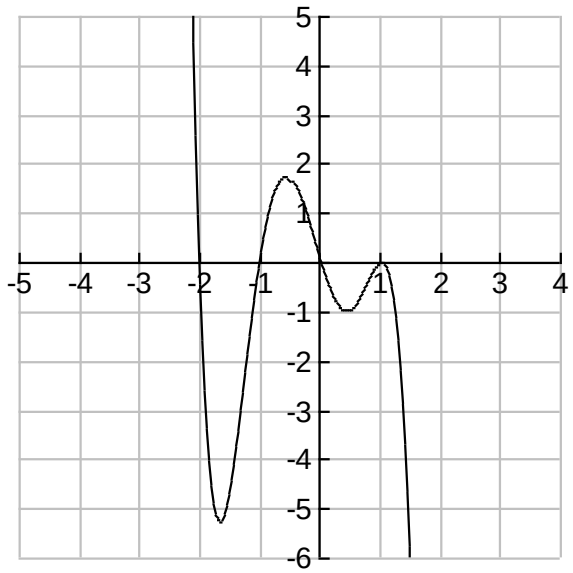
Review Sec. 2.2-2.3
WORKSHEET #3

Graph. State the *x* and *y* intercepts. Label scale on the *x* and *y* axis.

1. $f(x) = -2x(x+1)(x+2)(x-1)^2$

x-intercept(s) 0, –1, –2, 1

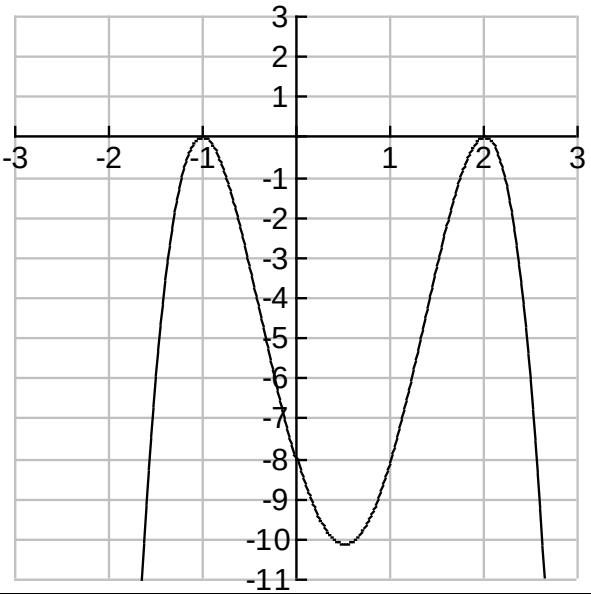
y-intercept 0



2. $f(x) = -2(x-2)^2(x+1)^2$

x-intercept(s) 2, –1

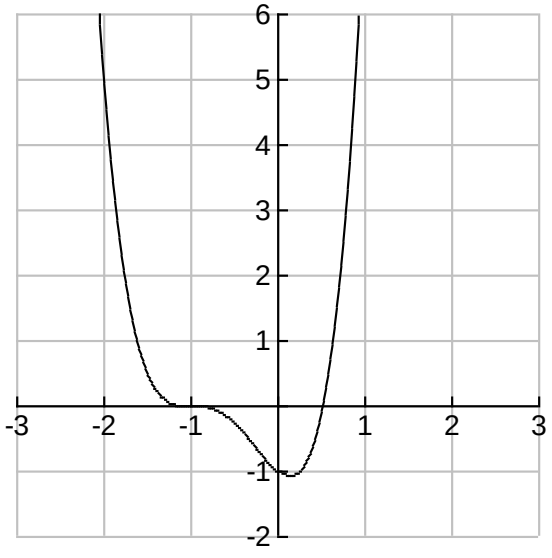
y-intercept –8



3. $f(x) = (2x-1)(x+1)^3$

x-intercept(s) $\frac{1}{2}, -1$

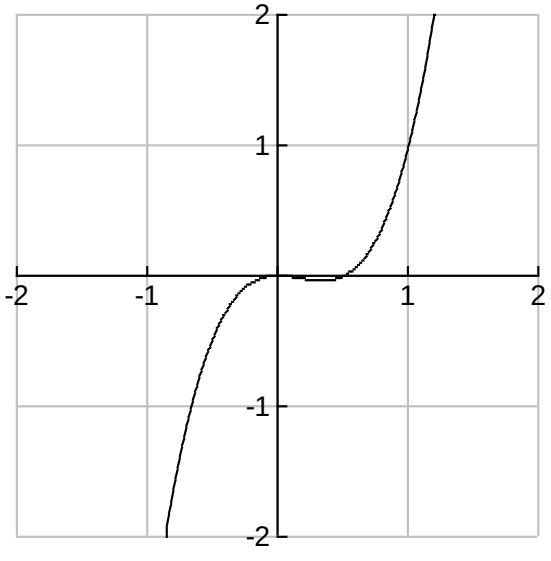
y-intercept –1



4. $f(x) = 2x^3 - x^2$ Hint: factor

x-intercept(s) $0, \frac{1}{2}$

y-intercept 0



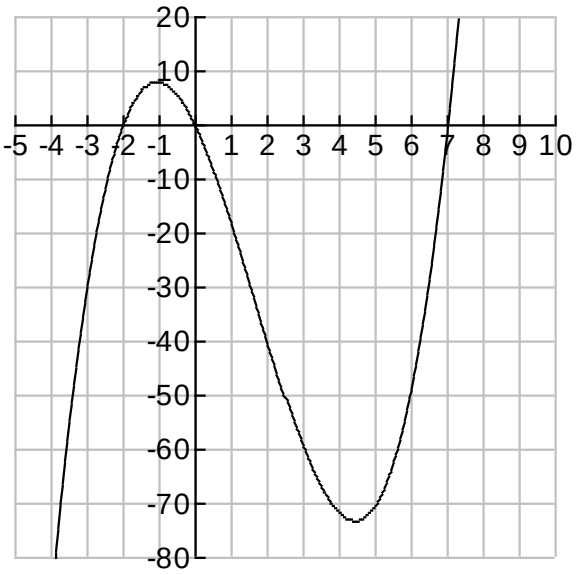
Find the solution when $f(x)=0$ and graph.

