=6$, and state the x-intercept, the y-intercept and the slope.
19. Find the equation of a line that passes through $(2,-3)$ and is perpendicular to $x+2y=7$.
20. Solve for x using the quadratic formula, $x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$:
$$2x^2-x=1$$
21. Solve for x: $(x-2)^2=4$.
22. Solve the system of equations algebraically:
$$\begin{array}{rcrcl} 2x & + & 3y & = & -6 \\ 3x & - & y & = & 12 \end{array}$$
23. An aeroplane is flying at an altitude of 8,000 feet, It then descends 3,000 feet and a half hour later descends another 1,500 feet. What is the new altitude?
24. A ladder is 18 feet long. It reaches 15 feet up on a wall. How far is the base of the ladder from the wall?

ANSWERS

1. $\frac{1}{2}$
2. 1
3. Yes.
4. The slope of the line is -2
5. The line has no slope.
6. The equation of the line is $y=-1$
7. $B=\dfrac{2A-hb}{h}$
8. $x=\frac{1}{3}$ or -2
9. (a) $\dfrac{3\sqrt{2}}{2}$ (b) $-2(2+\sqrt{5})$
10. $x=-3$ or 2
11. (a) $4x$ (b) $-x^2+7x-3$ (c) $10x^6$
    (d) $\dfrac{x^2}{4}$ (e) $x^2+5x-14$ (f) $6x^4$
12. (a) $(x-5y)(x-6y)$ (b) $4x^3(x-5)(x+2)$
    (c) $(x-2)(x+5)$
    (g) $-\sqrt{7}$ (h) $4x^3-3$ (i) $15x^6-35x^4$
    (j) $7+3\sqrt{7}$ (k) -1
13. $x=2$
14. (a) $x^2+2x+1+\dfrac{-3x-2}{x^2+1}$
    (b) $4x^2-2x+1+\dfrac{0}{x-2}$
15. $\dfrac{x-1}{2x-3}$
16. $\dfrac{2(2x-3)}{(x-2)(x+2)(x-1)}$
17. $\dfrac{(x-1)(x+1)(x+2)}{3}$
18. $x=50$
19. $2x-3y=6$



Slope: $\frac{2}{3}$
y-intercept: $(0,-2)$
x-intercept: $(3,0)$

20. $y=2x-7$
21. $x=1$ or $-\dfrac{1}{2}$
22. $x=0$ or 4
23. $x=3,\ y=-3$.
24. The new altitude is 3,500 feet.
25. The base of the ladder is $3\sqrt{11}\approx 9.9499$ feet from the wall.