DAWSON COLLEGE
Mathematics Department

FINAL EXAMINATION

Remedial Activities of Sec IV Mathematics - (201-016-50)

Fall, 2014
Instructors : O.Diaconescu, N. Sabetghadam

1. [5 marks] Multiply and simplify.

   $(2x - 3)(x^2 + 5) - x(x - 3)(x + 3)$

2. [5 marks] Factor completely.

   $12x^5 + 12x^3 - 4x^4 - 4x^2$

3. [6 marks] Divide and simplify.

   $\dfrac{x^2 + 8x + 16}{x^2 - 16} \div \dfrac{5x - x^2}{x^2 - 9x + 20}$

4. [5 marks] Rationalize the denominator and simplify.

   $\dfrac{\sqrt{6} - \sqrt{3}}{\sqrt{6} + \sqrt{3}}$

5. [4 marks] Solve the formula for k.

   $E = 2A + P(k - 1)$

6. [20 marks] Solve the following equations for x.

   (a) $3(2x - 4) - (x - 5) = 2(2x - 1) - 1$
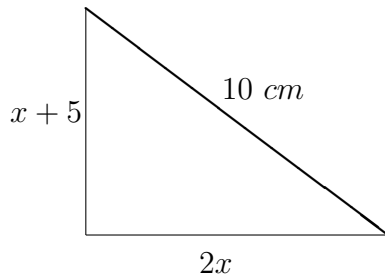
   (b) $x^2 - 4x = 1$

   (c) $2(x - 1)^2 = x(x - 1)$

   (d) $\sqrt{2x + 10} - x = 1$

(e) $4^{(2x-3)} = \sqrt{2}$

7. [5 marks] If a man has \$330 in five and ten dollar bills, then how many of each does he have if he has 41 bills in total?

8. [5 marks] Find x in the right-angled triangle below.

9. [5 marks] Solve the inequality and give the final answer using intervals and on the real line.

$$-2 < 3 - 2x \leq 7$$

10. [8 marks] Given the functions $f(x) = \sqrt{1 - 2x}$ and $g(x) = 2x^2 + 3$; Then

(a) evaluate $f(-4)$;

(b) find $g(h + 1)$ and simplify;

(c) find x's such that $g(x) = 5$;

(d) find the domain of f.

11. [6 marks] Having the points $A(-2, 6)$ and $B(1, 0)$, answer the following questions:

(a) find the distance between A and B;

(b) find the equation of the line passing through A and B;

(c) find the line passing through the point B and perpendicular to the line $2x - y = 3$.

12. [6 marks] The population, y of a small city has been growing linearly since 1995 as $y = 2050x + 11200$, where x is the number of years since 1995.

(a) What was the population of the city in 1995?

(b) What was the population in 2010?

(c) In which year did the population reach 35800?

13. [6 marks] The height h in meter of a ball in a soccer game, t seconds after it is kicked is given by $h(t) = -3.5t^2 + 17.5t$.
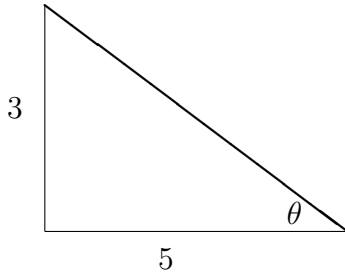
(a) When does the ball reach its maximum height?

(b) What is the maximum height?
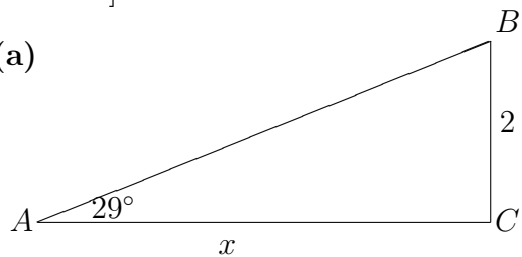
(c) After how many seconds the ball hits the ground?

14. [5 marks] Find the $y-$intercept, $x-$interceps and the vertex, and sketch the graph of the parabola given by: $\quad y = x^2 + 4x + 3$

15. [5 marks] Find the six trigonometric functions of θ in the following right-angled triangle.
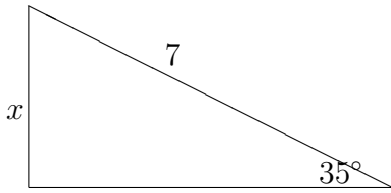

16. [4 marks] Find x.

(a)

(b)

Final Answers

1. $x^3 - 3x^2 + 19x - 15$

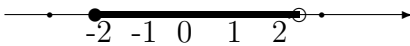2. $4x^2(3x - 1)(x^2 + 1)$

3. $\frac{-(x+4)}{x}$

4. $3 - 2\sqrt{2}$

5. $k = 1 + \frac{E - 2A}{P}$

6. (a) $x = 4$, (b) $x = 2 \pm \sqrt{5}$, (c) $x = 2$, $x = 1$, (d) $x = 3$, (e) $x = \frac{13}{8}$.

7. 25 (\$10 bills), and 16 (\$5 bills).

8. $x = 3$

9. $-2 \leq x < \frac{5}{2}$, $[-2, 2.5)$

10. (a) $f(-4) = 3$, (b) $g(h + 1) = 2h^2 + 4h + 5$ (c) $x = 1$, $x = -1$, (d) Domain$(f) = (-\infty, \frac{1}{2}]$

11. (a) $d = \sqrt{45} = 3\sqrt{5}$, (b) $y = -2x + 2$, (c) $y = \frac{-1}{2}x + \frac{1}{2}$

12. (a) $y(0) = 11200$, (b) $y(15) = 41950$, (c) in 2007

13. (a) $t = 2.5$, (b) $h(2.5) = 21.88$, (c) $t = 5$ seconds.

14. The vertex $(-2, -1)$, The y-intercept $(0, 3)$, The x-intercepts $(-1, 0)$, $(-3, 0)$

15. $\sin\theta = \frac{3}{\sqrt{34}}$, $\cos\theta = \frac{5}{\sqrt{34}}$, $\tan\theta = \frac{3}{5}$, $\csc\theta = \frac{\sqrt{34}}{3}$, $\sec\theta = \frac{\sqrt{34}}{5}$, $\cot\theta = \frac{5}{3}$

16. (a) $x = 3.608$, (b) $x = 4.015$