5. $f(x)=x^3-5x^2-14x$ factor

$0=x\left(x^2-5x-14\right)$

$0=x(x-7)(x+2)$

$x_1=$ 0 $x_2=$ 7 $x_3=$ –2

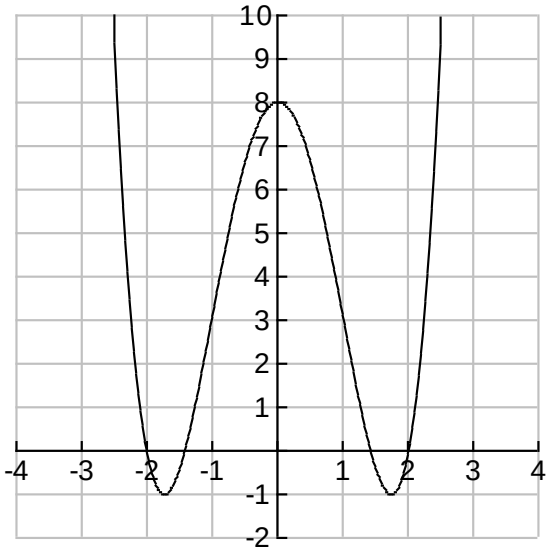


6. $f(x)=x^4-6x^2+8$

$0=\left(x^2-4\right)\left(x^2-2\right)$

$0=(x+2)(x-2)\left(x^2-2\right)$

$x_1=$ 2 $x_2=$ –2 $x_3=\sqrt{2}$ $x_4=-\sqrt{2}$

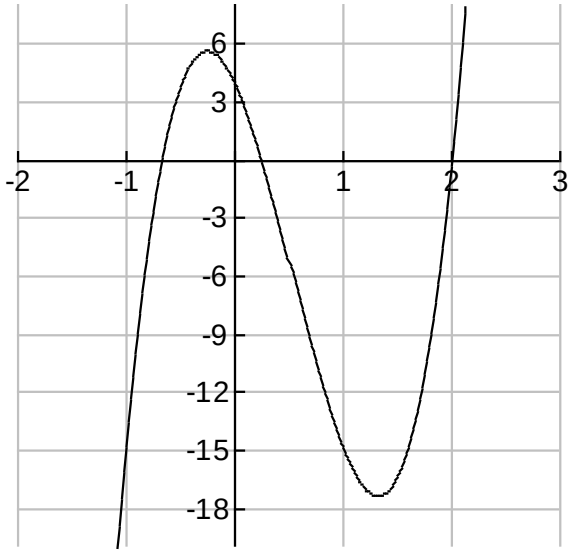


7. Using the graph of: $f(x)=12x^3-19x^2-12x+4$ Find all the roots Explain by showing work.

$x_1=$ 2 $x_2=-\frac{2}{3}$ $x_3=\frac{1}{4}$

2	12	–19	–12	4
		24	10	–4
	12	5	–2	0

Use factoring or quadratic formula on $12x^2+5x-2$ to get $x=-\frac{2}{3}$ or $x=\frac{1}{4}$



8. Divide: $2x+3\overline{)6x^3+x^2-2x+17}$

$$
\begin{array}{r}
3x^2-4x+5 \\
2x+3\overline{)6x^3+x^2-2x+17} \\
\underline{-\left(6x^3+9x^2\right)} \\
-8x^2-2x \\
\underline{-\left(-8x^2-12x\right)} \\
10x+17 \\
\underline{-\left(10x+15\right)} \\
