

Math 230 Test 3 Review

Solve.

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|-----------------------------|--|-----------------------------------|
| 1) $x^2 - 3x - 10 = 0$ | $\{-2, 5\}$ | (Factoring) |
| 2) $x^2 + 9x + 14 = 0$ | $\{-7, -2\}$ | (Factoring) |
| 3) $(x - 5)^2 = 36$ | $\{-1, 11\}$ | (Extracting Square Roots) |
| 4) $(x + 3)^2 + 13 = -11$ | $\{-3 \pm 2i\sqrt{6}\}$ | (Extracting Square Roots) |
| 5) $x^2 + x + 7 = 0$ | $\left\{\frac{-1 \pm 3i\sqrt{3}}{2}\right\}$ | (Quadratic Formula) |
| 6) $x^2 + 8x = 12$ | $\{-4 \pm 2\sqrt{7}\}$ | (Quad Formula or Complete Square) |
| 7) $x^4 + 5x^2 - 36 = 0$ | $\{-3i, 3i, -2, 2\}$ | U-substitution $u = x^2$ |
| 8) $x - 3\sqrt{x} - 18 = 0$ | $\{36\}$ | U-substitution $u = \sqrt{x}$ |
| 9) $x + 13 = \frac{30}{x}$ | $\{-15, 2\}$ | Multiply all terms by x . |

10) Solve by **completing the square**.

$$x^2 - 8x - 33 = 0$$

$$x^2 - 8x = 33$$

$$x^2 - 8x + 16 = 33 + 16$$

$$(x - 4)^2 = 49$$

$$\sqrt{(x - 4)^2} = \pm\sqrt{49}$$

$$x - 4 = \pm 7$$

$$x = 4 \pm 7$$

$$\{-3, 11\}$$

Find a quadratic equation with integer coefficients that has the given solution set.

11) $\left\{-2, \frac{3}{4}\right\}$	$4x^2 + 5x - 6 = 0$
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12) $\left\{\frac{3}{8}, -\frac{1}{7}\right\}$	$56x^2 - 13x - 3 = 0$
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13) $\{9\}$	$x^2 - 18x + 81 = 0$
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14) $\{5i, -5i\}$

$$x^2 + 25 = 0$$

15) The length of a rectangle is 10 inches less than its width. If the area of the rectangle is 100 square inches, find the length and width of the rectangle. (Round your answer to the nearest tenth of an inch.)

Equation: $x(x - 10) = 100$

Solution: $x = 5 + 5\sqrt{5} \approx 16.2$

Length: 6.2 inches, Width 16.2 inches

16) If Joe lives 12 miles north and 17 miles east of COS, how far from COS does he live?

$$12^2 + 17^2 = c^2$$

$$c = \sqrt{433} \approx 20.8 \text{ miles}$$

17) An object is launched at a speed of 64 feet per second from a platform that is 192 feet high. (Use the function $h(t) = -16t^2 + vt + s$, where v represents the initial velocity and h represents the initial height.)

a) When will the object land on the ground?

$$-16t^2 + 64t + 192 = 0$$

$$-16(t^2 - 4t - 12) = 0$$

$$-16(t - 6)(t + 2) = 0$$

$$t = 6 \text{ seconds} \text{ (Omit negative solution.)}$$

b) When will the object be 112 feet above the ground?

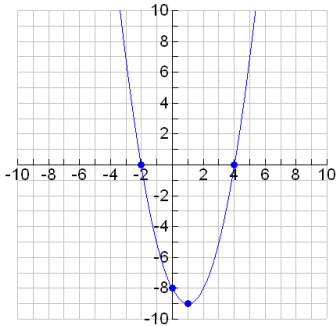
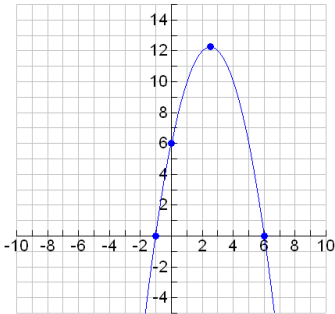
$$-16t^2 + 64t + 192 = 112$$

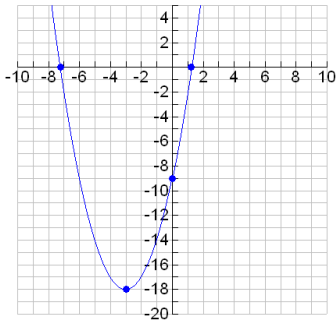
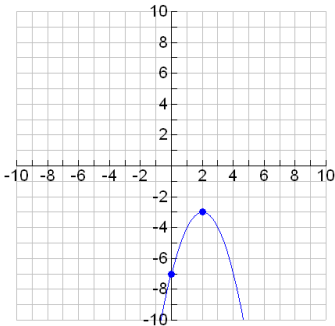
$$0 = 16t^2 - 64t - 80$$

$$0 = 16(t^2 - 4t - 5)$$

$$0 = 16(t - 5)(t + 1)$$

$$t = 5 \text{ seconds} \text{ (Omit negative solution.)}$$

	18) Graph $y = x^2 - 2x - 8$.	19) Graph $y = -x^2 + 5x + 6$.
Vertex	$(1, -9)$	$\left(\frac{5}{2}, \frac{49}{4}\right)$
y-int	$(0, -8)$	$(0, 6)$
x-int	$(-2, 0), (4, 0)$	$(-1, 0), (6, 0)$
Graph		

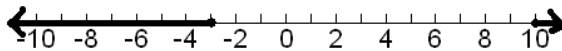
	20) Graph $y = x^2 + 6x - 9$.	21) Graph $y = -x^2 + 4x - 7$.
Vertex	$(-3, -18)$	$(2, -3)$
y-int	$(0, -9)$	$(0, -7)$
x-int	$(-7.2, 0), (1.2, 0)$	None
Graph		

Solve. Your solution must include a number line and interval notation. You must list your test points.

22) $x^2 - 7x - 30 \geq 0$

Critical Values: -3, 10

Test Points: -4, 0, 11

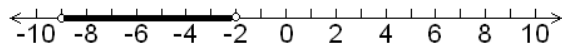


$(-\infty, -3] \cup [10, \infty)$

23) $x^2 + 11x + 18 < 0$

Critical Values: -9, -2

Test Points: -10, -3, 0

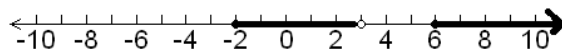


$(-9, -2)$

24) $\frac{x^2 - 4x - 12}{x - 3} \geq 0$

Critical Values: -2, 3*, 6

Test Points: -4, 0, 4, 7



$[-2, 3) \cup [6, \infty)$