2
\end{array}
$$

ANSWER:

$$3x^2-4x+5+\frac{2}{2x+3}$$

9. Is $x=\frac{3}{4}$ a root of: $4x^3+x^2+9x-9$? **Show work and explain.**

$\frac{3}{4}$	4	1	9	–9
		3	3	9
	4	4	12	0

Yes, remainder = 0
Therefore, $\frac{3}{4}$ is a root.

10. $f(x)=3x^3+5x^2-27x-45$

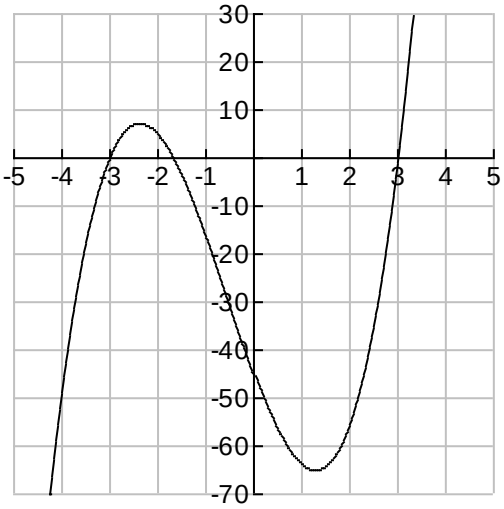
Find all *x*-intercepts if $x_1=3$. Show work.

3	3	5	–27	45
		9	42	45
	3	14	15	0

$(x-3)(3x^2+14x+15)=f(x)$

$(x-3)(3x+5)(x+3)=f(x)$

Graph, show scale on *x* and *y* axis



x-intercept(s) 3, –3, $-\frac{5}{3}$ *y*-intercept –45

11. Given: $f(x) = 3x^3 + 8x^2 + 7x + 2$

a) Use rational root theorem $\pm 1, \pm 2, \pm \frac{2}{3}$

b) Find all of the *x*-intercepts $x_1 = \underline{-1}$ $x_2 = \underline{-1}$ $x_3 = \underline{-\frac{2}{3}}$

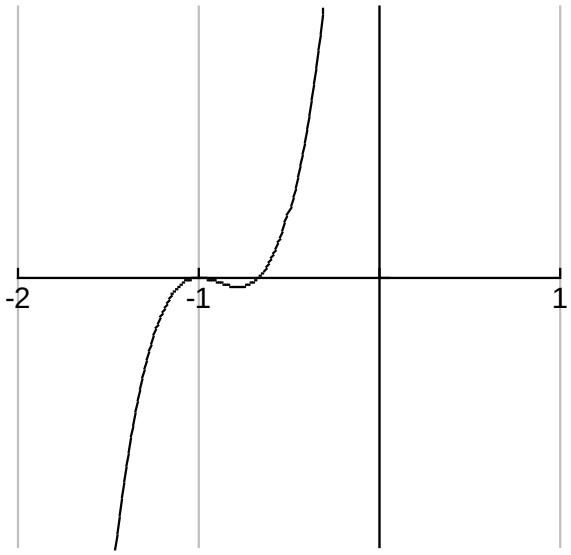
c) Find the *y*-intercept $\underline{2}$

d) Graph

3	3	8	7	2
		–3	–5	–2
	3	5	2	2

$(x+1)(3x^2+5x+2) = f(x)$

$(x+1)(3x+2)(x+1) = f(x)$



12. Find the root between 0 and 1 in:
$0 = 8x^3 + 9x^2 + 9x + 1$

Possible rational roots: $\pm 1, \pm\frac{1}{2}, \pm\frac{1}{4}, \pm\frac{1}{8}$

All the possible roots between 0 and 1 are: $-\frac{1}{2}, -\frac{1}{4}, -\frac{1}{8}$

Verify:

$-\frac{1}{2}$				
	8	9	9	1
		–4	$-\frac{5}{2}$	$-\frac{13}{4}$
	8	5	$\frac{13}{2}$	$-\frac{9}{4}$

NO

$-\frac{1}{4}$				
	8	9	9	1
		–2	$-\frac{7}{4}$	$-\frac{29}{16}$
	8	7	$\frac{29}{4}$	$-\frac{13}{16}$

NO

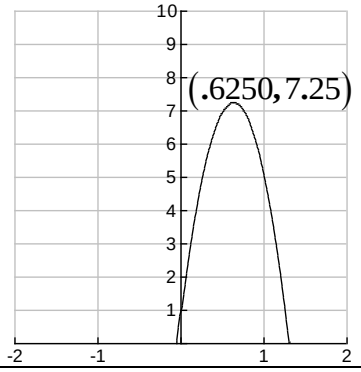
$-\frac{1}{8}$				
	8	9	9	1
		– 1	– 1	– 1
	8	8	8	0

YES

13. A tennis player hits a ball 1 meter above the ground with a velocity of 20 m/sec. What is the maximum height the ball will reach?

$h(t) = -16t^2 + v_o t + h_o$ $\qquad$ $h(t) = -16t^2 + 20 + 1$

$h_o = 1,\ v_o = 20$ $\qquad$ Find max.

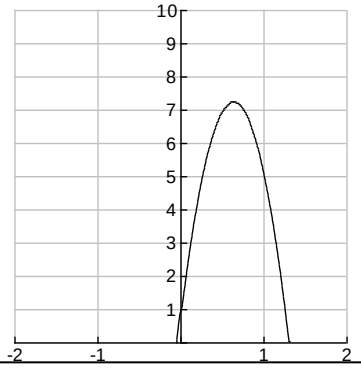


Max ht. = 7.25 ft

14. A tennis player hits a ball 1 meter above the ground with a velocity of 20 m/sec. How long will it take the ball to reach the ground?

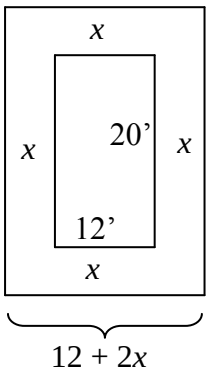
$h(t) = -16t^2 + 20 + 1$

Same graph, same equation as #13, just Need to find the zero.



1.298 seconds

15. The Smith's have decided to put a paved walkway of uniform width around their swimming pool. The pool is rectangular and measures 12 feet by 20 feet. The area of the walkway will be 68 square feet. Find the width of the walkway.



Area of pool
$12 \times 20 = 240\,\text{ft}^2$

Area of walkway
$68\,\text{ft}^2$

Area of big ▭ = area pool + area of walkway

$(12 + 2x)(20 + 2x) = 240 + 68$

$4x^2 + 64x + 240 = 308$

$4x^2 + 64x - 68 = 0$

$x^2 + 16x - 17 = 0$

$((x + 17)(x - 1) = 0$

$x = -17$ or $x = 1$

Width of walkway = 1 ft

16. A rectangular flower garden is surrounded by a walkway 4 meters wide. The flower garden is 6 Meters longer than it is wide. If the total area is 576 square meters more than the area of the flower garden, find the dimensions of the flower garden.

Total area = 576 + area of garden

$(w + 8)(w + 14) = 576 + w(w + 6)$

$w^2 + 22w = 112 = 576 + w^2 + 6w$

$16w = 464$

$w = 29$

Garden
$29\,\text{m} \times 35\,\text{m}$